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# ACCESS TO SAFE WATER

## FOR THE BASE OF THE PYRAMID

SEPTEMBER 2011 LESSONS LEARNED FROM 15 CASE STUDIES

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“...IF WE STOP THINKING OF THE POOR AS VICTIMS OR AS A BURDEN AND START RECOGNIZING THEM AS RESILIENT AND CREATIVE ENTREPRENEURS AND VALUE-CONSCIOUS CONSUMERS, A WHOLE NEW WORLD OF OPPORTUNITY WILL OPEN UP.”

C.K. Prahalad

Professor and author of the concept of the Bottom of the Pyramid

“THE PEOPLE’S MOTIVATION AND THEIR ENTHUSIASM AT THE SIGHT OF WATER RISING FROM THE EARTH IS AN EXPERIENCE IMPOSSIBLE TO DESCRIBE.”

Boubacar Macina

Co-founder and Manager of 2AEP

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## CASE STUDIES

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# A FEW PRELIMINARY CONSIDERATIONS FOR THE READER

*The authors of this report refer to the concept of Base of the Pyramid (BoP) as defined in the seminal work of C.K. Prahalad in 'The Fortune at the Bottom of the Pyramid', which refers to the four billion poor who live on less than US$2 a day. However, poverty – and lack of access to safe water - is determined by many other factors other than income, such as access to and type of housing, legal status (or the lack thereof), and other region-specific.*

*To assess the potential and scope of each solution reviewed in this report, the authors chose to categorize them along two dimensions: quality of raw water and density of population. There exists, clearly, other important factors to consider when assessing the local applicability of a solution, such as the availability of raw water. These other factors are described in the chapters that discuss the prerequisites to implementing each type of solution.*

*The latest UNICEF and WHO research on access to water shows encouragingly that for about 90% of the 1.7 billion people living in developing countries who have access to piped water, water is safe. Today, utility operators – public or private – have proven it is possible to provide quality services in an affordable and sustainable manner in urban areas. Hence, this report does not specifically look at the innovations many of these operators are promoting, so that the remaining 10% without access to safe water can equally benefit.*

*For the other 300 million urban dwellers who do not have access to pipes, or protected sources (that deliver safe water), it appears that a key factor to drive network expansion is government support and will. When such support is present, both public and private utilities can expand water services significantly, including to the poor. Yet such examples take time to spread, especially in light of the urban migration challenges that will face the cities of Africa and Asia in the coming decades. Hence, the need to look at (sometimes temporary) alternatives that can alleviate the burden on these populations in the short-term.*

*As for rural areas, existing solutions have proven it is possible to develop adapted, sustainable solutions for low-density, remote areas – including in areas experiencing heavy water pollution. However, the scaling-up of these initiatives requires more philanthropic support, as well as significant marketing innovation to boost penetration levels.*

*Finally, the focus of this study is on safe water solutions only. However, we understand that similar solutions need to be explored in the field of sanitation. This is particularly true for cases where safe water access translates into bringing large quantities of water into homes, which need to be evacuated and treated. This aspect is essential in terms of health and hygiene outcomes.*

# INTRODUCTION

Over the past five years, dozens of innovative, safe water solutions have gained increasing ground across the world: NGOs are setting-up enterprises manufacturing and offering low-cost, effective water filters; social entrepreneurs are managing networks of hundreds of mini-treatment plants in villages experiencing heavy water pollution; local entrepreneurs are building networks of low-cost, stand-alone pipe networks in poor suburbs and towns; and both public and private utilities have proven it is possible to expand public water services to the poor peripheries of large cities. While some innovations were developed in collaboration with individual country authorities, many developed in areas not yet reached by public services.

What makes these projects distinctive is that they try to serve the Base of the Pyramid in a sustainable manner, by offering quality services at a price that the poor are willing and able to pay.

This Report is first meant as a testimony of the work of these innovators and entrepreneurs – their creativity, vision and energy. But it also analyses what works best, and where: it categorizes the most exciting solutions (e.g., water filters, treatment units, or small decentralized piped networks), and identifies which environments would be more appropriate to scale them up.

Yet, while these innovations have already provided millions of poor people with access to safe water, they struggle to scale-up and reach the estimated two billion people who still do not have access to safe water today.

The Report aims to understand why, by analyzing the obstacles these projects face, suggesting strategies to help overcome them, and bring innovations to scale.

A major finding was that all the proposed strategies would require the creation of entire new industries, rather than the growth of a few organizations. Unprecedented collaboration is needed to make this happen: public authorities have to craft and implement effective water regulation, local entrepreneurs have to invest their time and energy into innovative products and services, philanthropists need to fund sector-wide initiatives, and large corporations must evolve new business models. None of them can succeed on their own.

We hope this Report will contribute to making this vision a reality.

We also want to thank the Consortium of public, philanthropic and private sponsors that made this work possible. Integrating their different perspectives has been critical in shaping recommendations that go beyond their playing field and to find solutions for the sector as a whole.

*Olivier Kayser*
*Hystra*

# ABSTRACT

More than 2 billion poor people lack access to safe water with devastating health consequences, causing almost 2.5 million deaths per year.

Over the past five years, innovative approaches led by social entrepreneurs, NGOs, and corporations have proven that sustainable solutions could provide safe water at the Base of the Pyramid. According to the Hystra Project Team, these solutions could reach approximately one billion poor people in need of safe water, should they be scaled-up to their full potential. These solutions accelerate and support the efforts of public authorities and operators in ensuring that access to safe water is guaranteed for all.

While these diverse solutions (e.g., mini-treatment plants, filters, decentralized piped networks) do address the full spectrum of situations facing the poor, they still remain at a small scale.

To accelerate the development of this new industry, a hybrid approach is needed that combines the energy of local entrepreneurs, effective government regulations, catalytic philanthropic interventions, and bold initiatives of water utility operators. Proposed strategies include:

- Helping the creation of local industries of water filters and chlorine-based products by funding nationwide education campaigns and supporting local small entrepreneurs.
- Supporting the emergence of local pump maintenance providers, along with setting up financial vehicles to replace pump parks in a phased manner.
- Creating a new type of platforms to support the development of small, local water Kiosk operators, would provide funding, training and maintenance services, combined with control of water quality delegated by public authorities.
- Creating a new type of water utility focused on accelerating access to home or stand post connections for poor populations living in slums and small towns where the mainstream utilities will not manage to expand service in the mid-term. This water utility will have a dedicated approach, hybrid governance and financing.

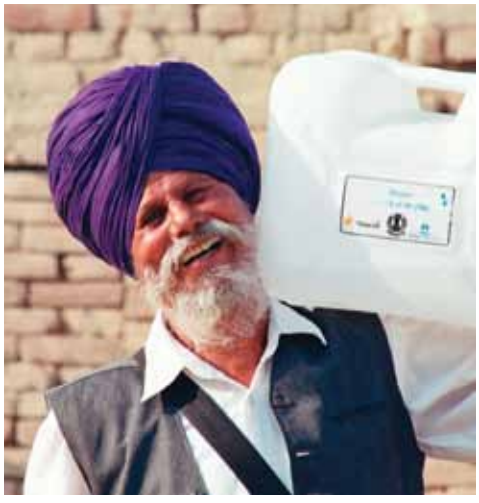
More than US$15 billion needs to be made available, combining grants, loans and equity, to accelerate the worldwide emergence of all the types of BoP-centered safe water industries discussed in this report.

In addition, to serve the millions of people that existing solutions cannot reach, further innovations need to be stimulated, mainly in the areas of:

- Social marketing: to increase penetration of proposed solutions and trigger lasting behavior change in safe water use, hygiene and sanitation.
- Low-cost water treatment and wastewater technology: to deliver piped water at a sufficiently low price in small towns and larger villages where water is brackish and/ or heavily polluted, in combination with sewage water solutions for small, independent piped-water networks.

# TABLE OF CONTENTS

# EXECUTIVE SUMMARY



# EXECUTIVE SUMMARY

## The Access to Safe Water Challenge

Today, the world is on track to meet the Millennium Development Goal of halving the number of people without reasonable access to an improved water source[1] by 2015.

However an improved water source does not necessarily guarantee affordable access to safe water for the poor. Based on recent data from WHO and UNICEF, an estimated 2.1 billion poor people still lack access to safe water, including 900 million *who do not have access to an improved water source,* and 1.2 billion who do have access to an improved water source, but where the *water is not safe.*[2]

As a result, diarrhea remains widespread, causing around 2.4 million deaths every year, of which the majority are among children less than five years of age. Women are also particularly affected as they are typically the ones in charge of fetching and carrying water.

Despite being under-serviced, the people at the Base of the Pyramid (BoP) generally pay more than those living at the top of the pyramid.[3] For instance, in the slums of Jakarta people spend up to US$7.5/m$^3$ for water sold by the local water vendors that serve their neighborhoods, while the official utility tariff is US$0.12/m$^3$.[4] In rural Cambodia, poor households spend up to US$180 a year on fuel to boil water, while an upscale, quality-certified filter just as effective as boiling water - costs around US$40 to own on a annual basis.

Mainstream utility operators (publicly-managed entities or private companies contracted by the public sector) already deliver piped water to 1.7 billion people in developing countries; water which is safe in an estimated 90% of the cases.[5] Yet another 300 million urban dwellers do not have access to pipes, or protected sources that deliver safe water. This worrying situation will intensify with the explosion of the urban population in Africa and Asia, which is expected to increase by almost 70% by 2030. Estimates predict there will be an additional 1.7 billion people living in cities by 2030, most of them poor. The bulk of this growth is likely to be concentrated in smaller cities and towns, whose capabilities for planning and delivery of public services will be stretched even further.

With the strong support and will of the government, utility operators – public and private – will continue expanding water services. Yet this takes time, and will require overcoming a number of obstacles. New approaches and resources will have to be found.

*1 Improved water source is defined by the United Nations as types of water infrastructure that are more likely to provide safe water than unimproved ones. Improved sources include: household connections, public standpipes, boreholes, protected wells or springs, or rainwater collection systems.*

*2 To calculate access to safe water, the Project Team took the total population without access to improved water sources, and added up those instances where an improved water source does not deliver safe water. The mean samples from a six-country survey show that 43% of protected dug wells provide safe water (range 19-56%), 63% of protected springs (range 43-82%), 69% of boreholes (range 39-99%), and 89% of pipes (range 39-99%). Assumptions based on data from WHO and UNICEF Joint Monitoring Program for Water Supply and Sanitation Rapid Assessment of Drinking-Water Quality (in press).*

*3 The BoP refers, in this report, to those 4 billion people living on an annual per capita income less than US$3,000 in Purchasing Power Parity (PPP). 3,000 PPP dollars corresponded, in nominal values, to US$3.2 a day in Brazil, US$2.1 in China, US$1.9 in Ghana, or US$1.6 in India, as of 2005.*

*4 See study on Suez Environnement/ PALYJA in the 'Case Study' Chapter of the full Report.*

*5 According to data from WHO and UNICEF Joint Monitoring Program for Water Supply and Sanitation Rapid Assessment of Drinking-Water Quality (in press).*

Fortunately a number of alternatives have emerged that can sustainably alleviate the burden on these populations in the short-term, in both rural and urban areas. These alternatives are led by social entrepreneurs, NGOs and corporations, which are both socially-minded and, for the most part, economically sustainable. As a result, safe water access has dramatically improved for millions of poor people, while also being less dependent on subsidies and grants. Having considerably scaled-up and accelerated (over the past 5-years in particular), such organizations complete and support the efforts of public authorities in their respective countries.

This Report explores strategies to scale-up these solutions even further and faster.

## About this Report

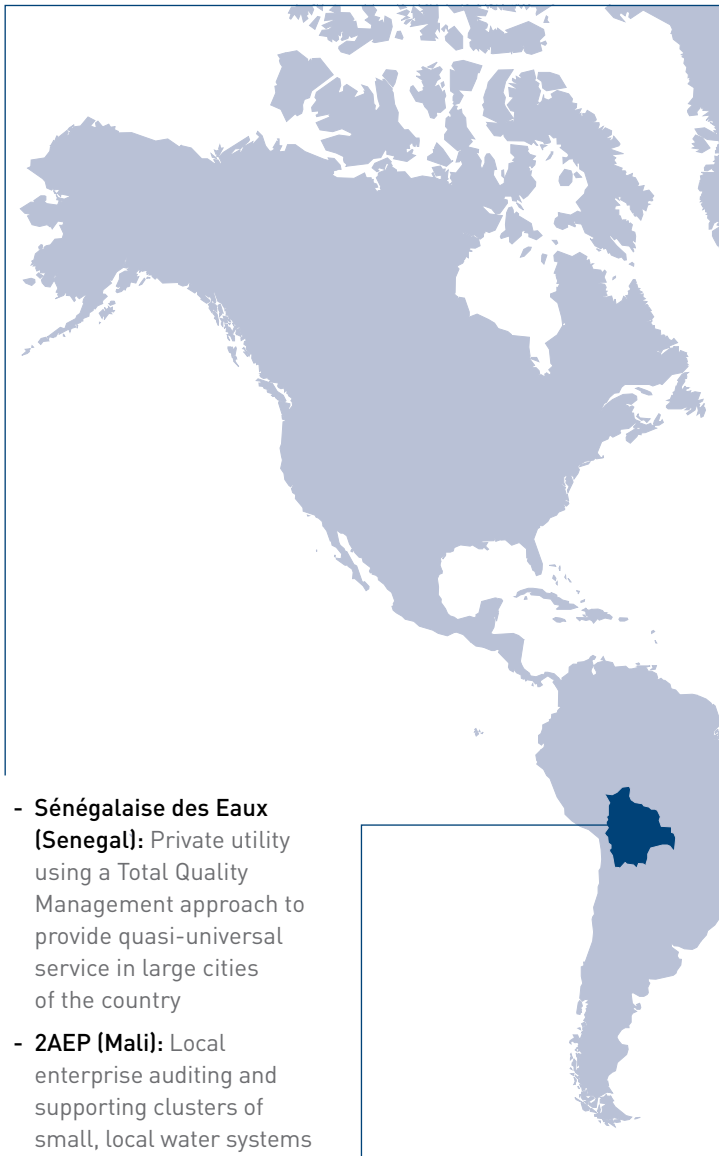
This Report focuses on:

- mapping and analyzing innovative enterprises and projects led by social entrepreneurs, NGOs and businesses that provide safe water to the poor in a sustainable and affordable manner
- understanding what hinders their growth
- proposing recommendations for the public sector, philanthropic and commercial players, as to how they can help bring such innovations to scale.

To do so, the Hystra Project Team conducted an initial review of around 140 safe water access projects across the world, and interviewed approximately 110 entrepreneurs, development specialists and water experts. 15 of these projects were analyzed in depth[6] and in close collaboration with the teams leading them.

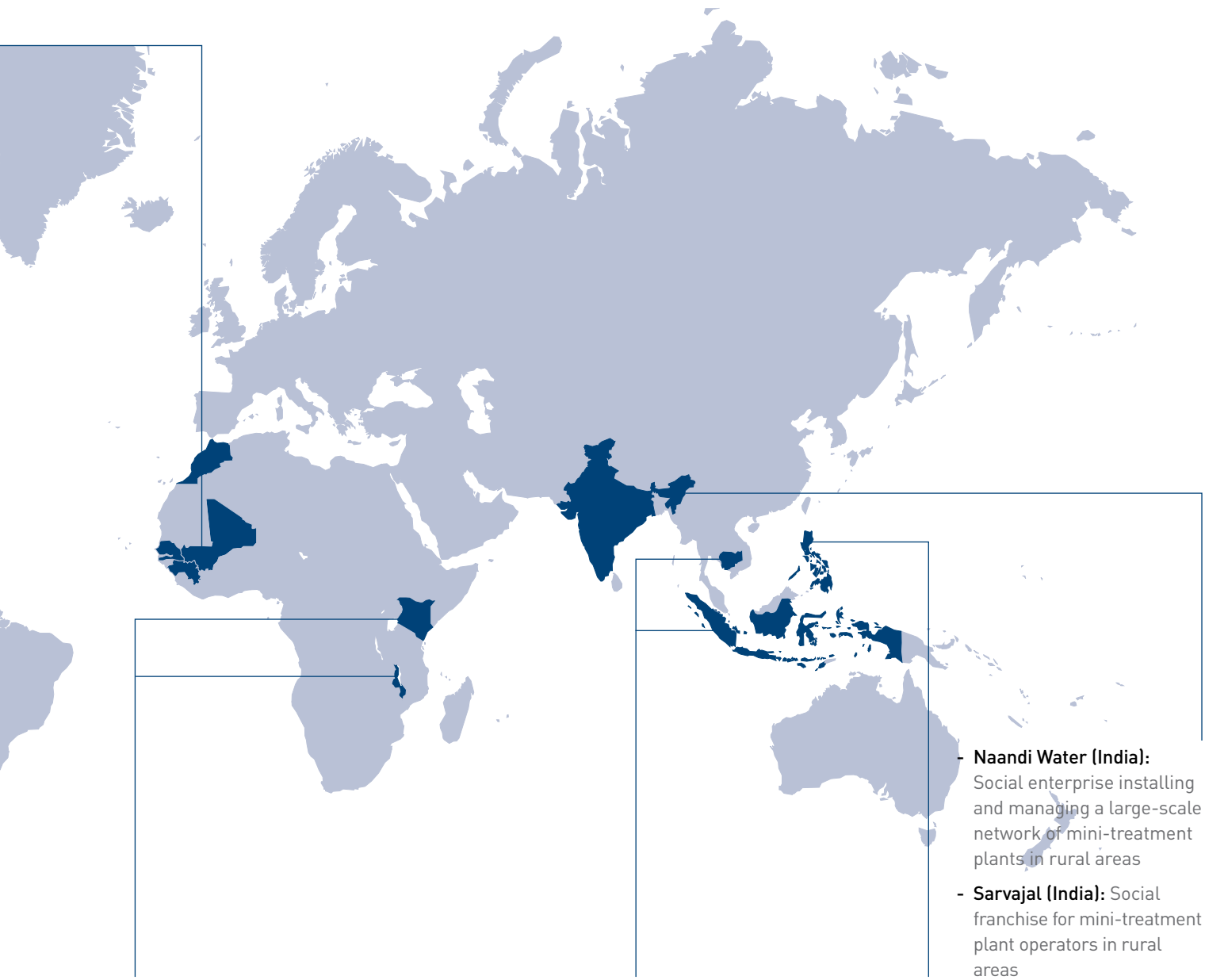
Our final selection of projects is representative of a wide variety of solutions, each differing in terms of services provided, treatment effectiveness, technology and sustainability. However, all of them provide solutions that cost less than the recommended 4% of the average income of a poor family in the BoP 500-1,000 range. The chosen projects also illustrate how the private sector can be called upon by public authorities to help develop and operate public infrastructure, or how it develops freely in areas with limited or no public service.

# OVERVIEW OF THE 15 PROJECTS SELECTED FOR ANALYSIS



- **Sénégalaise des Eaux (Senegal):** Private utility using a Total Quality Management approach to provide quasi-universal service in large cities of the country
- **2AEP (Mali):** Local enterprise auditing and supporting clusters of small, local water systems
- **Veolia/ Redal and Amendis (Morocco):** Private utility using innovative financing and outreach schemes to accelerate service coverage in the three urban centers of the concession
- **Antenna/ Tinkisso (Guinea Conakry):** Local NGO locally producing and distributing chlorine products in remote rural areas of Faranah region
- **AGUATUYA (Bolivia):** Public-Private-Partnership installing mini-pipe networks in under-serviced suburbs of Cochabamba, managed directly by the communities

*6 These 15 case studies were short-listed based on a) size – i.e., they already worked at some scale; b) representativeness of other successful projects in the same cluster; and c) potential for further scale and replication in a sustainable manner.*



- **Inter Aide/ Baseda (Malawi):** NGOs providing pump maintenance services and spare parts through networks of local entrepreneurs
- **PSI (Kenya):** NGO organizing the distribution of chlorine products at a large scale using commercial and non-profit distribution channels
- **Hydrologic (Cambodia):** Social enterprise producing and distributing low-cost filters countrywide
- **Suez Environnement/ PALYJA (Indonesia):** Private operator proposing multiple and modular solutions for connecting poor and informal neighborhoods of Jakarta
- **Manila Water (Philippines):** Private utility dramatically increasing service coverage in Manila slums thanks to the participation of communities
- **Balibago (Philippines):** Local, mid-scale utility building and managing piped water networks in small cities across the country
- **Naandi Water (India):** Social enterprise installing and managing a large-scale network of mini-treatment plants in rural areas
- **Sarvajal (India):** Social franchise for mini-treatment plant operators in rural areas
- **Healthpoint Services (India):** Social enterprise building and operating a network of health centers, and selling treated water at in-house Kiosks
- **Unilever Pureit (India):** Hindustan Lever-led pilots to increase market penetration of their water filters in rural India

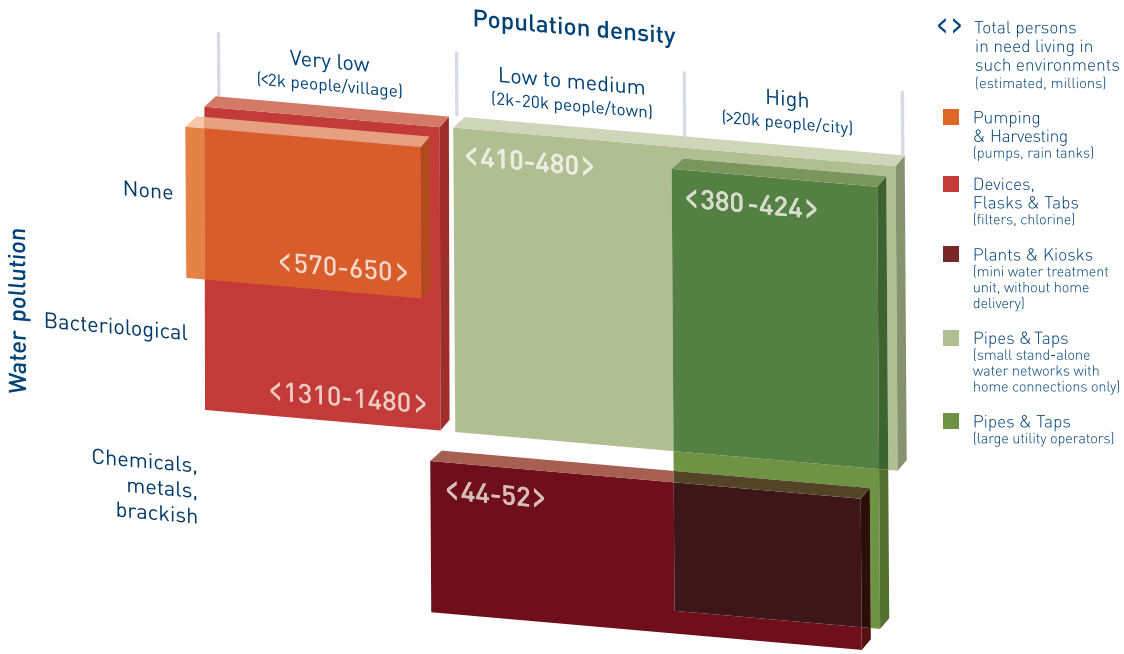
## New approaches to extending safe water access to the poor

**There are four distinct clusters of solutions, each appropriate for different environments.**

While access to safe water is a universal need, there is a wide diversity of solutions that provide safe water. The appropriateness of each solution for areas with little or no access to safe water at an affordable price depends primarily on two factors:

- The population density – the more dense an area, the more economic sense it makes to invest in collective treatment and distribution infrastructure
- The level of pollution in the water – the more polluted the water, the more expensive its treatment and the final price to the consumer; and the more discriminating people will be in choosing to use clean, expensive water for drinking purposes only.

**Figure 1. The scope of safe water solutions, in terms of appropriateness and cost-effectiveness[7]**




*7 The Project Team has attempted to estimate the number of people that live in environments where a given type of solution is most relevant, namely "people in need". This is different from the number of people that a particular solution could possibly reach ("people reached"), as the expected penetration (among people in need) varies by type of solution (e.g. 20% for Devices, Flasks & Tabs, 50% for Plants & Kiosks and 80% for Pipes & Taps). Sources: Team analysis; WHO/ UNICEF Joint Monitoring Programme for Water Supply and Sanitation; United Nations Environment Programme, Global Environmental Monitoring System/ Water Quality Monitoring System; Outside the Large Cities; The demographic importance of small urban centres and large villages in Africa, Asia and Latin America, IIED, 2006.*

As a result, we have identified four different safe water solutions, or 'clusters':

| | | |
|---|---|---|
| **Pumping & Harvesting** | Installations to pump underground water or collect rain water: e.g., protected wells with pumps, rainwater harvesting cisterns. | Most effective in areas where raw water is basically clean and where population density is low. These solutions are promoted largely by government, donors and NGOs. |
| **Devices, Flasks & Tabs** | Consumable disinfectant products, mostly chlorine-based, distributed in liquid or tablet forms.<br>Durable filtration devices and filters, using different purification technologies. | Appropriate and cost-effective solutions for populations in small villages, where water does not require complex treatment. They are promoted by both NGOs and commercial players, in areas with limited or no reliable public water service. |
| **Plants & Kiosks** | Mini-water-treatment stations: collective installations for more heavily polluted and/ or brackish water, suitable for small towns and villages. | Most cost-effective in areas where water is brackish/ heavily polluted, with a relatively high population (rural or urban). These solutions are promoted and operated by (social entrepreneurs), often in collaboration with local or regional authorities. |
| **Pipes & Taps** | Piped distribution networks: collective networks used to transport treated water to homes or public stand posts.<br>This includes:<br>• Mainstream utility operators (public or private operators mandated or contracted to serve large urban networks)<br>• 'Mini-Utilities': small, stand-alone piped networks reaching a few hundred or thousand families | Most effective in areas with high population density.<br>• Achieve significant economies of scale both in terms of treatment and distribution operations<br>• Sustainable and affordable in areas where water requires limited treatment (e.g., chlorination and filtration). While very small installations can be managed by informal entrepreneurs, larger operations are often mandated by local authorities. |

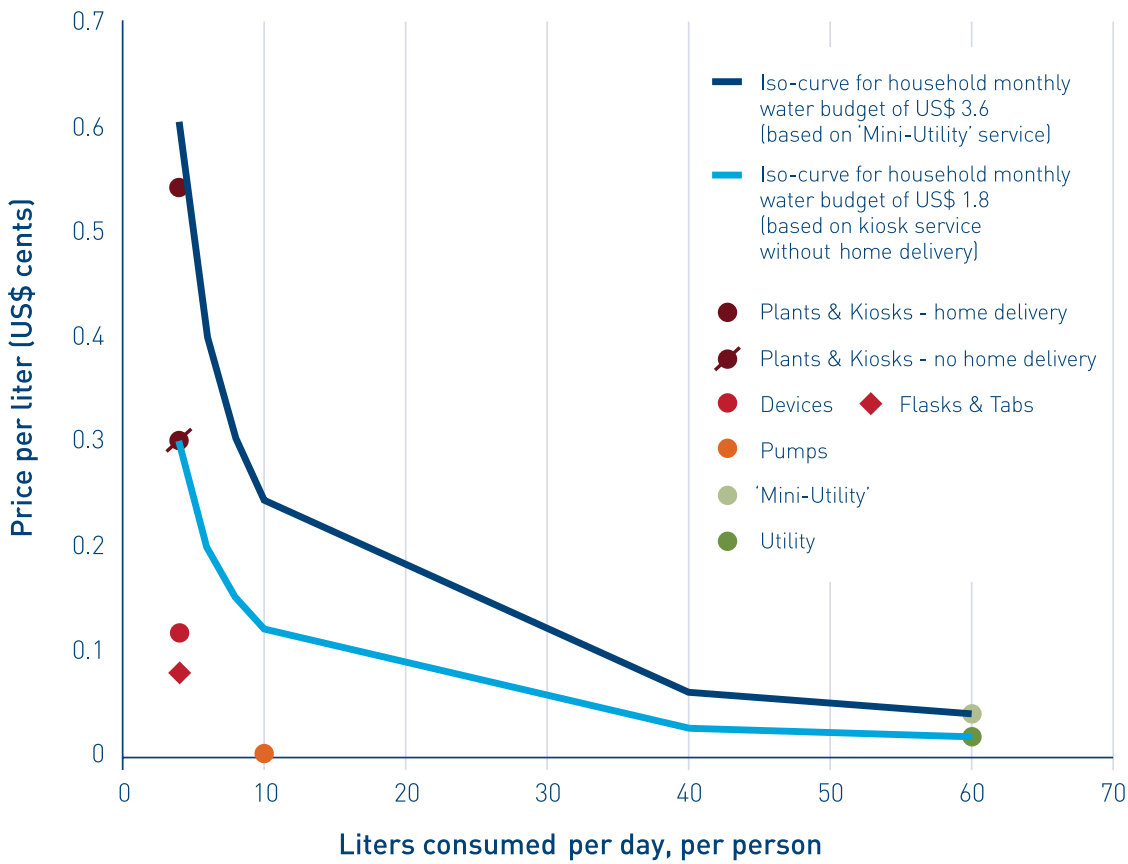
"WHILE ACCESS TO SAFE WATER IS A UNIVERSAL NEED, THERE IS A WIDE DIVERSITY OF SOLUTIONS THAT PROVIDE SAFE WATER."

In addition to population density and pollution, these four clusters differ on other aspects:

a) **Needs served and type of service rendered:** Some of these solutions only address the 'quality' issue, i.e., they provide 4 liters of safe water a day per person. Others address both 'quality' and 'quantity', i.e., they provide over 40 liters of safe water a day per person. Furthermore, some of these solutions may be more convenient than others, e.g., whether water can be distributed at home or not.

b) **Willingness to pay:** As each solution provides a different product and service, households spend different amounts for water. The graph below shows that households are able and ready to spend on average US$0.30 cents per liter for small quantities of treated water picked up at the treatment Kiosk, versus US$0.50 cents for small quantities delivered to the home, and only about US$0.04 cents per liter for large quantities of treated water available at the home tap.

**Figure 2. Observed daily spend on safe water (price and quantity), in light of total monthly household water budget[8]**




*8 Price points are defined on the basis of the lowest price points observed in the case studies, which would still allow for the financial viability of a safe water intervention. The budget iso-curves are calculated on the basis of a set baseline. For instance, in the light blue curve, the baseline is the monthly amount spent on safe water by a household picking up water at a water kiosk (typically 4 liters per person per day, priced at US$ cents 0.3 per liter). This budget was kept constant, all along the curve, for any quantity-price combination. Therefore, if the same household would consume 60 liters per person per day, the price of water would need to be as low as US$ cents 0.02, to keep the budget at US$1.8. This figure can then be compared with the prices that poor households are able and actually willing to pay for piped water solutions that provide 60 liters per day per person. Differences between the iso-budget curve and the reality show that households value each solution differently, and are ready to pay sometimes more (or less) than a theoretical budget limit.*

c) **Role of government and water authorities:** The public sector, which has primary responsibility for ensuring safe water access to all, often shapes the degree and the type of involvement by private players. For instance, the Pipes & Taps Cluster falls directly under public mandate - water utilities are tasked by national and local authorities with operating public infrastructure. While water operators are mostly public in developing countries, government can call on private players to operate water networks (e.g., through delegated management contracts or Public Private Partnerships). In contrast, in the absence of public services provision, other clusters fall almost entirely to the private sector. This is the case for Devices, Flasks & Tabs, whereby commercial players and NGOs propose alternative water treatment products in areas not catered for by public water services. Finally, Kiosks and Pumps are often established by local communities, NGOs and entrepreneurs, but require support from public authorities to reach significant scale.

d) **The need for corresponding sanitation solutions:** Utilities of any type that bring large quantities of water to the home tap, should also propose solutions for wastewater collection and treatment. Otherwise any potential benefits to public health will be compromised from the exposure of local communities to contaminated water.

As a result of these differences, each cluster is necessary, in the sense that each one is more appropriate for certain environments, and cannot be easily compared with other clusters in terms of feasibility, impact or cost-effectiveness.

The authors of this report also acknowledge that, in real life, solutions may overlap temporarily to solve a particular situation – e.g., the presence of water filters in large cities, where the water network has to undergo important refurbishments in order to deliver safe water. Yet what the previous table shows is that in dense urban areas with major pollution problems, the most cost-effective way to ensure that everyone drinks safe water all the time, is to provide it at the tap after having treated it with appropriate technology in large upstream facilities.

It is also important to note that there exists—alongside issues of raw water quality and density of population—other important factors to consider when assessing the local compatibility of a solution, such as the availability of raw water. These other factors are outlined in the chapters which discuss the prerequisites to implementing a given solution.

## Proposed scaling-up strategies for each cluster

After reviewing the most promising innovations within each cluster, and identifying the obstacles they face, the Hystra Project Team established distinct recommendations to scale them up.

In the Devices, Flasks & Tabs, Pumping & Harvesting, and Plants & Kiosks Clusters, the Hystra Project Team could identify successful *individual projects*. Yet the challenge is to develop—on that basis—*entire industries* of safe water goods and services that can reach out to poorer populations at an affordable price and offer a standardized level of quality. To reach that scale requires heavy investment in awareness and education campaigns on the need for safe water, while incubating a set of local enterprises that would copy the winning approaches for each cluster. Such efforts cannot be borne by private players alone, and should also be supported by philanthropic or public institutions.

In the Pipes & Taps Cluster, there already are a number of examples whereby utility operators (public or private) managed to expand and dramatically improve safe water provision for the BoP. These efforts could be accelerated by the emergence of a new type of hybrid water utility, which we name in the Report the 'BoP Utility'. The Hystra Project Team believes that this enterprise could exclusively focus on serving populations at the periphery and slums of large cities, as well as in fast growing towns. For different reasons, such a utility could not be purely public or private, but rather requires a blend of both, in terms of both governance and financing.

## 'Devices' and 'Flasks & Tabs' Cluster

### Devices

**Household water purifying filters that treat water at the point-of-use in small quantities**

Most of the low-cost filters can only treat bacteriological contamination. Filters typically last 1-2 years, after which they require the replacement of the whole or part of the device. Some models last longer but instead require the filtering cartridge to be replaced more often. Devices typically include a storage container to ensure water remains safe until consumption.

The Devices sector is dominated by commercial companies that focus on higher-income segments, in areas where the quality of water provided by public services is not reliable.

Successful projects that serve the poor are typically led by NGOs or Corporate Social Responsibility (CSR) departments of large corporations. These projects innovate on the marketing side, to improve adoption and regular use, and use alternative distribution channels to increase reach and penetration, notably in rural areas. The proactive management of these sales channels is crucial, as Devices require regular maintenance and replacement, which households may not comply with if not reminded regularly. Penetration is also accelerated by the availability of credit for the Device purchase.

Two such projects are presented in this report: IDE/ Hydrologic Ceramic Rabbit Filters (Cambodia) and Unilever Pureit Filters (India). The former is a social enterprise that has built up a countrywide operation to produce and distribute ceramic filters. The latter is an example of how a multinational company can adapt its products and operations to make it available and affordable in poor, rural areas.

### Flasks & Tabs

**Household water-treatment liquid or tablets, mostly chlorine-based, that are added to water at the point-of-use**

Most of these products treat for bacteriological contamination, while other more expensive products also reduce turbidity. These products are typically sold in doses that treat drinking water for a family for a period of one day to one month.

Similar to Devices, this cluster is dominated by commercial institutions focused on higher income customers. BoP-focused projects are often initiated by NGOs or Corporate Social Responsibility program. They mostly innovate on the technology side, allowing for low-cost, modular, decentralized manufacturing. These projects also manage to introduce an element of 'push' in their sales channel, ensuring daily usage and regular purchasing. This aspect is essential as many users think of chlorine as a chemical, 'medicine-like' product to add to water only when one is sick or weak, rather than an essential daily routine.

Two of these projects are presented in detail in this Report: Antenna/ Tinkisso WATASOL (Guinea Conakry), and PSI WaterGuard/ PUR/ Aquatabs (Kenya). The former depicts an initiative that produces and promotes chlorine locally in rural Guinea Conakry. The latter is an example of a successful large-scale introduction and promotion of chlorine-based products at a national scale, thanks to intense social marketing campaigns. Both are run by NGOs which aim to use commercial-based approaches to achieve better sustainability of their activities.

## Scale-up strategy

Devices and Flasks & Tabs are low-cost, effective solutions for a wide range of rural settings where water pollution is limited.

Devices and Flasks & Tabs solutions could serve over 1.3 billion people in need worldwide.[9] If such products were made available extensively in these territories, they could possibly reach approximately 20% of these people in need, possibly preventing 90-110,000 deaths and more than 3 million Disability-Adjusted Life Years (DALYs) annually.

Existing projects show that manufacturing and distributing Devices and Flasks & Tabs for the poor in a given country can present an attractive commercial opportunity for local entrepreneurs, provided financial and technical support is available in the start-up phase.[10]

The main barrier to scaling-up and replicating these pioneering enterprises, and ultimately serving more people in need, is that no single player wants to invest upfront in building nationwide demand for filters or chlorine. Firstly, the investment is too large for any small entrepreneur to bear, and secondly, it would not make commercial sense to do so. Since the technology is basic and as there is little brand loyalty, it would equate to making a big investment that would profit their future competitors as much as themselves. Even NGOs active in this field are not attempting to spur the development of competitive industries, but rather stay focused on growing their own operations. As a result no-one is investing sufficiently in awareness campaigns on the importance of safe water and the need for home water treatment solutions.

Hence, there is a need for a philanthropic intervention to finance awareness and education campaigns on the need for safe water, and to facilitate the birth of sustainable local enterprises. Such an intervention would require a concerted effort from donors, investors and public authorities, and a considerable amount of financing.

According to estimates based on existing projects, the cost of social marketing campaigns and initial industry incubation efforts required for a hypothetical country of 30 million people would hover around US$24-26 million over a period of 5 years at least, and would mostly consist of grants. Based on case study penetration levels, it is estimated that 1.3-1.7 million people could actually be reached and benefit from this intervention in such a country.

> “THERE IS A NEED FOR A PHILANTHROPIC INTERVENTION TO FINANCE AWARENESS AND EDUCATION CAMPAIGNS ON THE NEED FOR SAFE WATER, AND TO FACILITATE THE BIRTH OF SUSTAINABLE LOCAL ENTERPRISES.”

*9 This includes the number of people in need who live in areas where raw water is in principle clean, but where a device or chlorination would provide an additional assurance of water safety until consumption. A more restrictive definition that only includes people in need living in areas where water is bacteriologically polluted would limit it to 740-830 million people in need worldwide.*

*10 According to estimates based on the case studies, an average enterprise serving sustainably 500k people would generate revenues of US$400 to 700k, and would require modest investments of approximately US$120k for Devices manufacturers and less than US$20k for a Flasks & Tabs enterprise.*

### Players and their roles in implementation

While local entrepreneurs have a key role to play in developing a thriving local industry for Devices, Flasks & Tabs, philanthropic and public entities are essential to laying the foundations for it.

Firstly, overall orchestration of this initiative and grant funding would best come from a foundation or a donor focusing on private sector development. In addition, this organization would need strong local implementation partners to lead the education and awareness campaigns, as well as industry incubation efforts, such as identifying and supporting the local entrepreneurs that would manufacture and distribute these products.

The public sector would play a leading role in coordinating social marketing efforts, and setting quality standards for Devices, Flasks & Tabs, in order to control and limit the proliferation of fake or low-quality products.

## 'Pumping & Harvesting' Cluster

### Installations for underground water extraction or rainwater collection

Pumping & Harvesting operations are typically small-scale installations for households or small villages. In the vast majority of cases, there is little or no water treatment attached to it, though the raw water sources can be protected from (bacteriological) contamination.[11]

Today hundreds of millions of people rely on manual pumps to access water. Many have been installed by governments and donors. Similarly, many large-scale water harvesting programs have been subsidized by the state.

A lot of this public or philanthropic funding goes to finance new installations, as opposed to maintaining existing ones. As a result, most pumps available in rural areas have been installed without a sustainable solution for maintenance and spare parts provision. In fact, of the 600-800,000 hand pumps installed in Sub-Saharan Africa over the past 20 years, an estimated 30% are not functional, resulting in a total failed investment of more than US$1 billion.[12]

The Hystra Project Team has therefore concentrated its analysis on those projects that successfully provide maintenance services for hand pumps at a large-scale, and with minimum subsidies. Such projects typically manage to keep costs low by enrolling local, part-time mechanics and retailers, while the communities contribute a very small amount for the maintenance and repair services, as well as for the spare parts. In addition, these projects work with local authorities to map pump parks and work with local communities.

The project analyzed and presented in this report is the Inter Aide Maintenance System project (Malawi). This project uses commercially-based approaches to ensure large-scale maintenance of pump parks, in collaboration with local authorities.

*11 According to WHO and UNICEF 2008 Joint Monitoring Program for Water Supply and Sanitation Rapid Assessment of Drinking-Water Quality (in press)*

*12 Source: RWSN study on hand pump functionality for 20 countries in sub-Saharan Africa, 2009 (http://www.rwsn.ch/documentation/skatdocumentation.2009-07-27.8158674790/file)*

## Scale-up strategy

Because protected manual pumps provide safer water than surface water, they are low-cost and effective solutions for a wide range of rural settings where water pollution is low.

It is estimated that 570-650 million people in need live in areas where manual pumps would be appropriate solutions.[13] An estimated 80% of these people could potentially be provided with pump maintenance services,[14] making pump installations more sustainable over time. As a result, 150-190,000 deaths and about 5.5-6 million DALYs could be prevented annually.

Existing examples indicate that manual pump maintenance operations could be set up as sustainable, local enterprises, provided they benefit from financial and technical support in the start-up phase.[15]

However, for these pump maintenance and spare part provision services to flourish and expand over time, a solution needs to be found to finance the systematic replacement of existing pumps when they reach end-of-life. Moreover public authorities need to be supportive in organizing and promoting such maintenance operators.

The former issue is challenging given the lack of coordinated approach between entities that finance the installation of new pumps and the current focus on installing new pumps, rather maintaining and replacing existing ones. As a result, pump parks are heterogeneous, not mapped, and there are no coordinated plans to replace existing pumps (and harmonize the pump park) in a phased manner on a given territory.

To solve these issues would take government support: it would require that public authorities issue competitive tenders to local maintenance operators for the coverage of a given territory over a specified period of time. It also requires public authorities to actively endorse and supervise such efforts with local user populations. Without this it will be difficult for the local operators to gain the trust and access they need among potential users.

In addition, there is an opportunity for a philanthropic intervention that could contribute to setting up nationwide revolving funds, which would finance the phased replacement of pump parks. Seed money (mostly in grants) would also be needed for the set up and development of local pump maintenance operators (which should also replace pumps that reach end-of-life), and help them promote their services among future users. These operators could then become sustainable by offering their services to user communities for a fee.

Assuming there are 3-3.5 million actual pump users (out of which, some 2.5-3 million users that could benefit from pump maintenance services) in a hypothetical country of 30 million people, the total amount needed to finance such an initiative would hover around US$11-12 million, solely to purchase basic manual pumps and have them maintained over a period of 6 years. This amount would mostly consist of grants.

## Players and their role in implementation

Overall orchestration of this initiative and grant funding would best come from a foundation or a donor focusing on private sector development. In addition, it would need strong local implementation partners to lead the industry incubation initiative (through a 5-year program identifying and supporting local entrepreneurs) and manage the set up and disbursement of the revolving fund.

*13 This figure is based on the total number of people living in rural areas that have access to an improved (non-piped) water source (according to WHO/ UNICEF data), and discounts it further for the instances where installations could be other than a manual pump (e.g., protected spring, rainwater collection).*

*14 Based on penetration levels observed in case studies*

*15 An average enterprise could sustainably serve 1.6m beneficiaries, generating revenues of US$150-250k, while requiring modest initial investments of US$30-40k (excluding the cost of the mapping of pump parks).*

## 'Plants & Kiosks' Cluster

### Mini-treatment plants for highly polluted and/ or brackish water

Plants & Kiosks sell treated water to users at the plant. In some instances, they also offer a home delivery service in containers. While most appropriate for large villages, they should also be considered as a temporary alternative for larger cities' under-serviced suburbs that are experiencing heavy water pollution.

Mini-water treatment units today offer safe water to thousands of villages and small towns that experience severe water quality problems. Rapidly spreading in a few Indian states, they are now being selectively piloted in both Africa and South East Asia.

The Plants & Kiosks sector is still lightly regulated, even in India where local governments promote them by issuing public tenders for Build-Operate-Transfer (BOT) contracts. In the remaining cases, Kiosks are owned and operated by local entrepreneurs or handed over to local communities (when the infrastructure had previously been financed by donors).

This cluster has seen a number of important innovations over the years. These include: technological advances that brought the cost of filtering membranes significantly down; introduction of e-monitoring devices to rationalize maintenance operations; effective education programs and promotional techniques; billing schemes to drive regular purchase of treated water; and aseptic bottling processes to limit water re-contamination until use.

In this cluster, three projects were analyzed in depth: Naandi Community Safe Water Services (India), Sarvajal Reverse Osmosis Franchise (India), and Health Services E-Health Points (India). These projects are each run by social enterprises, which often rely on grants to build large-scale sustainable operations. In some cases, they operate under the mandate of regional authorities. In others, they establish close links with local authorities and communities.

### Scale-up strategy

Plants & Kiosks are important community-based solutions, because they are the only low-cost alternative that provide safe water access to people whose water source is highly polluted and/ or brackish. Though anecdotal, there is already widespread evidence of improved health outcomes among users.

Plants & Kiosks could be appropriate solutions for 44 to 50 million[16] people in need worldwide. Given penetration levels of today's kiosks, one can estimate that around half of these potential users would adopt kiosk services, possibly saving about 11 - 13,000 lives and between 350 - 450,000 DALYs each year.

Encouragingly, existing examples also indicate that operating a small kiosk can be an attractive business for a village-level entrepreneur. The average kiosk operator could sustainably serve 1,000-1,500 beneficiaries, generating US$5-6,000 in annual revenues, while being able to repay the loans required to finance a US$3-4,000 capital investment.

However, as some Plants & Kiosk networks reach significant scale, they struggle with a number of issues:

- Fully-owned networks struggle to raise funds to cover the initial capital expenditure investment (and often the overhead costs of the organization). They also find it challenging to monitor their employees in hundreds of hard-to-reach locations.
- Franchising models struggle to retain their best local operators. These quickly realize they could make more money by setting up their own kiosk.
- As the industry is relatively new, there are not yet clear quality standards. As a result, there are more and more small independent operators that compete on price but are unable to guarantee consistent water quality. This represents an increasing health risk for users and threatens the reputation of this nascent industry as a whole.

*16 This figure includes people in need living in semi-rural areas, as well as those living in highly polluted urban areas where public utilities fail to deliver safe water. If considered for semi-rural areas only, it would only cover 9 million people in need.*

Hence, there is an opportunity to rethink the structure of the Plants & Kiosks sector, to enable it to reach further scale. Roles could be re-defined as follows:

a) Public authorities set and enforce strict quality standards for drinking water quality (which are not exclusively targeted at water kiosks or rural areas). It would also be necessary to develop licensing requirements for kiosk operators. The auditing of these standards could be outsourced to players that would bid for portions of the territory.

b) Kiosks should be owned and operated by village-level entrepreneurs, as this represents an attractive business opportunity for them. Loan financing for these entrepreneurs should ideally be provided through local banks.

c) Industry support platforms should be set up that will facilitate and accelerate the dissemination of kiosks. These platforms would provide, for a fee, a number of services to the local kiosk operators, including:

   - start-up support: training and licensing (if required by law), equipment sourcing, marketing support, and possible channeling of loan financing
   - continued support: such as maintenance support, and auditing of the kiosks' operations on behalf of the authorities (out of the public bid contracts mentioned above).

   These platforms would function like social businesses (i.e. all proceeds are reinvested into growth).

Implementing this sector-wide transformation would require a concerted effort from public authorities and civil society to evolve the regulatory framework, as well as set up and fund support platforms for the kiosks, and provide loans to local kiosk operators.

The total investment required would be relatively modest, given that kiosks are financially sustainable businesses for village-level entrepreneurs, requiring little upfront investment, and that we are proposing a model of industry platforms that are operated as social enterprises. On the basis of the economics observed in the case studies, an estimated US$1.5-1.7 million would be needed to gradually promote and build this industry across a hypothetical country of 30 million people, over a period of 5 years (out of which two-thirds in grants, and the rest in equity and loan).

It is also important to note that Plants & Kiosks are most effective in highly polluted areas that cannot be connected to piped-water networks. It would therefore be appropriate to prioritize their expansion in countries such as India, where problems of brackish water infiltration are concentrated geographically.

By contrast, in a hypothetical country of 30 million people not experiencing heavy pollution, as little as 240-280,000 poor people would be in need of kiosk services. It is estimated that only about half of those would adopt kiosk services.

In addition, to further increase the health impact of kiosk services requires achieving penetration levels beyond the 50% average observed today in mature operations. A way to do this would be to increase service value and offer piped water delivery: users could have water at the tap, rather than go and pick up their daily container at the kiosk. However, despite significant advances in technology and operational effectiveness, there is no large-scale proven model that combines a kiosk with a piped-water network at a price that is sufficiently low for the BoP (still allowing recovering for investment and operational costs without any major form of subsidies). It is therefore critical to stimulate innovation in this field.

### Players and their role in implementation

Overall orchestration of this initiative would best come from a CSR department of a large corporation or a social impact fund. Such players would be able to offer both philanthropic and business support, and achieve high social impact with relatively low financial investment.

In addition, this player would need to have local presence or hire a strong local partner to manage the program. In either case, the support platforms would be set up in partnership with, or by hiring local entrepreneurs, with a view to transfer the platforms to these entrepreneurs in the mid-term.

The CSR unit or social impact fund should ideally provide all the grant and equity required to set up the support platform. Loan packages for the local kiosk operators would however be best provided by local banks (to minimize currency risk), with a guarantee from a donor or development agency to facilitate access and availability for small entrepreneurs.

Public authorities also have a central role to play in professionalizing this nascent industry, by establishing early on, an appropriate regulatory framework and quality standards.

> "PLANTS & KIOSKS ARE IMPORTANT COMMUNITY-BASED SOLUTIONS, BECAUSE THEY ARE THE ONLY LOW-COST ALTERNATIVE THAT PROVIDE SAFE WATER ACCESS TO PEOPLE WHOSE WATER SOURCE IS HIGHLY POLLUTED AND/ OR BRACKISH."

## 'Pipes & Taps' Cluster

**Piped-water networks that distribute treated water up to home connections, collective meters, or to stand posts, managed by utility companies or local operators**

In this Report, we broadly distinguish between:

a) **Large utility operators** (publicly-managed entities or private companies mandated by public authorities); and

b) **'Mini-Utilities'**, which are smaller, stand-alone, low-cost networks that can be fed either by a local source of water, or connected to the main water supply, and which distribute water to domestic connections mainly.[17]

In this cluster more than in others, public authorities play a central role in organizing and regulating water provision. This makes comparison between utilities difficult, without putting them into the regulatory and contractual context they operate within.

Some mainstream utility operators (public and private) have been successful in improving service and water quality, and in expanding their network to users in slums and suburbs. These utilities have innovated in terms of community outreach and mobilization (e.g., by involving communities in the realization of infrastructure works), innovative technology (e.g., the installation of automated stand posts), billing and collection (that facilitate payment for communities in informal areas), as well as financing of new social connections (e.g., revolving funds, credit facilities for households).

'Mini-Utilities', run by local entrepreneurs, have also flourished in urban and semi-urban areas not yet sufficiently or appropriately serviced by the main operator. These entrepreneurs managed to significantly lower infrastructure costs, notably thanks to technical innovations. Many of them have strong community support, and offer services tailored to their users' needs (e.g., offering daily billing to users not able to spend large amounts on a monthly basis, or water delivery by flexible hose for households not able to afford a permanent

*17 In this Report, we differentiate those 'Mini-Utilities' from small water networks, such as the ones that can be found in many parts of Africa, which consist of a borehole, pumping station, water tank, and which pipe water to collective stand posts mostly.*

connection). However, to maintain low prices, these 'Mini-Utilities' only perform basic water treatment, such as chlorination and filtration, and would not be appropriate in areas experiencing heavy water pollution. Similarly, these installations often do not offer wastewater solutions, relying instead on municipal infrastructure.

In this cluster, the experiences of four large utility operators were analyzed in depth: Manila Water Corporation (Manila), Sénégalaise des Eaux – SDE (largest cities in Senegal), SUEZ Environnement PALYJA Water for All Program (Jakarta), and Veolia Environnement Social Connection Program (three cities, Morocco). All of these examples illustrate how public authorities can call on private players to significantly improve operations and coverage, including among poorer populations. In addition, three other 'Mini-Utility' projects are analyzed in the report: AGUATUYA Agua para Todos (Cochabamba, Bolivia), Balibago Waterworks (Balibago and other areas around Manila), and 2AEP (rural Mali). These projects, run by private companies and a foundation, are examples of local players working together with public authorities to support smaller municipalities' water provision.

### Scale-up strategy

Today, for the 450-520 million poor living in slums and rapidly growing towns who do not have permanent access to safe water, extension of piped water networks, and in particular home connections, represent the most cost-effective and convenient alternative to water trucks, vendors, and long queues at stand posts. Expanding water networks in these areas would allow reaching out to an estimated 80% of people in need (according to case study estimates), and potentially saving 100,000 lives and over 3 million DALYs annually.

This half a billion people will likely almost double over the next 20 years, as urban population is expected to rise by almost 70% in Africa and Asia.

This upcoming crisis presents a formidable challenge for public authorities, which have a mandate to provide these growing populations with adequate access to safe water.

While a number of public and private utilities have proven that it is possible to sustainably expand their services (through individual connections, stand posts and other arrangements) to poor urban areas, this takes time (typically 20 to 30 years) and requires overcoming a number of obstacles:

- Lack of solutions (and financing) for wastewater collection and treatment in new, informal areas where the water network has been extended and users start consuming larger quantities of water. Technical constraints are more complex and costs are much higher for sanitation, than for water.
- Administrative hurdles: utilities – public and private – need to follow a number of administrative requirements related to property titles and urban development. Typically, applications for a home water connection need to be accompanied by a proof of house ownership or legal residency, automatically disqualifying populations living in informal areas. In those territories, stand posts, water tankers and water resellers often remain the only options.
- Most contractual and regulatory frameworks in place for water operators do not provide sufficient incentives to serve the rapidly growing number of poor residents and city newcomers: most contracts are structured in such a way that it forces operators to finance network extensions to the poorer neighborhoods through cross-subsidies with the richer segments. As a result, the more a utility expands into peripheral and poorer areas, the more difficult it is for it to maintain a sound economic balance.
- The political and social instability of informal, poor areas often heightens the technical difficulties that underpin large infrastructure works in these zones.
- Successfully serving BoP users requires developing very specific technical, societal, operational and marketing expertise, and mobilizing dedicated financial and human resources. Such expertise is difficult to consolidate within large utilities, be they public or private, without dedicated structures and processes in place.

The magnitude of the challenge will force public authorities to think beyond existing solutions and imagine new ways of harnessing the capabilities and resources of civil society, aid agencies, local entrepreneurs and international industry players.

To achieve this, a source of inspiration could come from small, local utility players such as Balibago and IWADCO, which are sustainably serving large numbers of low-income populations in previously under-serviced areas, through consolidated clusters of smaller piped networks, established through contractual agreements with the local communities and authorities.

The most interesting features of such players are summarized below:

- No need for the operator to manage cross-subsidies: each piped network is conceived as a standalone business, tailored to the situation of each municipality or neighborhood authority.
- Centralized management and strong capabilities: because they are organized in clusters, these operators can centralize key processes and develop a strong level of professionalism. As a result, they are able to offer a whole set of services to any municipality or neighborhood, ranging from refurbishing an existing network, to installing a new one, or simply taking on the operations in an area where public authorities do not have yet the capabilities to run the existing infrastructure. Given their size, they can also set up central advanced maintenance and engineering teams.
- Well anchored in the local community: while many processes are centralized, each network is run by a local team. Belonging to the communities they serve, these teams know the users, and are often able to better respond to their needs (e.g., by providing payment or credit terms adapted to an individual's ability to pay).
- BoP-focused: given their focus on BoP and under-serviced populations, these operators develop innovative solutions better adapted to their needs.
- Speed in serving populations that would otherwise remain under-serviced in the mid-term: because they are decentralized, stand-alone solutions, such networks can be set up directly where needs are greatest. Once the main network finally reaches these areas, smaller networks present the advantage of being sufficiently modular to be directly connected to the main water supply at once.
- Sustainable operations, given the availability of patient capital: these operators are local, medium-sized businesses typically serving a few hundred thousand users. While they are sustainable they require patient equity capital. Extrapolating from case study data, an average operator of around 60 mini-networks serving almost 500,000 users in total, would require a capital investment of US$8-10 million (to finance new water infrastructure development only), generating US$3-4 million annual revenues after more than five years of operation. In addition, subsidies and soft loans may be required for very low income users who cannot afford the full connection cost, or who need time to repay their connection. According to initial estimates, about five such utilities would be needed in a hypothetical country of around 30 million inhabitants, to offer piped water to the 2.3-2.5 million urban dwellers without safe water access, and effectively reaching out to a possible 1.8-2 million of them.

Of course, Filipino companies like Balibago and IWADCO, have flourished due to a specific regulatory environment. While being a source of inspiration, their model needs to be adapted to suit a broader set of geographical, demographic, regulatory and political environments. Furthermore, solutions must be found to offer wastewater management services each time a new water network is installed, which brings large quantities of water into homes.

But these examples could form the core of alternative approaches that could complement and hereby accelerate the efforts undertaken by a number of private and public utilities to sustainably expand water services to the BoP. The Hystra Project Team believes that their most innovative aspects could be captured and formalized through the creation of a new type of mid-sized 'BoP Utility', which would:

a) focus and specialize in providing safe piped-water to poor households, which the main utility operators are not able to reach in the medium-term: in this sense, it should complement the work of the main utility operators, rather than compete with it.

b) seek supportive political and regulatory environment, necessary for connecting families living in informal neighborhoods (especially those which lack the property titles necessary to apply for a home connection). Similarly, the tariff policy and contractual framework would have to be structured in a way that incentivizes the 'BoP Utility' to expand its services to the most difficult and costly areas as well.

c) set up 'hybrid' governance and performance indicators: the dual social and commercial nature of this new 'BoP Utility' should be reflected across its functions. For instance, the Executive Board should also include public sector and donor representatives to help strike the right balance between its objectives towards providing universal public service and economic viability. The success of this utility would also be measured through hybrid key performance indicators that track financial viability, as well as health outcomes.

d) develop a BoP-adapted operating model. Such a model requires a 'rethink' of the mainstream utility paradigm, in that it would be based on consolidated clusters of independent, and versatile, small modular networks. It would also strive to maintain low operational costs.

e) tap into social investment capital: until now, raising funds for water utilities has been difficult. Public and donor money has been limited, while private investors see little appeal in it, given the low returns and high risk involved in such businesses. By contrast, a 'BoP Utility' has the potential to raise significant amounts among social impact investors, i.e., investors that are ready to forego some financial return, if social impact is high.

f) continue evolving low-cost technology: until now, smaller decentralized piped networks do not propose sophisticated water treatment technology or wastewater solutions, without bringing costs up significantly. Technological advances are needed to make this possible.

> "A SOURCE OF INSPIRATION COULD COME FROM SMALL, LOCAL UTILITY PLAYERS SUCH AS BALIBAGO AND IWADCO, WHICH ARE SUSTAINABLY SERVING LARGE NUMBERS OF LOW-INCOME POPULATIONS IN PREVIOUSLY UNDER-SERVICED AREAS, THROUGH A CONSOLIDATED CLUSTER OF SMALLER PIPED NETWORKS."

### Players and their role in implementation

The emergence of this 'BoP Utility' would require the cooperation of three essential players:

a) **The public water authority:** its role would be to identify under-serviced territories, issue tenders to build, develop or manage water infrastructure in given perimeters, and to adapt the regulatory framework (in order to facilitate home connections in informal neighborhoods). This authority would also be in charge of overseeing and coordinating overall contract implementation by the 'BoP Utility', as well as between the 'BoP Utility' and the main water utility.

b) **The 'BoP Utility':** a medium-scale water utility whose mandate will be to build, refurbish, expand and operate clusters of water networks in under-serviced urban and semi-urban areas. Such a utility could develop as a spin-off of an existing large utility player. It could also be set up by a local conglomerate active in infrastructure works that acquires existing, small utility players, such as Balibago in the Philippines.

c) **The investors:** patient capital is required to finance new infrastructure developments. Soft loans will be required to offer credit to low-income households that need time to repay their connection. Financing could be provided by impact investment funds and investors, or by a development agency.

## Recommendations

### To bring these innovations to scale, hybrid partnerships, financing and strategies are needed.

Over the past five years, social entrepreneurs, NGOs, corporations have implemented alternative and innovative approaches to provide safe water to millions of poor people in ways that are (for the most part) economically sustainable.

Were these innovative approaches scaled-up in every developing country to reach full potential, they could effectively reach approximately 950-1100 million people in need, i.e. around 50% of today's total poor population without access to safe water. This in turn translates into an estimated potential 300-350,000 lives saved annually by averting deaths due to diarrhea and lack of safe water. In addition to impacting people's lives, these initiatives would create employment and business opportunities for thousands of local entrepreneurs and companies.

Significant funding will be required to make this happen. Extrapolating from case study data, the Hystra Project Team estimates that over US$15 billion will be needed to accelerate the development of BoP-focused safe water industries across all clusters. About one third of this amount would come from grants, while the rest would consist of loan and equity financing. Similarly, considerable financial innovation will be needed to create the right incentives for more corporates and investors to come in.

Given the size and complexity of the problems there is a need for unprecedented collaboration between public, non-profit and private players, so that solutions are made available to all, where and as needed:

a) **Public authorities** (whose responsibility is to guarantee universal public services) will need to facilitate the work of these new hybrid players who seek to solve the safe water access issue while not becoming dependent on grants and subsidies. For instance, public authorities could engage utilities in developing public water infrastructure specifically for the BoP, or by regulating quality standards for water kiosk services.

b) **Not-for-profit institutions and philanthropic players/ donors** will be critical in helping to harness the power of commercial players by contributing to industry building efforts, and establishing industry support platforms. In addition, grant money will be necessary to launch many of the proposed initiatives and attract further commercial capital for the proposed scale-up strategies. This is true, for instance, in the Devices, Flasks & Tabs Cluster, where grants are needed to finance education campaigns and incubate local enterprises; in the Pipes & Taps Cluster, where subsidies will be needed to connect the poorest populations; and in the Pumping & Harvesting Cluster, where donors will need to jump in to refurbish entire pump parks.

Finally, public and not-for-profit institutions will be instrumental to keeping health outcomes at the heart of these initiatives. They can do so by:

- taking the lead in measuring and publicizing the number of actual deaths or DALYs averted by these interventions
- bringing in players from other intervention areas such as sanitation, hygiene, education and health, with a view to increase the effectiveness of water programs.

## Conclusions

### Breakthrough innovations in marketing, technology and wastewater management are required to go beyond the limitations of existing solutions

While recommended scale-up strategies could bring safe water to millions, they suffer from specific limitations. To overcome these, two types of innovations are required:

a) **High impact social marketing campaigns:**

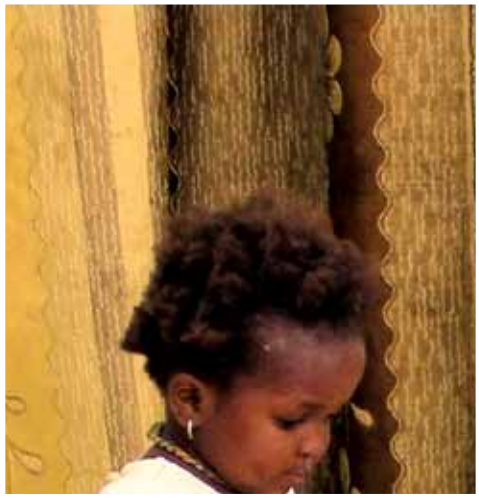
In Devices, Flasks & Tabs and to some extent, Plants & Kiosks, existing solutions struggle to achieve more than 20% to 50% penetration levels respectively in the user communities. This can be partly explained by the fact that current marketing and user education strategies often fail to drive lasting behavior change.

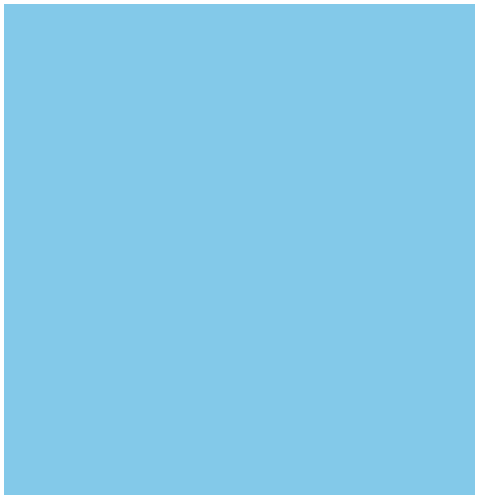
For those clusters of solutions which revolve around individual routines and regular decisions about purchase and use of safe water products, we need to continue investing in research that investigates the actual impact of various promotional and educational techniques. We also need to better understand how user education on safe water practices could be effectively coupled with hygiene and sanitation messages in a way that increases exponentially lasting adoption of appropriate behavior. This development could be encouraged through 'challenge competitions' that reward the social marketing techniques with the most impact.

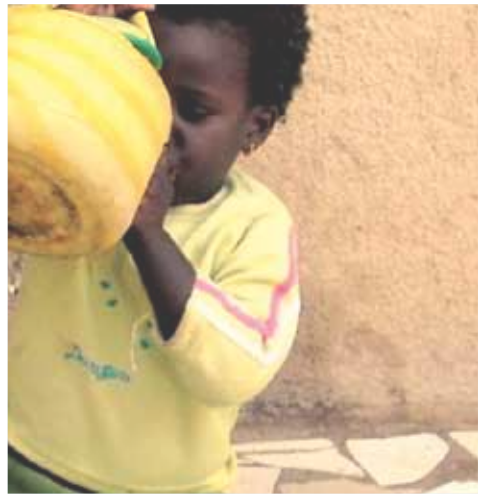
b) **Low-cost decentralized water treatment and distribution technology, and integrated wastewater systems for smaller communities:**

Today, hundreds of thousands of households are reluctant to buy and pick up safe water every day from a water kiosk. However, experience shows that having large quantities of safe water available at the tap is the service that people value most (and are therefore most willing to pay for). Yet despite significant advances in technology and operational effectiveness, there is no large-scale proven model that combines a kiosk with a piped-water network at a price that is sufficiently low for the BoP (while still allowing for recovery of investment without any major form of subsidies). It is therefore critical to stimulate innovation in this field. Similarly, more needs to be done to explore how existing small wastewater systems could be integrated at a low cost with decentralized water networks in small towns.

# THE ACCESS TO SAFE WATER CHALLENGE






# THE ACCESS TO SAFE WATER CHALLENGE

**Over 2 billion people still lack access to safe water. Out of those, about 80% live in rural areas**

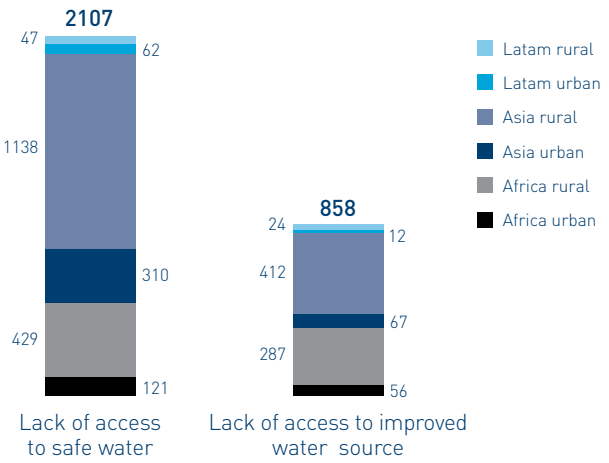
Today the world is on track to meet the Millennium Development Goal of halving the number of people without reasonable access to an improved water source[18] by 2015.

However, access to an improved water source does not necessarily give access to safe water at a price affordable for the poor. The data also says very little about the sustainability of the infrastructure currently in place. Based on recent data from WHO and UNICEF, the Hystra Project Team estimates that over 2 billion people lack access to safe water; this includes 900 million who *do not have access to an improved water source* and another 1.2 billion who do, yet *do not have access to safe drinking water.*[19]

Asia accounts for 69% of the total 2.1 billion people without access to safe water, Africa 26%, and Latin America only 5%. Progress has also been uneven: China and India alone account for 47% of the 1.8 billion people who gained access to an improved drinking source during the period 1990-2008.[20]

There are also striking disparities between cities, towns and small villages: over 1.6 billion people without access to safe water today live in rural areas. In urban areas, however, the increase in coverage is barely keeping pace with population growth.[21]

**Figure 3. World population access to improved water source vs. access to safe water, 2008 data, million people [22]**




## *Safe or safer water?*

Among water specialists, "logs" are used to measure and compare the efficacy of water treatments. The term "log" removal or inactivation refers to an order of magnitude of change. For example, if a given volume of water containing one million organisms is treated and reduced to one thousand organisms this is a 3-log reduction.

Standards for the approval of specific treatment products are set by the WHO and national authorities. In most developed countries, the requirement is that treatment products have a minimum efficacy of log-4 against viruses. But treatment efficacy is costly to achieve. Many experts therefore argue that if local sources are only lightly contaminated, a lower log technology would be sufficient.

In addition, the greatest risks of waterborne disease globally are still from microbial contaminants. With the exception of arsenic, lead, and fluoride, the risk of illness and death from chemicals is relatively low.

*18 Millennium Development Goal definitions: Improved water source is defined by the United Nations as types of water infrastructure that are more likely to provide safe water than unimproved ones. Improved sources include: household connections, public standpipes, boreholes, protected dug wells, protected springs, and rainwater collection systems; Reasonable access: Availability of at least 20 liters per person per day from a source within one kilometer of the user's dwelling.*

*19 To calculate access to safe water, the Project Team took the total population without access to improved water sources, and added up those instances where improved water source did not deliver safe water. The mean samples from a six-country survey show that 43% of protected dug wells provide safe water (range 19-56%), 63% of protected springs (range 43-82%), 69% of boreholes (range 39-99%), and 89% of pipes (range 39-99%). Assumptions based on data from WHO and UNICEF Joint Monitoring Program for Water Supply and Sanitation Rapid Assessment of Drinking-Water Quality (in press).*

*20 Source: WHO and UNICEF Joint Monitoring Program for Water Supply and Sanitation Rapid Assessment of Drinking-Water Quality (in press).*

*21 2008 data. Joint Monitoring Program: Progress on sanitation and drinking water 2010 update, WHO and UNICEF*

*22 2008 data. Joint Monitoring Program: Progress on sanitation and drinking water 2010 update, WHO and UNICEF*

## The health consequences can be devastating, especially for children under five years of age

As a result, diarrhea remains widespread, causing over 2.4 million deaths every year, out of which an overwhelming majority of those are among children less than five years of age. It is further estimated that about 80 million deaths adjusted life years (DALYs) are lost to diarrheal diseases annually. The effects of being repeatedly sick are also dramatic for children, causing about half of child malnutrition cases, and over 440 million school days missed annually.[23]

Women are another group particularly affected, as they are typically the ones in charge of fetching and carrying water. In developing countries, it is estimated that women spend up to 40 billion hours per year fetching water that is not necessarily safe to drink.

Around a third of diarrhea-related sickness and deaths could be prevented by providing safe drinking water.

Hygiene and sanitation are the two other intervention areas that significantly impact the prevalence of diarrheal diseases.

**Table 1. Impact on diarrhea reduction by intervention area**

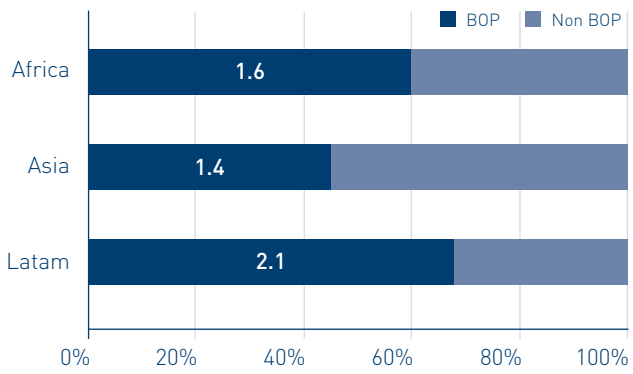
| Intervention area | Reduction in diarrhea frequency |
|---|---|
| Hygiene | 37% |
| Sanitation | 32% |
| Water quality | 31% |
| Water supply | 25% |
| Multiple | 33% |

*Source: Safe water, better health. Costs, benefits and sustainability of interventions to protect and promote health, WHO, 2008*

## Yet, the poor pay often more than the rich for water

Despite being under-serviced, people at the Base of the Pyramid (BoP) spend an estimated US$5.1 billion on water annually.

**Figure 4. Spend of BoP population on water vs. non-BoP (US$ billion)[24]**




In fact, the poor often pay more than those living at the top of the pyramid. For instance, in the slums of Jakarta, people spend up to US$7.5/$m^3$ for water sold by the local water vendors that serve their neighborhoods, even though the official utility tariff is US$0.12/$m^3$.[25]

Lack of financing is one of the factors that explains why utilities cannot expand the water network to new areas more rapidly. With water tariffs being generally very low, such operations do not generate sufficient revenues to reinvest in further infrastructure. As a result, the low tariffs mostly benefit the rich who already have a water connection, rather than the poor that still do not have one.

The situation is similar in rural areas. In rural Cambodia, poor households spend up to US$180 a year on fuel to boil water, while an upscale, quality-certified filter which is just as effective as boiling water, costs only US$40 to own on an annual basis.

**23** *Moszynski, P. 2006, British Medical Journal 333:986*

**24** *The BoP as defined by "The Next 4 Billion" is the four billion people living on an annual per capita income that is less than $3,000 in purchasing power parity (PPP). The BoP is further divided in 6 income level groups. The lowest segment is people with an annual revenue per capita below $500PPP (BoP500) and the highest one those with a revenue comprised between $2,500 and 3,000PPP (BoP3000). 3,000 PPP dollars a year corresponded, in nominal values, to US$3.2 a day in Brazil, US$2.1 in China, US$1.9 in Ghana, or US$1.6 in India (2005 data). Source: The next 4 billion: market size and business strategy at the base of the pyramid, IFC and World Resource Institute, 2007*

**25** *See case study on Suez Environnement/ PALYJA Water for All Program in Jakarta for more details*

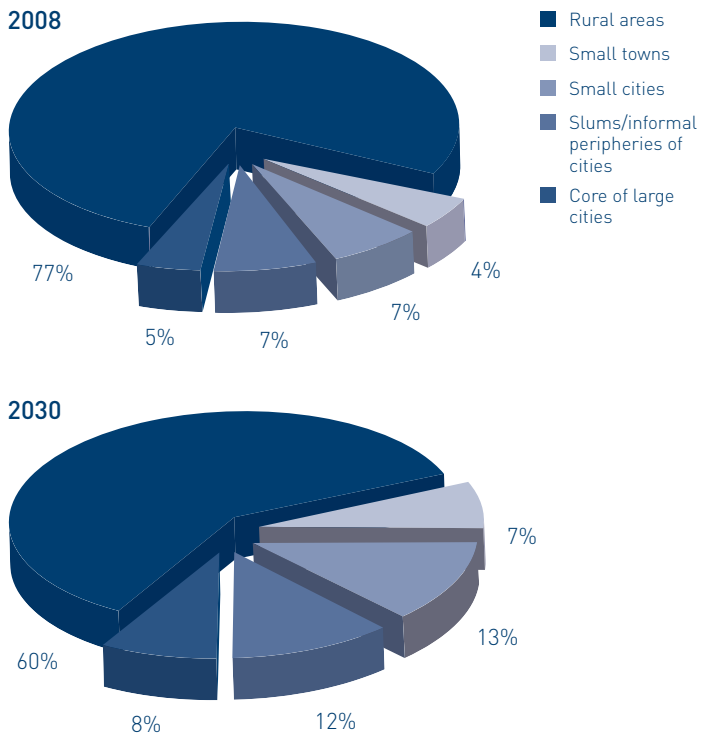
## These 2 billion poor live in very different environments and will experience massive migrations over the upcoming 20 years

The two billion poor surviving at the BoP who do not have access to safe water face very different realities, depending on where they live:

- Large cities, typically served by the main water utility operator: mainstream utility operators (publicly-managed entities or private companies contracted by the public sector) deliver piped water to 1.7 billion people in developing countries, water which is considered safe in an estimated 89% of cases.[26] Yet there exists another 300 million urban dwellers who do not have access to piped water, or protected water sources (that deliver safe water). These inhabitants often live in slums and informal suburbs. Given the lack of presence of public water services in these zones. Informal players bring in and distribute water to the local population, often charging more than the main public utility. A number of households are also unable to secure a home connection in informal areas, either because an official home property certificate is required to apply for a water connection which they do not have, or because they live in zones unfit for construction, where the water network cannot be piped in.
- Small towns (more than 2,000 inhabitants but less than 20,000) and small cities (up to 500,000 inhabitants): water infrastructure is generally basic in these areas and often falls under the responsibility of local authorities, who may not have the ability or resources to operate and expand it. Such areas are swelling rapidly under waves of rural migration and the existing infrastructure is rapidly becoming inadequate.
- Rural areas: these locations are characterized by low levels of population density, the availability of free (though often unsafe) water, and poorer populations who are generally less aware of the need for safe water. These areas require very low-cost safe water products and services.

The urban landscape is expected to change dramatically in the coming years. It is estimated that the urban population will increase by almost 70% from today's levels, by 2030. There will be an estimated 1.7 billion additional people in total living in cities by 2030, most of them poor. The bulk of this growth is likely to be in smaller cities and towns, whose capabilities for planning and delivery of public water services will be stretched even further.

**Figure 5. Repartition of the BoP population without access to safe water[27]**




*26 According to data from WHO and UNICEF Joint Monitoring Program for Water Supply and Sanitation Rapid Assessment of Drinking-Water Quality (in press), the mean samples from a six-country survey show that 89% of pipes (with a range of 39-99%) provide safe water.*

*27 2030 projections based on UNFPA estimates that urban population would almost double over this period in Africa and Asia. Source: Team analysis; http://www.iied.org/pubs/display.php?o=10537IIED; ww.citypopulation.de; State of the world population 2007, UNFPA*

With the explosion of the urban population in Africa and Asia, the current situation will become dramatic.

With strong support and government will, mainstream utility operators – public and private – will continue to expand water services. Yet this takes time, and will require overcoming a number of obstacles. National and local public authorities, which have been bestowed with a mandate to regulate and organize water provision, will have to develop new strategies to address this challenge of unprecedented magnitude.

Fortunately, a number of alternatives have emerged that can sustainably alleviate the burden on these populations in the short-term. They are led by social entrepreneurs, NGOs and corporations, which are both socially-minded and (for the most part) economically sustainable. They have dramatically improved safe water access for millions of poor people in both rural and urban areas, while being less dependent on subsidies and grants. Having considerably scaled-up and accelerated over the past five years, these alternatives complement and support the efforts of public authorities in these countries.

This study is about exploring strategies to scale-up these solutions further.

> “A NUMBER OF ALTERNATIVES HAVE EMERGED THAT CAN SUSTAINABLY ALLEVIATE THE BURDEN ON POOR POPULATIONS IN THE SHORT-TERM, BOTH IN RURAL AND URBAN AREAS.”

# ABOUT THIS REPORT

# ABOUT THIS REPORT

## Objectives

The objectives of this Report are to:

- map and investigate innovative enterprises and projects – led by social entrepreneurs, NGOs and businesses – that provide safe water to the poor in a sustainable and affordable manner
- understand what hinders their growth
- propose recommendations for the public sector, as well as philanthropic and commercial players, on how they can help bring these innovations to scale.

## Methodology

The authors of this Report conducted an initial review of approximately 140 safe water access projects across the world, and interviewed around 110 entrepreneurs, development specialists and water experts.

In order to be able to compare these 140 projects (e.g., in terms of needs addressed and environment in which they function), they have been clustered into four broad categories of solutions namely 'clusters'.

**Figure 6. Clustering of projects**

| Needs addressed | Clusters of projects | Description |
|---|---|---|
| Water quality | Flasks & Tabs<br>Devices | **Consumable disinfectant products:** mostly chlorine-based, distributed in liquid or tablet forms.<br>**Durable filtration products:** mostly filters, using different purification technologies. |
| | Plants & Kiosks | **Mini-water-treatment stations:** collective installations for more heavily polluted and/ or brackish water, suitable for small towns and villages. |
| Water quality and quantity | Pumping & Harvesting | **Installations that pump underground water or collect rain water:** e.g., protected wells with pumps, rainwater harvesting cisterns. |
| | Pipes & Taps<br>'Mini-Utilities'<br>Large utilities | **Piped distribution networks:** treatment installations and distribution networks that transport treated water to homes or public stand posts. This cluster includes:<br>a) 'Mini-Utilities': independent, small networks' operators<br>b) Large utilities: mainstream large urban networks' operators |

Within each cluster, 15 specific projects were short-listed for further analysis. Selecting these projects was done on the following basis:

- size – i.e., projects that already worked at some scale and served more than 10,000 regular beneficiaries
- representativeness of the approach adopted by other successful projects in the same cluster
- potential for further scale and replication, in a sustainable manner.

The final selection is representative of a wide range of solutions, differing in terms of services provided, treatment effectiveness and technology, and sustainability. However, all these projects provide solutions that cost less than the recommended 4% of the average income of a poor family of the BoP 500-1000 range. The chosen projects also demonstrate how private sector can be called in by public authorities to help develop and operate public infrastructure, or can develop almost independently in geographies with limited or no public water service.

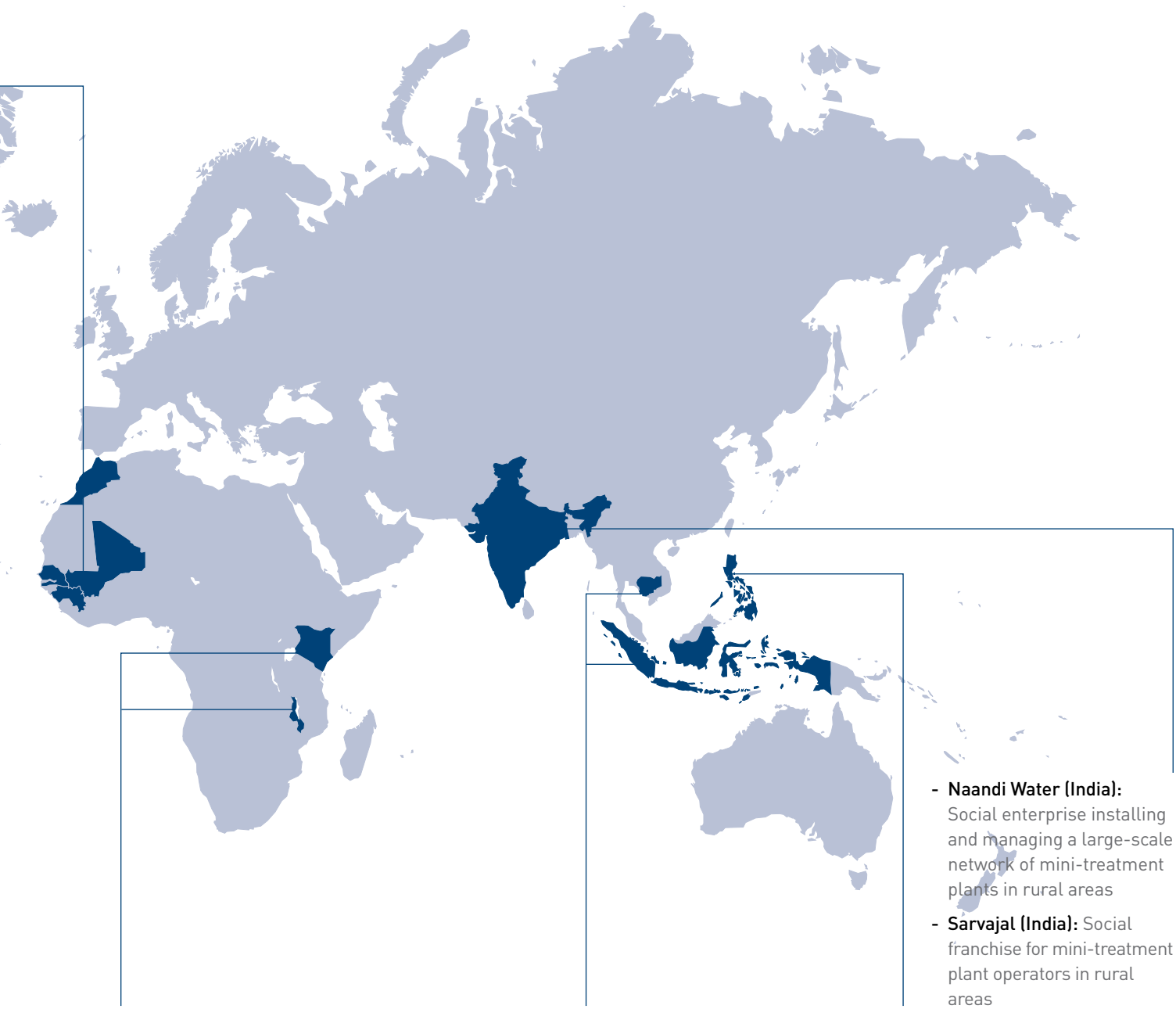
The case studies selected were evaluated in close collaboration with the management teams leading these projects in order to thoroughly document their innovations, the obstacles they encountered, and their economics. Each project was analyzed across the following four criteria:

1. Ability to solve the problem – social impact, effectiveness of treatment and scale of solution
2. Economic sustainability, limiting the need for grants and subsidies
3. Environmental sustainability and impact
4. Scalability and replicability – conditions and potential thereof.

On the basis of the case studies, obstacles to scale and replication specific to each cluster were identified, along with the innovations proposed to overcome these obstacles.

# OVERVIEW OF THE 15 PROJECTS SELECTED FOR ANALYSIS

- **Sénégalaise des Eaux (Senegal):** Private utility using a Total Quality Management approach to provide quasi-universal service in large cities of the country
- **2AEP (Mali):** Local enterprise auditing and supporting clusters of small, local water systems
- **Veolia/ Redal and Amendis (Morocco):** Private utility using innovative financing and outreach schemes to accelerate service coverage in the three urban centers of the concession
- **Antenna/ Tinkisso (Guinea Conakry):** Local NGO locally producing and distributing chlorine products in remote rural areas of Faranah region
- **AGUATUYA (Bolivia):** Public-Private-Partnership installing mini-piped networks in under-serviced suburbs of Cochabamba, managed directly by the communities



- **Inter Aide/ Baseda (Malawi):** NGOs providing pump maintenance services and spare parts through networks of local entrepreneurs
- **PSI (Kenya):** NGO organizing the distribution of chlorine products at a large scale using commercial and non-profit distribution channels
- **Hydrologic (Cambodia):** Social enterprise producing and distributing low-cost filters countrywide
- **Suez Environnement/ PALYJA (Indonesia):** Private operator proposing multiple and modular solutions for connecting poor and informal neighborhoods of Jakarta
- **Manila Water (Philippines):** Private utility dramatically increasing service coverage in Manila slums thanks to the participation of communities
- **Balibago (Philippines):** Local, mid-scale utility building and managing piped water networks in small cities across the country
- **Naandi Water (India):** Social enterprise installing and managing a large-scale network of mini-treatment plants in rural areas
- **Sarvajal (India):** Social franchise for mini-treatment plant operators in rural areas
- **Healthpoint Services (India):** Social enterprise building and operating a network of health centers, and selling treated water at in-house Kiosks
- **Unilever Pureit (India):** Hindustan Lever-led pilots to increase market penetration of their water filters in rural India

Figure 7. Overview of Project approach

| Document existing successes | | | Identify scale-up strategies | Develop recommendations |
|---|---|---|---|---|
| Database | Cluster of solutions | Case studies | Strategic vision for industry | Resources and players needed |
| Mapping of existing innovative projects | Categorizing of projects addressing similar needs with similar solutions into clusters | Short-listing of projects for further analysis | Description of scale-up strategies for each cluster, given innovations and obstacles encountered | Description of investment and players needed to overcome obstacles and implement proposed scale-up strategies |

The Project took place between October 2010 and July 2011. Data published in this Report refers to the end of 2010, unless specified otherwise.

## Sponsors

This Report is part of a broader project on access to safe water. This project aims to catalyze a set of actions for stakeholders in the private, citizen and public sectors to design and scale-up sustainable models of access to safe water for the BoP.

This project has been financed by a Consortium of seven leading institutions in the water and development space:

- Agence Française du Développement (AFD) and Proparco (France)
- Aqua for All (The Netherlands)
- BoP Innovation Center Inc. (The Netherlands)
- Children Investment Fund Foundation (CIFF) (United Kingdom)
- Finagestion (France)
- Suez Environnement – Fondation *Eau pour tous* (France)
- Swiss Development Cooperation (SDC) (Switzerland)
- Veolia Environnement (France)

This multi-stakeholder set up was chosen in order to facilitate relationships between philanthropic and corporate players, as well as ensure that all the winning strategies identified through the project would find a natural 'owner'.

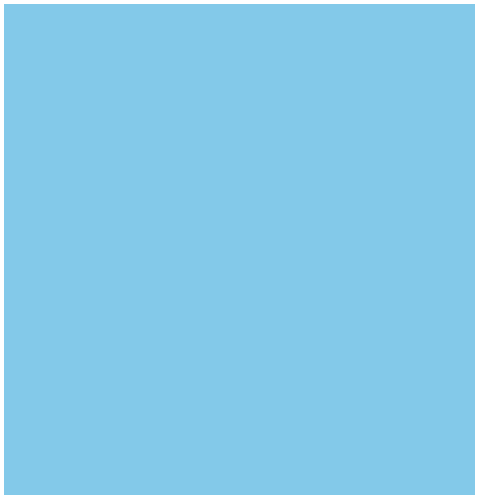
## Project Team

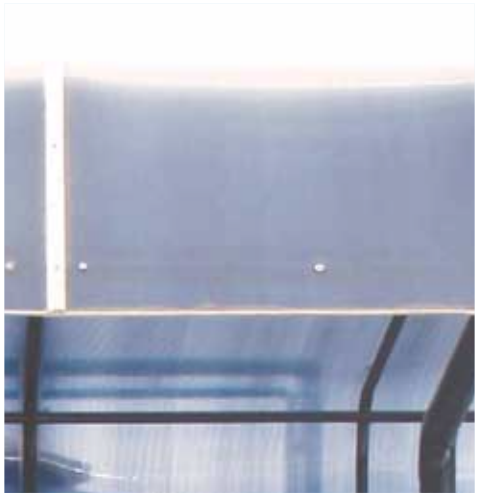
The Report has been prepared by Hystra, an international consultancy working with business and social sector pioneers to design and implement hybrid strategies. Hybrid strategies are innovative approaches that are economically sustainable, that eradicate social and environmental problems, and which aim to combine the insights and resources of business and citizen sectors.

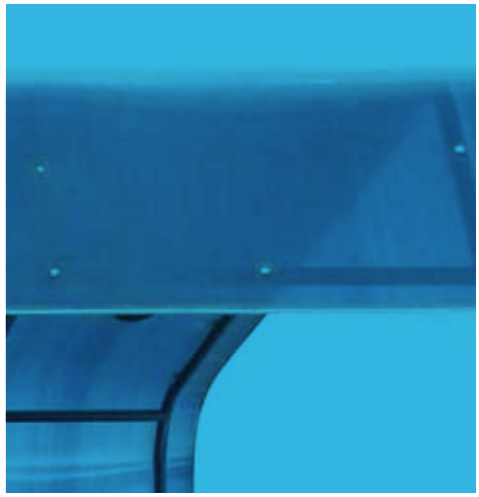
The team was overseen by a Steering Committee, with representatives of each Consortium member. In addition, the team was supported by three experts: Urs Heierli (MSD Consulting), Sjef Ernes (Aqua for All), and Taco De Nies (BoP Innovation Center) and Christian Vousvouras (Consultant, 300in6).

Finally, the team also relied on the support of Ashoka, whose team helped to identify relevant projects and entrepreneurs.

# NEW APPROACHES TO EXTENDING SAFE WATER ACCESS TO THE POOR









# NEW APPROACHES TO EXTENDING SAFE WATER ACCESS TO THE POOR

## There are four distinct clusters of solutions, each appropriate for different environments

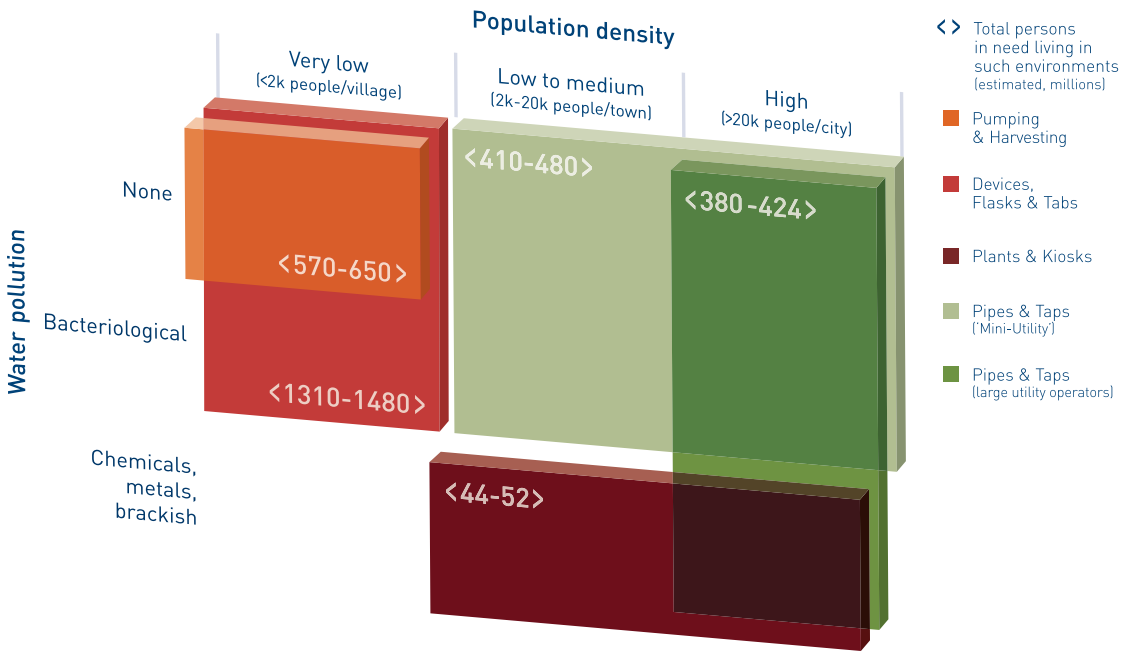
While access to safe water is a universal need, there is a wide diversity of solutions that provide safe water at an affordable price. Yet the appropriateness of each solution depends primarily on two factors:

- The population density – the more dense an area, the more economic sense it makes to invest in collective treatment and distribution infrastructure
- The level of pollution in the water – the more polluted the water, the more expensive its treatment (and the final price to the consumer), the more discriminating people will be in choosing to use the clean, expensive water for drinking purposes only.

As a result, we have identified four different safe water solutions , namely 'clusters':

| | | |
|---|---|---|
| **Pumping & Harvesting** | Installations to pump underground water or collect rain water: e.g., protected wells with pumps, rainwater harvesting cisterns. | Most effective in areas where raw water is basically clean and where population density is low. These solutions are promoted largely by government, donors and NGOs. |
| **Devices**<br>**Flasks & Tabs** | Consumable disinfectant products, mostly chlorine-based, distributed in liquid or tablet forms.<br>Durable filtration devices and filters, using different purification technologies. | Solutions for populations in small villages, where water does not require complex treatment. They are promoted by both NGOs and commercial players, in areas with limited or no reliable safe water provision. |
| **Plants & Kiosks** | Mini-water-treatment stations: collective installations for more heavily polluted and/ or brackish water, best suited for small towns and villages. | Most cost-effective in areas where water is brackish/ heavily polluted, with a relatively high population density (rural or urban). These solutions are promoted and operated by (social) entrepreneurs, often in collaboration with local or regional authorities. |
| **Pipes & Taps** | Piped distribution networks: collective networks used to transport treated water to homes or public stand posts.<br>This includes: | Most effective in areas with high population density. |
| | • Large utility operators (public or private operators mandated or contracted to serve large urban networks) | • Achieves significant economies of scale both in terms of treatment and distribution operations. |
| | • 'Mini-Utilities': small, stand-alone piped networks reaching a few hundred or thousand families | • Sustainable and affordable in areas where water requires limited treatment (e.g., chlorination and filtration). While very small installations can be managed by informal entrepreneurs, larger operations are often mandated by local authorities. |

**Figure 8. The scope of safe water solutions, in terms of appropriateness and cost-effectiveness[28]**




In addition to population density and pollution, these four clusters differ on other aspects:

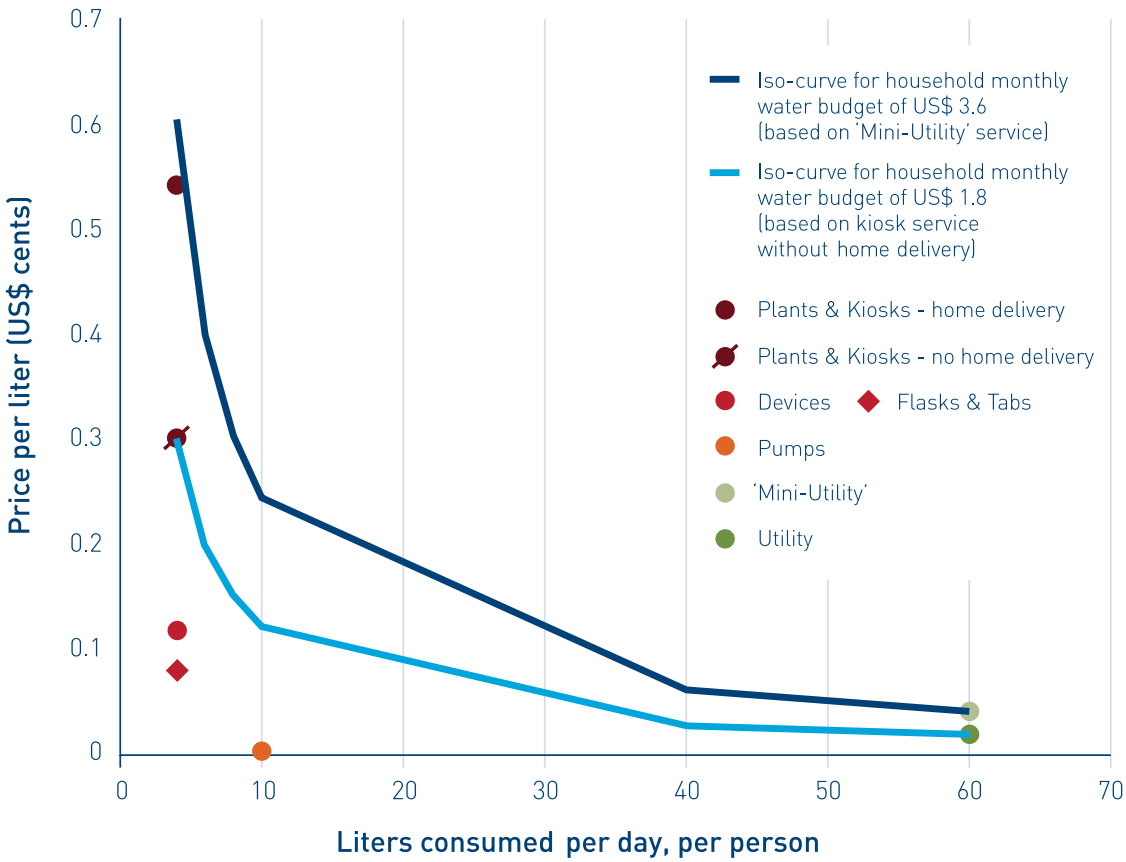
**a) Needs served and type of service rendered:** Some of these solutions only address the 'quality' issue, i.e., they provide 4 liters of safe water a day per person. Others address both 'quality' and 'quantity', i.e., they provide over 40 liters of safe water a day per person. Furthermore, some of these solutions may be more convenient than others, e.g., whether water can be distributed at home or not.

**b) Willingness to pay:** As each of these solutions provides a different product and service, households will spend a different amount for water. The graph below shows that households are (able and) willing to spend on average US$0.30 cents per liter for small quantities of treated water picked up at the treatment kiosk versus US$0.50 cents for small quantities delivered to the home, and only about US$0.04 cents per liter for large quantities of treated water available at the home tap.

Interestingly, users are willing to spend more of their income on water, if they can get large quantities delivered to home. For instance, the case studies show that a low-income household with a home connection to a 'Mini-Utility' service spends on average US$3.60 on water every month. In contrast, a household which has to pick up 20 liters of safe water every day at the water kiosk is only willing to spend US$1.80 on water every month.

*28 The Project Team has attempted to estimate the number of people that live in environments where a given type of solution is most relevant – namely "people in need". This is different from the number of people that a particular solution could possibly reach ("people reached"), as the expected penetration (among people in need) varies by type of solution (e.g. 20% for Devices, Flasks & Tabs, 50% for Plants & Kiosks and 80% for Pipes & Taps"). There is an overlap between some solutions: Devices can also be used in environments for Pumps (to ensure water quality until consumption). The overlap amounts to 570-650m people; Plants & Kiosks can also be installed in very polluted suburbs of large cities – which should typically be covered by large utilities. The overlap amounts to 36-42m people; 'Mini-Utilities' can be installed in less polluted cities – which should typically be covered by large utilities. The overlap amounts to 320-410m people. Sources: Team analysis; WHO/ UNICEF Joint Monitoring Programme for Water Supply and Sanitation; United Nations Environment Programme, Global Environmental Monitoring System/ Water Quality Monitoring System; Outside the Large Cities; The demographic importance of small urban centres and large villages in Africa, Asia and Latin America, IIED, 2006.*

**Figure 9. Observed daily spend on safe water (price and quantity), in light of total monthly household water budget[29]**




**c) Role of government and water authorities:** The public sector, which has primary responsibility for ensuring safe water access for all, often shapes the degree and type of involvement of private players. For instance, the Pipes & Taps Cluster falls directly under the public mandate as water utilities are tasked by local authorities with operating public infrastructure. While water operators are mostly public in developing countries, authorities can call on private players to operate water networks (e.g., through delegated management contracts or Public Private Partnerships). In contrast, in the absence of public service provisioning, other clusters fall almost entirely into the private sector. This is the case for Devices, Flasks & Tabs, whereby commercial players and NGOs propose alternative water treatment products in areas not catered for by public water services. Finally, Kiosks and Pumps are often established by local communities, NGOs and entrepreneurs, but require the support of public authorities to reach significant scale.

**d) The need for corresponding wastewater solutions:** Utilities of any type, which bring large quantities of water to the home tap, should also propose solutions for wastewater collection and treatment. Otherwise any potential benefits to public health will be compromised by the exposure of people to contaminated water.

*29 Price points are defined on the basis of the lowest price points observed in the case studies, which would still allow for the financial viability of a safe water intervention to provide that particular good or service at a large-scale. The budget iso-curves are calculated on the basis of a set baseline. For instance, in the blue curve, the baseline is the monthly amount spent on safe water by a household picking up water at a water kiosk (typically 4 liters per person per day, priced at US$ cents 0.3 per liter). This budget was kept constant, all along the curve, for any quantity-price combination. Therefore, if the same household would consume 60 liters per person per day, the price of water would need to be as low as US$ cents 0.02, to keep the budget at US$1.8. This figure can then be compared with the prices that poor households are actually willing and able to pay for piped water solutions that provide 60 liters per day per person. Differences between the iso-budget curve and the reality show that households value each solution differently, and are ready to pay sometimes more (or less) than a theoretical budget limit.*

As a result of these differences, each cluster is necessary and distinct, in the sense that each one is appropriate for certain environments, and cannot be easily compared with other clusters in terms of feasibility, impact or cost-effectiveness.

The authors of this report also acknowledge that, in real life, solutions may overlap temporarily, to solve a particular situation. This is for instance the rationale for having household water filters in large cities, where the water network needs to undergo important refurbishments to deliver safe water. Yet what the table above shows is that in dense urban areas with important pollution problems the most cost-effective way to ensure that everyone drinks safe water all the time, is to provide it at the tap, after having treated it with appropriate technology in large facilities.

It is also important to note that there exists, besides issues of raw water quality and density of population, other important factors to consider when assessing the local applicability of a solution, such as the availability of raw water. These other factors are described in the following chapters that discuss the prerequisites for implementing a given solution.

## Introduction to the following cluster chapters

The four following chapters—one per cluster—are structured as follows:

- A synthesis of the findings of each case study, including obstacles and innovations
- The outline of a possible scale-up strategy for the cluster, so that successful innovations can be replicated elsewhere
- A description of the resources and roles needed for the implementation of these strategies, followed by recommendations as to which player—public, philanthropic or commercial—will best suit each role.

Major findings are summarized here:

In the Devices, Flasks & Tabs, Pumping & Harvesting, and Plants & Kiosks Clusters, the Hystra Project Team could identify successful *individual projects*, but the challenge is to develop—on that basis—*entire industries* of safe water goods and services that can reach out to poorer populations at an affordable price and offer a standardized level of quality. To reach that scale requires heavy investment in awareness and education campaigns on the need for safe water, while incubating a set of local enterprises that would copy the winning approaches for each cluster. Such efforts cannot be borne by private players alone, and should also be supported by philanthropic or public institutions.

In the fourth cluster, Pipes & Taps, there already are a number of examples whereby utility operators (public or private) managed to expand and dramatically improve safe water provision for the BoP. These efforts could be accelerated by the emergence of a new type of hybrid water utility, which we name in the Report the 'BoP Utility'. The Hystra Project Team believes that this enterprise could exclusively focus on serving populations at the periphery and slums of large cities, as well as in fast growing towns. For different reasons, such a utility could not be purely public or private, but rather requires a blend of both, in terms of both governance and financing.

# DEVICES, FLASKS & TABS

# DEVICES, FLASKS & TABS

**Devices are durable goods that filter and store water. Flasks & Tabs are consumable products that disinfect it.**

## Highlights

- Devices, Flasks & Tabs are among the most affordable solutions to provide safe water to millions of households worldwide who live in rural areas with limited water pollution.
- There are a number of projects aiming to achieve economic sustainability in the mid-term, led by NGOs, social enterprises and corporations.
- This cluster has mostly innovated in the areas of user education and low-cost distribution and promotional techniques.
- Devices, Flasks & Tabs represent appropriate solutions for the 1.3-1.5 billion people in need living in rural areas across the developing world.
- A sustainable local industry of Devices, Flasks & Tabs for the BoP could emerge given heavy up-front philanthropic investment to finance user education and social marketing campaigns, and to support the incubation of local pioneering enterprises.

**Devices, Flasks & Tabs are among the most affordable solutions to provide safe water to millions of households worldwide who live in rural areas with limited water pollution.**

Devices, Flasks & Tabs offer today safe water to millions of households in areas with low population density, experiencing minimal water pollution (as most low-cost products do not remove chemicals or treat brackish water, but are effective against bacteria and in some cases viruses). They are promoted as complementary, alternative solutions in areas where piped-water is not safe or not available, by both NGOs and the private sector.

However, both Devices and Flasks & Tab solutions have their limitations. With Flasks & Tabs, households have to decide every month whether to purchase their water disinfectant and have to adopt daily routines to treat their water. The challenge for Devices is about financing the initial purchase, and from there ensuring correct use, maintenance, and replacement. Of note, most low-cost filters typically last 1-2 years after which they require the replacement of the whole or part of the device.

Table 2. Comparison of main Devices, Flasks & Tabs product categories[30]

| | Liquid chlorine *WaterGuard* | Ceramic filters *Hydrologic* | Chlorination tablets *Aquatabs* | Solar disinfection *Sodis* | Biosand filters - | Coagulation/ chlorination powder *PUR* | Liquid colloidal silver *Silverdyne* |
|---|---|---|---|---|---|---|---|
| **Value proposition** | Lowest cost solution | Low-cost filters | Easy and convenient to use; daily dose | Freely available | Low-cost filters; high flow rate | Treatment of turbid water | Neutral taste |
| **Product drawbacks** | Taste | Slow flow rate, easily broken | Expensive for the BoP | Small quantities, cumbersome to use | Difficult to transport and set up | Expensive for the BoP | Not adopted by WHO yet |
| **Price/day/ household (US$ cents)** | 0.50 (WaterGuard Kenya) | 1.60 (Hydrologic Cambodia) | 3.15 (Aquatabs Kenya) | 0.00 | ~1.50 | 12.50 (PUR Kenya) | 5.00 (Silverdyne Mexico) |

### There are a number of projects aiming at achieving economic sustainability in the mid-term, led by NGOs, social enterprises and corporations

The Hystra Project Team has selected four projects for further analysis in this cluster (which can be found in the case study section of the Report). These projects reflect various approaches undertaken by a large NGO, a social enterprise, a multinational corporation, and a small local NGO. All of them operate with minimal involvement from local authorities, as they strive to bring their products to areas with limited or no access to reliable public services.

### Overview of selected case studies

#### Devices

*Hydrologic Ceramic Rabbit Filters (Cambodia):* Hydrologic produces and distributes 'flower pot' style ceramic filters at large-scale. Established in 2009 as a social enterprise, Hydrologic has been operational in Cambodia since 2001. It is now aiming to reach financial sustainability in the mid-term. It is estimated that about 2-3% of the Cambodian population has purchased a filter from Hydrologic since 2009 (reaching an estimated 400,000 beneficiaries). The acquisition cost is US$12.50 per unit. Their main product, the Rabbit filter, positioned as a basic affordable household appliance, it is simple to use but requires regular cleaning and replacement every two years on average. The company has recently introduced an upscale product, and is building up a direct sales force to increase reach and penetration. Distribution of Rabbit filters is done through 600 commercial retail outlets, as well as a recently established own direct door-to-door sales force for the rural areas. Deliveries to key accounts (NGOs mostly) are handled directly by the central team.

30 *Source: Interviews with PSI, Antenna and Tinkisso; Scaling up Household Water Treatment among Low-Income Populations, WHO, 2009.*

*Unilever Pureit Water Purifier (India):* Unilever has developed a range of home filters (four products on total), including a low-cost purifier aimed at poor urban dwellers, as well as rural users. All filters are branded Unilever, and are positioned as aspirational purchases. The unit cost for the end user is US$20 for the cheapest version, and US$40 for the mid-range. The filter is comparatively complex to use, clean, and maintain: the cartridge needs to be replaced around 3-4 times per year for the low-cost version, and 1-2 times per year for the mid-range model, assuming each household uses only 10 liters per day (per Pureit team assumptions). While most of the 3.6 million filters sold since 2008 were bought by wealthy urban, households, Unilever has launched a number of ambitious pilot programs to promote their products to the BoP in rural areas. These include a project leveraging Unilever's rural fast-moving consumer goods sales network (i.e., the 'Shakti ladies'), as well as partnerships with microfinance institutions to reach out to self-help group members. One of these pilots notably recorded an all-time-high 40% penetration in some villages where potential users were offered micro-loans to fund the purchase of water purifiers.

## Flasks & Tabs

*Tinkisso/ Antenna Watasol (Guinea Conakry):* Tinkisso, a local NGO, produces and distributes chlorine in rural Guinea. The operation is supported by Antenna, a Geneva-based NGO, which specializes in designing and manufacturing electro-chlorinators (low-cost devices to produce chlorine). The chlorine is simple to use: one bottle cap needs to be diluted into 20 liters of water, 30 minutes before use. Chlorine, bottled in 250ml flasks, is sold by Tinkisso sales teams at local fairs and markets, by independent agents doing door-to-door sales, and by regional health centers participating in the project. The company is now close to break-even and operations have been scaled-up to the entire Faranah region, now reaching over 50,000 regular beneficiaries. The project benefited from social education campaigns conducted in the aftermath of recent cholera outbreaks.

*PSI/ Point-of-Use Water Disinfection Project (Kenya):* PSI is the largest promoter and distributor of chlorine-based products worldwide. In Kenya, PSI introduced three different water disinfection products to market (two imported, and one produced locally). All three products are stored in PSI warehouses before being distributed through existing commercial channels, as well as community-based organizations. The PSI Kenya water program presently reaches around one million people every day. PSI also conducts extensive product and social marketing operations throughout Kenya – all of which are grant funded – while distribution expenses are partly recovered through the sale of products.

A number of key performance indicators are reproduced below to illustrate the approach and performance of each project. However, given that each project is being implemented under very different circumstances, comparison may be difficult. More detail about each case study can be found in the case study section of this Report.

## Overview of key performance indicators for each case study (end 2010 data)

| Service level | Unit | Hydrologic Rabbit filter | Unilever Pureit filter[31] | Tinkisso/ Antenna Watasol[32] | PSI Water-Guard |
|---|---|---|---|---|---|
| **Average liters/ person/day** | *Liters* | 4 | 2 | 9-10 | 4 |
| **Treatment effectiveness** | | Low-medium | Medium-high | Medium | Medium |
| **Product characteristics** | *Liters per hour* | 2-4L/hour flow rate<br>12L storage capacity | 2-9L/hour flow rate<br>5L storage (low-end version); 9L (mid-range) | 21 days shelf life | N/A |
| **Price/liter** | *US$ cents* | 0.08-0.09 | 0.71 | 0.043 | 0.0325 |
| **Proportion of safe water product cost over BoP 500 family income[33]** | *%* | 0.3 | 3.8 | 6.3 | 0.1 |
| **Price of device/bottle** | *US$* | 12.5 | 20 | 0. 43 | 0.25 |
| **Total cost of ownership per year** | *US$* | 5.8-6.3 | 25.6 | 7.3 | 1.825 |
| **Total regular beneficiaries** | | 400k | 150k (BoP pilots only) | 52k | 984k |
| Operational performance | | | | | |
| **Start of operations** | *Year* | 2009 (Hydrologic); 2001 (local operation) | 2008 (Pureit); 2009 (BoP pilots) | 2008 | 2003 |
| **Location of operations** | | Cambodia | India | Guinea Conakry (Faranah region) | Kenya |
| **Penetration of population** | *%* | 2.6 (Cambodia wide); 3.1 (target provinces) | 1 (India wide); 40 (self-help group micro-loan pilot) | 6.5 (region wide) | 3 (Kenya wide); 4.3 (of population targeted) |
| **Retail margin** | *%* | 30 | N/A | 30 | N/A |
| **Revenues from sales of products** | *US$ per year* | 282k | N/A | 46k | ~ 323k (WaterGuard only) |
| **Operational expenses (excl. overhead)** | *US$ per year* | 409k | N/A | 53k | ~ 318k (WaterGuard only) |
| **(Social) marketing expenses** | *US$ per year* | 43k | N/A | 11k | ~. 1m (all products) |

*31 A consumption of 10L/day/household is the level assumed by Pureit team, following expert assessments. Assuming a consumption of 20L/ day/household, for comparability sake with the other Filter solutions, would bring the price of the liter down to US$ cent 6.5 and the total cost of ownership/ year/ household up to US$43-47 for the low-end version and mid-range models respectively.*

*32 The higher consumption level is due to the fact that a bottle of product (that can treat 1kL of water) lasts a minimum of 21 days only.*

*33 BoP 500-3000 classification scale of 2002 was adjusted on U.S. Consumer Purchasing Index with latest 2010 available data (ftp://ftp.bls.gov/pub/special.requests/cpi/cpiai.txt). Prices of water and family incomes were converted following PPP conversion factor for private consumption (LCU per international $) 2009 (http://search.worldbank.org/data?qterm=PPP%20conversion&language=EN). For Pureit, we assumed a consumption of 20L/day/household, to make data comparable. However, according to Pureit team estimates, actual consumption should hover around 10L/day/household.*

**This cluster has mostly innovated in the areas of user education and low-cost distribution and promotional techniques.**

To reach scale, successful players had to overcome a number of obstacles, by innovating in terms of approaches and products. Their innovations (and others') are described below:

a) **Financing of extensive user education/ social marketing campaigns:** the first obstacle to scale and replication is the cost of social marketing campaigns required to drive lasting behavior change, trigger sufficient demand and ensure regular use. These campaigns should focus on the necessity to use safe water, but are not necessarily linked to a specific product. Innovative solutions include:

- PSI seeks grant funding for its social marketing activities, while deploying its household water treatment products through traditional commercial supply chains.
- Large companies like Unilever and Tata, rely on NGOs and government assistance for social marketing, and put their brand behind their filters, to drive early product adoption, in order to reduce overall marketing costs.
- Organizations like Antenna have capitalized on the power of emergencies, becoming active during and after major sanitation crises (e.g., the 2010 floods in Pakistan or the 2008 cholera outbreaks in Guinea Conakry). Similarly, the 'Blue Bus' social marketing campaign, widely acclaimed for its cost-effectiveness, took place in the aftermath of the Mitch Hurricane (see text box).
- Unilever finances hygiene and hand-washing campaigns using funds from its soap marketing budget, resulting in 20% increase in actual sales (see text box on Lifebuoy).
- In its *'Bolsa Familia'* program, the Government of Brazil only provides social benefits and financial aid to households with children who comply with public guidelines about enrolling children in school, regular vaccinations, etc.

### *The Blue Bus: Entertainment and education for the villagers*

***Nicaragua***

**Overview**

The 'Blue Bus' was part of a larger communication campaign - the 'Blue Star Campaign', designed by Johns Hopkins University after hurricane Mitch struck Central America. The campaign aimed to raise awareness around hygiene, sanitation and water quality. It was divided into several elements: an educational, mass media campaign (including TV and radio) using entertainment/ education messages; community mobilization, (a.k.a, The Blue Bus) used to reinforce these messages through interpersonal communication; and training for local organizations.

The innovative part of the campaign was the use of 'The Blue Bus' that went from village to village, and served as an interactive educational facility. Visitors could visit the bus and learn from their own experiences, as well as by observing others. Education-entertainment was also used here: presentations that fitted the local culture, motivational contests and fun movies were offered to the community. The bus even had a small laboratory where people could see the difference between treated and untreated water under microscopes. Before the arrival of the bus in a village, everyone – especially schools – had to prepare for the visit by discussing issues such as hygiene, hand washing, sanitation and water quality.

**The results**

During the life of the project, The Blue Bus visited 114 communities, and involved an additional 258 communities. About 66k people participated in the presentations and activities of the bus. As a result, visitors could give the 'right answers' to hygiene, water and sanitation questions, in significantly more instances than before stepping onto the bus.

The whole campaign was financed by USAID and amounted to US$2 million. The cost of The Blue Bus was only a share of this amount.

## *Why corporations should use their marketing budget to finance life-saving products for the BoP: Lifebuoy Swasthya Chetna*

***India***

**Overview**

Initiated by Hindustan Unilever in 2002, 'Lifebuoy Swastha Chetna' is the largest private education initiative on rural and hygiene in the world. Re-launched in 2009, it has two main objectives: increase soap usage in rural India and spread awareness about the importance of hand washing with soap to 200 million people.

Issue: 600k children under 5-years of age die every year from diarrhea in India. It is estimated that between 30 to 50% of these deaths could be prevented by washing hands with soap.

**Solutions**

- Marketing campaigns to promote personal hygiene practices through television, press and in-store advertising and promotion
- In partnership with local government, implement educational campaign in four phases:
  1. Identify the presence of germs using the 'Glow-Germ' demo kit on hands washed only with water and show the causality between germs and infections
  2. Marketing initiatives (e.g., stories, games, songs and quizzes) that involve school children so that they become ambassadors of the campaign
  3. Visits to villager's homes to convince mothers to attend health care education sessions
  4. Creation of self-help groups to ensure local ownership and continuation of the campaign.
- Continuous monitoring and evaluation on awareness levels and behavior change.

**Financial sustainability**

- The program was financed out of Unilever's soap marketing budget
- A total cost of US$5.4 million for 5-year program
- At a cost of US$80 per village
- Lifebuoy is the leading soap manufacturer in India with 70% market share. During the first 2002-2004 campaign, the program helped increase soap sales by 20%.

**Social impact**

- As of end 2010, the program reached 130 million people in 44,000 villages
- 30% increase in germ awareness and 20% increase in people understanding the link between germ and infections.

**b) Low-cost distribution channels for rural areas:** these products need to be made available in the most remote parts of the country where no other safe water alternatives exist. For Devices, these distribution channels should also provide after-sales service. Yet product margins are often too low to put in place extensive door-to-door sales and marketing operations. Hence, most players use a combination of promotional channels, relying wherever possible on existing low-cost distribution networks and local partners.

Innovative solutions include:

- In India, Unilever leverages its existing BoP sales channel – the 'Shakti Ladies' – to promote and sell its Pureit filters. It also works in partnership with micro-finance institutions to reach out to self-help group members.
- In Guinea Conakry, Tinkisso works closely with health centers and pharmacies, to recommend and sell chlorine for the prevention of diarrhea. In Kenya, PSI is working together with community-based organizations to promote and sell its products door-to-door.
- Antenna has developed low-cost technology that allows for local, small-scale production of chlorine, therefore reducing the need for transport and distribution infrastructure, as each production unit can cover a small catchment area. In Nepal, Antenna also leverages community structures such as schools (teachers, students and parents) for producing, promoting and distributing chlorine in their communities. Localized production may also facilitate the setting-up of recycling schemes for the chlorine plastic bottles (as these represent a significant share of operational costs).

**c) Financing of device purchase:** This issue is specific to Devices, as few poor people have the US$10-20 to hand to purchase a filter. Innovative solutions include micro-credit, payment by installments or leasing schemes:

- Through partnerships with micro-finance institutions, Unilever can propose micro-loans for the purchase of filters to self-help group members.
- 'Sun Shines for All' and 'The Water Initiative' (TWI) promote more expensive and effective filters by leasing them.
- Gloria Leche (a dairy company), contributes financially to the purchase of filters for its employees. It considers this as a way to improve employee health, and therefore productivity.

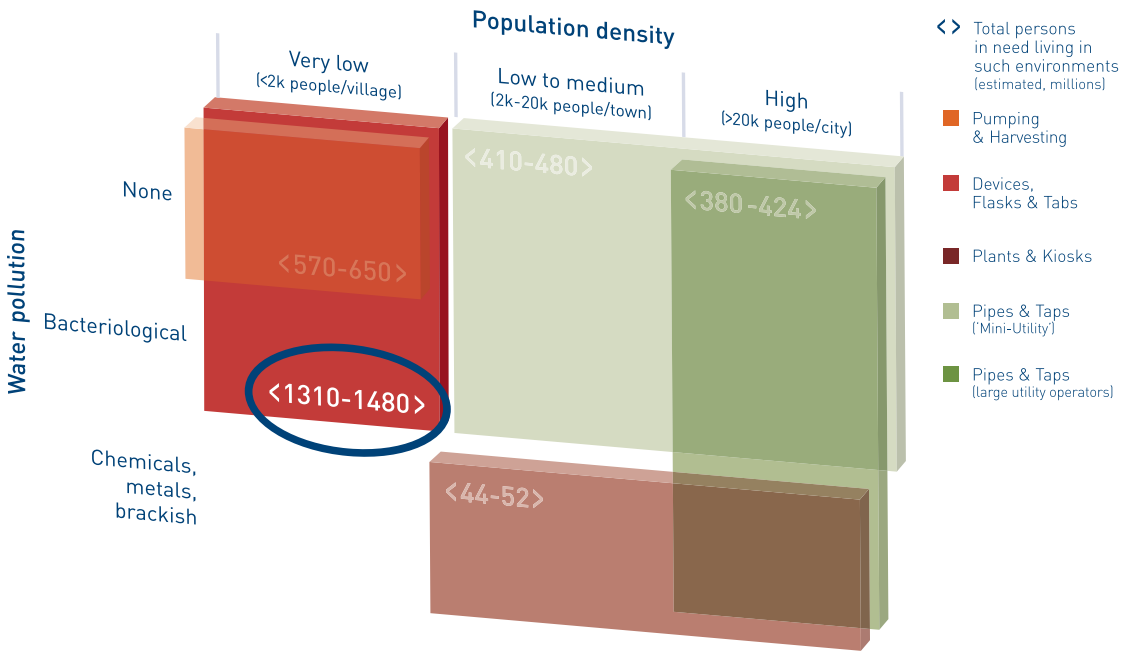
**d) Ensuring proper, daily use and maintenance of products:** In Devices, even the simpler versions require regular maintenance and cleaning, in order toto ensure effectiveness of treatment. These routines must become ingrained with users. Similarly, when the filter (or cartridge) needs replacement, people often wait to purchase a new set, if at all. In Flasks & Tabs, users see chlorine as a 'bad-tasting medicine' or chemical used to purify water when people are sick or weak in the family, rather than part of an essential daily routine. Innovative solutions include:

- Unilever's Pureit filters have a self-shutting mechanism when filtration performance reaches too low a threshold.
- Jompy cooking stoves devices allow boiling of water while cooking food, making boiling water more energy and cost-efficient, and part of the daily routine.
- A number of players are trying to improve the taste of disinfected water: Medentech new tablets have a slight lemon flavor, hiding the taste of chlorine in the water. Silverdyne is testing alternative technologies, such as the use of colloidal silver that does not leave an aftertaste in the water.
- Chlorine dispensers are being installed by IPA in Kenya next to community water sources, to encourage users to add some each time they come and fetch water.

## Devices, Flasks & Tabs could be appropriate solutions for the 1.3-1.5 billion people in need in rural areas across the developing world

Devices, Flasks & Tabs are important solutions because they are among the only low-cost alternatives to providing safe water to people who live in small villages (defined as more than 2,000 people) where the water source is bacteriologically polluted, or where the water source is safe but the necessary transport and manipulation of the water results in frequent recontamination.[34]

**Figure 10. Number of people in need who could benefit from Devices, Flasks & Tabs solutions[35]**



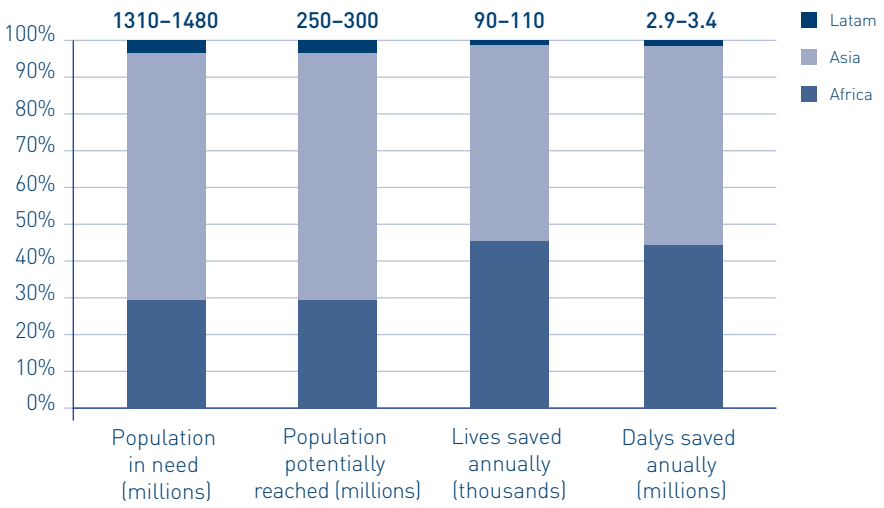

Devices, Flasks & Tabs could offer appropriate safe water solutions for a population in need of 1.3-1.5 billion people worldwide, including the 740-830 million living in small villages where water is bacteriologically polluted, and the 570-650 million people living in places where water is in principle safe, but where water extraction, transportation and manipulation can result in re-contaminated water before consumption. If such products were made available extensively in these areas, they could possibly reach approximately 20% of the total number of people in need, or 250-300 million regular users of Devices, Flasks or Tabs. Improved health outcomes could possibly result in 90-110,000 lives saved and 2.9-3.4 million DALYs averted annually worldwide.[36]

*34 Studies estimate that protecting springs reduce fecal contamination by two-thirds in water at the source, but only by 25% for water stored at home. This is likely due to in large part to recontamination in transport and storage within the household. Source: Kremer K, Miguel E, Mullainathan S, Null C, Zwane A: Coupons, promoters and dispensers: impact evaluations to increase water treatment, 2009.*

*35 Sources: Team analysis; WHO/ UNICEF Joint Monitoring Programme (JMP) for Water Supply and Sanitation; United Nations Environment Programme (UNEP), Global Environmental Monitoring System/ Water Quality Monitoring System; Outside the Large Cities; The demographic importance of small urban centres and large villages in Africa, Asia and Latin America, IIED, 2006.*

*36 Assumptions based on WHO 2008 country data on deaths and DALYs related to diarrhea: There are 0.14% of people without access to safe water who die out of diarrhea every year. Out of those deaths (and DALYs), 31% could be averted by safe water interventions (UNICEF estimates).*

Figure 11. Potential impact of Devices, Flasks & Tabs[37]




## A sustainable local industry of Devices, Flasks & Tabs for the BoP could emerge provided there is significant, upfront philanthropic investment

Existing projects show that large-scale manufacturing and distribution of Devices and Flasks & Tabs for the BoP can be sustainably provided by local business entrepreneurs, provided there is financial and technical support in the start-up phase.

However, overall penetration remains low among potential users, limiting the health impact such schemes could bring. A number of factors contribute to this situation:

- To have the industry reach sufficient scale, significant resources have to be invested in social marketing campaigns, not necessarily linked to specific products.
- Once demand picks up, any first mover advantage is quickly eaten away by low-cost, low-quality copycats competition: the technology remains relatively easy to copy, brand loyalty is low, and quality standard certification is nonexistent or not enforced (see text box on the right).
- Quite frequently, private donors and NGOs who are promoting and distributing their own subsidized or free products, undermine emerging commercial products and distribution channels.

As a result, no single player wants to invest sufficiently in awareness campaigns on the importance of safe water and the need for home water treatment solutions, so as to build nationwide demand for filters and chlorine solutions.

### *How low-cost, low-quality competing products have emerged in Cambodia and Kenya*

Vietnamese and Korean filters (e.g., Happy Cook, Alibaba, Korea King) appeared in Cambodia some 5-6 years ago, but only after local, mainly philanthropic players such as RDI, IDE and the Red Cross, built up the water filter industry from zero to 5% penetration across the county. Vietnamese and Korean filters are now in the homes of 7% of the Cambodian population. The companies producing them are part of large regional plastic and household goods manufacturers. They aggressively engage with local retail, by giving them profit margins of up to 30% and by bundling filters with other household goods (e.g., presents for newly-weds).

They also offer a product range that is more attractive than most NGO-subsidized items, while still keeping prices much lower than the high-end devices sold in cities. Quality of the devices, however, is not guaranteed.

Similarly, PSI Kenya, after years of social marketing and promotion of their WaterGuard branded chlorine bottles, now has a low-cost competitor piggybacking on their efforts. The competitor's product, named Aqua Guard, is priced slightly below WaterGuard, and is gaining ground rapidly.

37 *Sources: Population in need: WHO/ UNICEF Joint Monitoring Programme for Water Supply and Sanitation; United Nations Environment Programme, Global Environmental Monitoring System/ Water Quality Monitoring System; Outside the Large Cities; The demographic importance of small urban centres and large villages in Africa, Asia and Latin America, IIED, 2006); Population reached: Hypotheses derived from case study analysis; Lives and DALYs saved: Deaths and DALYs database, WHO, 2010.*

**Recommended scale-up strategy: philanthropic players should finance user education and social marketing campaigns, and support the incubation of local pioneering enterprises**

There is a case to be made for philanthropic initiatives which would focus on creating the right conditions for the birth of a competitive household water-treatment product industry in a given country, including social marketing campaigns.

Such interventions would require a concerted effort from donors, private investors and public authorities, and a considerable amount of financing for the following activities:

- Creating a 'social marketing alliance': ie., concerted campaigns that reinforce awareness on the importance of safe water and create demand for household water treatment products. The campaigns could be implemented by an alliance of local non-profit players, in close concert with the Ministries of Health and Education. The alliance should also be entrusted with monitoring health improvements among beneficiary populations.
- Industry incubation efforts: a handful of local entrepreneurs should be identified and grown into viable businesses, each covering a given territory. Depending on the product, the setup of their manufacturing operations could differ. For instance, centralized operations could make sense for filters, while decentralized production could make sense for chlorine, depending on local logistical constraints and the total number of people in need. For chlorine, entrepreneurs should consider setting-up recycling schemes for the PET bottles - which incentivizes retailers and users to bring back the bottles rather than divert them for other uses. While the social marketing alliance would do sector wide campaigns on the importance of safe drinking water, these local companies would do product promotion. They would do so through their own sales force, or in partnership with existing networks and partner organizations.

An estimated 25% of the total population would need such an intervention in a hypothetical country of 30m inhabitants, and over 5% (about 1.5 million people) would actually benefit if rolled-out successfully (based on case study penetration levels evidence).

For a hypothetical country of 30 million inhabitants, the investment need totals US$24-26 million, almost exclusively in grants.

## Implications for private and public players

### Role of government

Public authorities will have an important role to play, by participating in the planning and implementation of the safe water campaigns. In addition, as industry reaches critical mass, the public water agency will become instrumental in setting quality standards for Devices, Flasks & Tabs in order to control and limit the proliferation of fake or low-quality products (see text box on IDCOL).

*Government's role in bringing standards up: Infrastructure Development Company Limited (IDCOL)*

***Bangladesh***

IDCOL was established in 1998 by the Government of Bangladesh as a non-banking financial institution. Since its inception, IDCOL has been playing a major role in bridging the financing gap for developing medium to large-scale renewable energy infrastructure projects in Bangladesh. IDCOL also provides subsidies for the sale of solar home systems.

IDCOL has been instrumental in promoting better technologies for solar home systems and helping build a reliable solar home systems industry: For solar home systems to function well, they must be run on tubular batteries (as opposed to automotive batteries). But as tubular are more expensive, distributors tend to sell solar home systems with automotive batteries, thus undermining the whole industry. As a result, IDCOL decided to only subsidize the sale of solar home systems with tubular batteries.

### Implementation of intervention

Overall orchestration of this initiative would best come from a foundation or donor. It could also be designed as a Corporate Social Responsibility (CSR) program for a large corporate active in the field of water, healthcare, etc.

To be successful, this organization would need a strong local partner – a dedicated Program Management Organization (PMO), whose mandate would be to:

- identify, accompany, and bring to scale local companies that would manufacture and distribute household water treatment products
- source low-cost, effective and appropriate technology and material inputs
- coordinate with NGOs and other philanthropic players, to avoid serving the same users.

The PMO would be identified through a competitive bidding process. It could either be an NGO (e.g., PATH, BRAC, and TechnoServe), a local company, or an impact investment fund interested in developing a pipeline of companies in water. It would be important to incentivize such a PMO in the long-term, possibly by introducing a 'success fee' for achieving the program's targets. Success could be measured, for instance, by the viability of companies put in place, or the level of product penetration among the BoP.

In addition, the lead donor may consider financing impact measurement surveys. This would allow monitoring the performance of all partners, and adjust the approach, if necessary.

### Funding of intervention

Ideally, the lead donor, foundation or CSR unit would provide most of the grant and non-grant financing necessary to build a Device, Flasks & Tabs industry in a country. That includes financing the social marketing campaigns, the local PMO, as well as the start-up costs of local enterprises.

However, it should also seek to join forces with the relevant public authorities and other donors to establish the social marketing alliance.

### Business opportunity

Extrapolating from case study data, an average business sustainably serving 500,000 people could generate revenues of US$400,000 to 700,000 (making between US$20-60,000 in profit[38]), and would require modest investments of approximately US$120,000 for Devices manufacturers and less than US$20,000 for a Flask & Tabs business.[39]

Given these estimates, there would be room for three such entrepreneurs in a hypothetical country of 30 million inhabitants.

Companies could be set up and run by local (social) entrepreneurs with a track-record in manufacturing or distribution operations, or by existing household goods, ceramics, bricks or detergents producers.

*38 Profit before tax realized at the end of year 5, with a 20% interest rate on debt (with principal repayment over 5 years).*

*39 The estimated global economic opportunity would add up to about US$300-500 million, depending on the type of safe water product. This estimate has been calculated on the basis of the lowest safe water prices observed in the case studies, which would allow covering operational costs and capital expenditures. In this case, it would be US$17-19 for a filter, and US$0.47-49 for a chlorine bottle to disinfect the drinking water of a whole family over one month.*

# PUMPING & HARVESTING

# PUMPING & HARVESTING

## Small-scale installations for underground water extraction or rain water collection

### Highlights:

- Large-scale pump maintenance schemes are essential to optimize the use of the extensive pump parks set up worldwide by governments and donors.
- There are currently very few successful, large-scale pump maintenance projects that aim at becoming fully sustainable.
- Yet protected pumps could be an essential source of safe water for more than half a billion people living in rural areas of the developing world.
- While some existing pump maintenance schemes reached significant scale, their approach to operations could be improved on a number of points.
- To scale-up such schemes, a possible strategy would be to launch nationwide programs for pump parks lifecycle management, by having local entrepreneurs (or NGOs) provide maintenance services for local communities, and donors financing the gradual replacement of the older infrastructure.

**Large-scale pump maintenance schemes are essential to optimize the use of the extensive pump parks set up worldwide by governments and donors**

Pumping & Harvesting solutions are typically small-scale installations for households or small villages. In the vast majority of cases, there is little or no treatment attached to it, but the raw water sources can be protected from contamination.[40] Hence, water is safe so long as it is not polluted at the source, and the extraction/ collection installation is protected from any further, external contamination.

Today, hundreds of millions of people rely on manual pumps and rainwater harvesting tanks. Many have been installed and subsidized by governments and donors.

Given that the overwhelming majority of large-scale initiatives in this cluster are public sector or donor-driven, the Hystra Project Team identified only a few projects that have taken steps towards financial sustainability. Henceforth, the Team focused the analysis on manual pumps for small villages, where most innovations in the field of sustainable enterprises serving the poor appear to take place.

*40 According to WHO and UNICEF 2008 Joint Monitoring Program for Water Supply and Sanitation Rapid Assessment of Drinking-Water Quality (in press), 69% boreholes and 43% dug wells worldwide provide safe water (mean result).*

For manual pumps, it appears that most public or philanthropic funding goes to pay for new installations as opposed to maintaining existing ones. As a result, most pumps existing in rural areas do not have a sustainable solution for maintenance and spare part provision. In fact, it is estimated that out of the 600 to 800,000 hand pumps installed in Sub-Saharan Africa over the past 20 years, approximately one third are nonfunctional, resulting in a total failed investment of more than US$1 billion.[41] Another issue is that given the lack of coordinated approach between entities financing the installation of new pumps, pump parks tend to be heterogeneous and not mapped or monitored systematically.

### There are only a few successful, large-scale pump maintenance projects that aim at becoming fully sustainable

The Hystra Project Team concentrated its analysis on projects that provide maintenance services for hand pumps, and have selected a large-scale operation implemented by the NGOs Inter Aide and its local counterpart Baseda in Malawi, to conduct a detailed case study (found in the case study section of this Report). This project aims at achieving operational and financial sustainability by using commercially-based approaches.

*Inter Aide/ Baseda Maintenance System Project (rural Malawi):* This project provides maintenance services by part-time local mechanics for a small fee paid by the local communities. Communities can also purchase the required spare parts at local shops, which sell reliable products at an affordable price, thanks to a supply chain set up by the project. In addition, the project works with local authorities to map pump parks and approach communities. After 8 years of operations, 85 retailers and 149 local mechanics currently help maintain 8,500 hand pumps across 5 of the 28 districts of Malawi.

**Table 3. Overview of Key Performance Indicators for case study (end 2010 data)**

| Service levels | Unit | Inter Aide |
|---|---|---|
| Liter/day/household | *L* | 50 |
| Cost for household/ year for Inter Aide's services and spare parts | *US$* | 0.17 |
| Proportion of safe water expenses over BoP 500 family income[42] | *%* | 0.01 |
| Price/liter for Inter Aide's service and spare parts | *US$ cents* | 0,001 |
| Average maintenance expense/ pump/ year recorded by Inter Aide | *US$* | 8.7 |
| Total beneficiaries (actual) | *million* | 2.1 |
| **Operational performance** | | |
| Start of operations | | 2002 |
| Total pumps which need regular maintenance services | | 10,000 |
| Actual pumps' coverage in project area | *%* | 85 |
| Population coverage of project Malawi-wide (and in rural Malawi) | *%* | 16 (18) |
| Average pumps covered/local mechanic | | 57 |
| Revenues from sales of spare parts/ year | *US$* | 50k |
| Revenues from sales of maintenance services/year | *US$* | 24k |
| Operational costs/year (without overhead) | *US$* | 127k |

*41 RWSN study on hand pump functionality for 20 countries in sub-Saharan Africa, 2009 (http://www.rwsn.ch/documentation/skatdocumentation.2009-07-27.8158674790/file).*

*42 BoP 500-3000 classification scale of 2002 was adjusted on U.S. Consumer Purchasing Index with latest 2010 available data (ftp://ftp.bls.gov/pub/special.requests/cpi/cpiai.txt). Prices of water and family incomes were converted following Purchasing Power Parity conversion factor for private consumption (LCU per international $) 2009 (http://search.worldbank.org/data?qterm=PPP%20conversion&language=EN).*

### Large-scale provision of pump maintenance services requires dealing with complex operational and change management issues

The following paragraphs list the most significant obstacles that pump maintenance projects need to address to reach significant scale, as well as observed innovative approaches to overcome them.

**a) Introduction of paid services:** the sector is dominated by NGOs and donors, which set up manual pumps and provide spare parts for free. After they discontinue operations in a given area, the local communities may not be ready to start paying a small amount to ensure the functioning of their pumps. Similarly, large pump wholesalers and distributors concentrate on selling their products to governments and donors, rather than local retailers. This results in spare parts being unavailable for sale locally. Innovations to overcome this obstacle include:

- Inter Aide/ Baseda involve local authorities in their operations, which sponsor the company's activities among the communities where they operate. As the project is positioned as a partnership with the government, it gives it further credibility and acceptance among communities.
- Inter Aide/ Baseda act as an intermediary between spare parts wholesalers and retailers, by purchasing in bulk, and ensuring the warehousing and provision of parts to commercial retailers.

**b) Lack of community ownership:** 'water committees', which are commonly set up at the moment of the installation of new pumps, tend to become less effective at managing the equipment on behalf of the community over time. To address this:

- Inter Aide/ Baseda regularly train the communities in basic pump maintenance, so that they can perform basic maintenance operations at little or no cost.
- Bushproof, a social enterprise specializing in developing, manufacturing and installing safe water products and solutions for the poor, installs pumps and leases them, taking responsibility for the provision of a constant quantity and quality of water. Ownership of the pumps stays with Bushproof.

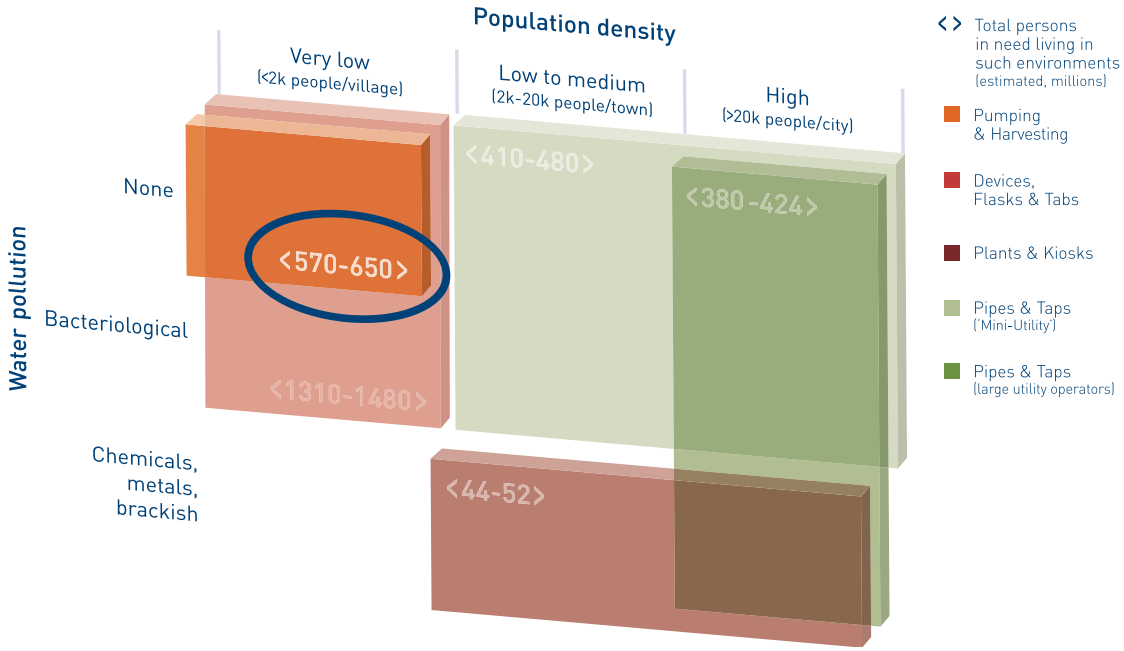
c) **Management and control of decentralized operations:** This third challenge is about providing services across thousands of geographically dispersed pumps, sometimes of different types and brands. This challenge must start with the mapping of the pump park, since there is no survey available on where the pumps are and in what condition they stand. Innovations include:

- For the mapping issue specifically, Inter Aide/ Baseda conduct surveys on existing water points, enrolling the mechanics and local water departments.
- For the management and control of decentralized operations, Inter Aide/ Baseda offer preventive maintenance services, which are easier to organize, good value, though a more difficult sell with the user communities at the beginning.
- Inter Aide/ Baseda also issues ID cards to its local mechanics in charge of doing repairs. These cards are officially given to the mechanic when Inter Aide/ Baseda kick start their operations in a village. This aims at reinforcing the trust that the community puts in the scheme.
- Sarvajal has developed a remote e-monitoring device, able to track water consumption and other operational parameters. Anomalies in operations trigger an immediate intervention and maintenance.

## Protected pumps could be an essential source of safe water for more than half a billion people living in rural areas of the developing world

Because protected manual pumps provide safer water than surface water, they are low-cost and effective solutions for a wide range of rural settings where water pollution is low.

**Figure 12. People in need who could benefit from Pump maintenance service solutions[43]**

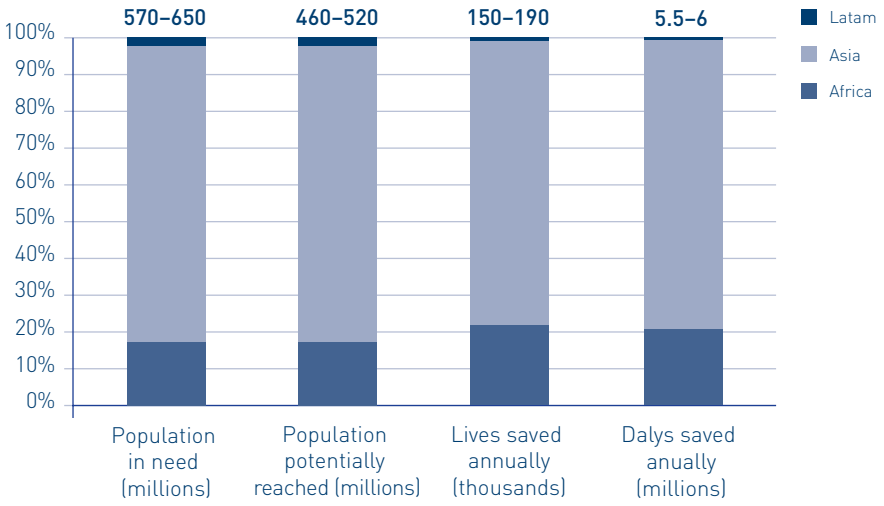



*43 These figures are based on the total number of people living in rural areas that have access to an improved (non-piped) water source (according to WHO/ UNICEF data). This number is discounted further for the instances where installations could be other than a manual pump (e.g., protected spring, rainwater collection). They are not based on the number of people who today have access to a manual pump.*

*Sources: Team analysis; WHO/ UNICEF Joint Monitoring Programme (JMP) for Water Supply and Sanitation; United Nations Environment Programme (UNEP), Global Environmental Monitoring System/ Water Quality Monitoring System; Outside the Large Cities; The demographic importance of small urban centres and large villages in Africa, Asia and Latin America, IIED, 2006.*

Better functioning pumps could provide an appropriate safe water solution for 570-650 million people in need across the developing world. If pumps were made functional in all these communities, it is estimated – on the basis of case study penetration levels, that 80% of such people could be reached, i.e., 460-520 million people would have improved water access. As a result, improved health outcomes could possibly translate into 150-190,000 lives saved and 5.5-6 million DALYs averted annually.[44]

**Figure 13. Potential impact of Pumps[45]**




### While some existing pump maintenance schemes reached significant scale, their approach and operations could be improved

Existing examples indicate that manual pump maintenance enterprises could be set up as sustainable, local businesses, and that local communities are ready to pay for their services and spare parts.[46]

A key factor in the success of making such services affordable, and yet sustainable, is to reach a scale where a single enterprise services thousands of pumps. An organization like Inter Aide went a long way towards developing such a scheme, notably on two axes:

a) First, by collaborating closely with authorities they gradually carpet-covered whole districts, winning communities to the idea that the government is leaving the provision of maintenance services at an affordable cost to a third party such as Inter Aide, and the local mechanics it employs.

b) It built operations in a very lean manner, by enrolling dozens of local, part-time entrepreneurs with basic knowledge of mechanics, and for whom this represents a side job, but a sufficiently lucrative enough one to be meaningful.

Nevertheless, the work of Inter Aide is not fully financially sustainable, and a number of operational aspects should be reconsidered for such a model to reach full potential. Moreover, a key part of the solution is missing: i.e., how to finance the systematic replacement of existing pumps when they reach end-of-life, in such a way that helps to better monitor and manage the pump park assets over time by government agencies.

*44 According to WHO 2008 country data on deaths and DALYs related to diarrhea, there are 0.14% of people without access to safe water who die out of diarrhea every year. 25% of these deaths (and DALYs) could be saved by interventions improving water access (UNICEF estimates).*

*45 Sources: Population in need: WHO/ UNICEF Joint Monitoring Programme (JMP) for Water Supply and Sanitation; United Nations Environment Programme*

*46 Estimates for recommended maintenance expenditure per pump vary in function of pump types. For instance, the maintenance cost of an Afridev pump is estimated at US$65-80/pump/year by the manufacturer (both spare parts and services). However, the Inter Aide case study shows that local communities get pumps going for far less: typically US$10-40, mostly on minor repairs. For reference, a u-seal is the main joint that needs to be replaced every year, and typically costs around US$0.20-30.*

**Recommended scale-up strategy: launch nationwide programs for pump park lifecycle management by having local entrepreneurs, or NGOs, provide maintenance services for local communities, while donors finance the gradual replacement of older infrastructure**

A scale-up strategy would be to launch a nationwide pump lifecycle management program, which may be partially financially sustainable but would also require philanthropic support. This program would consist of the following key elements:

a) **Plan for scale:** to ensure rapid, nationwide coverage, government should play a key role in driving and coordinating the national pump park maintenance effort. A way to do so would be for public authorities to issue bids for local maintenance companies (or NGOs) to conduct preventive and curative maintenance over a given geographic area, as well as replace old pumps, when and where required.

b) **Full pump lifecycle management:** to find a solution for sustainable maintenance services is not enough, if there is no solution to replace the old pumps. For this, the phased replacement[47] of the pumps in given territories should be financed with public or philanthropic resources through a national revolving fund. A centralized approach would allow for gradual standardization of the pump park, and monitoring the performance of the infrastructure. It would also allow dedicating sufficient grant resources to the education and sensitization of the users and local village committees on maintenance issues and solutions. While the first wave of funding should be financed by philanthropic (and/ or public) money, local user communities could partly contribute to the fund over time, as part of the fee they pay to the maintenance services operator. The fund could also be supplemented by donors and authorities installing new pumps (by having a percentage of the pump program budget allocated to maintenance and channeled into the fund).

c) **Offer a strong value proposition for beneficiaries:** local maintenance operators can provide more value for the pump users in four different ways:

- Train village committees on basic maintenance operations; educate users on the importance of regular maintenance; promote actively preventive maintenance services; and rationalize reactive maintenance. For instance, Inter Aide manages to have 15% penetration of preventive maintenance contracts. This should be pushed up much higher: preventive and self-help maintenance schemes reduce overall maintenance cost for communities (by avoiding major breakdowns) and increase long-term use of the pumps. Henceforth, maintenance could be done through local part-time mechanics, which the operator would train and certify. However, rather than the mechanic charging the community directly, he or she could be paid a monthly lump sum to perform a given number of maintenance operations in his area. Problems with pumps would be signaled directly to the maintenance company, either through remote devices installed on pumps or more simply through a toll-free line, which communities can call or sms in case of problems. The company would then dispatch the mechanic covering this area.
- Bundle maintenance interventions with the provision of spare parts, at a preferential rate: The service and the spare parts should be bundled, rather than asking the local communities to go and purchase the spare parts at the certified local shop. The supply of spare parts itself could be organized through a local network of partner retail shops, acting as local warehouses for the mechanics. The latter would come and pick up the spare parts required, and sign a spare parts log book. The company would pay a monthly lump sum to the retailer for carrying the stock (equivalent to an average margin on volumes stored). The retailers would also be able to sell available spare parts to individual customers at their own price.

*47 Life span of pumps depends on technology. For instance, average lifetime of Afridev pumps is estimated at 15 years. However, on average, after 3-4 years of use, pumps experience major problems, requiring professional maintenance. The Project Team took an average life span of 6 years, which is the estimated lifetime of most equipment before it starts requiring extensive and costly repairs. Source: RWSSHP.*

- Propose an all-in-one package for communities that would cover for preventive and curative maintenance services, basic spare part provision, and pump replacement every so many years. The fees would be collected – ideally upfront - from the communities on an annual basis, along with cycles of preventive maintenance operations. Such an offer would incentivize communities to actively seek help in managing their pump, given that most interventions would already be paid for.
- Ensure water quality, on top of pump functioning. At minimal additional cost to the maintenance operator, the integrity of the pump installation and safety of the water source could be checked at the beginning of the project in a given area, and regularly afterwards. With additional grants, channeled through the revolving fund, the local mechanics could also install and supply chlorine dispensers, which would be located just next to the water source, for users to disinfect water each time it is collected. For instance, IPA has already promoted such schemes in Kenya with promising results in terms of health outcomes for beneficiaries. Alternatively, in areas where the water supply is not safe, pumps could be fitted with add-on filters (a number of organizations, such as PATH and Cascade Design have developed devices to connect various filters to water installations). Such initiatives would obviously have to be preceded by user education campaigns to trigger actual compliance in the use of chlorine or filters.

To implement such a comprehensive intervention at the scale of a hypothetical country of 30 million inhabitants, would require to:

- Establish a national revolving fund, which would finance the phased replacement of pump parks (and initial promotion of maintenance scheme and education of beneficiary populations).
- Set up a 5-year incubation program to identify and grow local maintenance operators which could then become sustainable by offering their services to user communities. This would also include: establishment of detailed pump park maps; launch of program in each village; establishment of monitoring system for communities to report equipment failures; and training of mechanics.

In addition, these interventions would require a concerted effort from public authorities and donors, as well as grant financing, to ensure that the revolving fund keeps being supplemented to finance pump replacement after an initial wave of refurbishment.

Assuming there are a potential 3-3.5 million actual pump users (2.5-3 million of which are potential beneficiaries of pump maintenance services based on penetration levels observed in case study analyses), the total amount needed to finance a countrywide intervention would hover around US$11-12 million, solely to purchase new basic manual pumps,[48] and to have them installed and maintained by a set of local operators over a period of 6 years. This amount would mostly consist of grants.

*48 This only includes the cost of the equipment, without any operational overhead needed to organize the actual procurement of the pumps.*

## Implications for private and public players

### Role of government

Public water authorities and local municipalities have a critical role to play in supporting the establishment of such a nationwide program:

- Contractual aspects: the public water authority would issue and award bids for maintenance contracts across geographical areas, in partnership with the local water/ communal authorities.
- Political support: local authorities should sponsor local maintenance operators, by participating in the launch of the service in local villages, and acting as a relay for the local communities' concerns and suggestions. Without this, it would be difficult for the local operator to gain the trust and access required to serve these communities effectively and sustainably.
- Governance and oversight: The water authority should oversee overall contract implementation by the local maintenance operators. It should also be closely involved in the setup of the revolving fund.

### Implementation of intervention

Overall orchestration of this initiative would best come from a donor, a foundation, or perhaps the CSR unit of a large corporation. To be successful, this organization would need a strong local partner – a dedicated Program Management Organization (PMO), whose mandate would be to:

- identify, accompany and bring to scale local maintenance operators
- oversee the disbursement of the revolving fund
- maintain a close dialogue with local authorities on the implementation of the program
- coordinate with NGOs and donors to align on respective pump-related initiatives
- lead recommended efforts to monitor impact on health of user populations.

The PMO would be identified through a competitive bidding process. It could either be an NGO (e.g., PATH, BRAC, and TechnoServe), a local company, or an impact investment fund interested in developing a pipeline of companies in water. It would be important to incentivize such a PMO in the long-term, possibly by introducing a success fee for achieving the program's targets. Success could be measured, for instance, by the percentage of pumps functioning in project areas, and the viability of companies put in place.

The lead donor could also finance impact measurement surveys. This would allow monitoring the performance of all partners, and adjust the approach, if necessary.

### Funding of intervention

Wherever possible, the donor, foundation or CSR unit shall provide for all the grant and non-grant financing required to set up a pump lifecycle management scheme in a country. That includes setting up and financing an important part of the revolving fund and education campaigns, the local PMO, as well as the start-up costs of local maintenance operators.

However, it should seek to join forces with the relevant public authorities and other donors, in establishing and alimenting the revolving fund.

### Business opportunity

Such programs could lead to the development of a local pump maintenance and spare part distribution industry in a number of countries, provided it benefits government and donor financing and support in adopting integrated pump park lifecycle management approaches.[49]

Extrapolating from case study data, it appears that an operator maintaining 8,000 pumps for about 1.6 million beneficiaries, could realize revenues of US$190-210,000, and a profit of about US$40-60,000.[50] Capital expenditures required to set up such a company would be about US$30-40,000 (excluding pump park mapping costs).

Given these estimates, there would be room for two such operators in a country of 30 million inhabitants.

Operators could be local (social) entrepreneurs or NGOs. Operators would need to be able to identify a network of reliable village-level mechanics, and interact closely with local authorities.

*49 The estimated global economic opportunity would add up to about US$20-40 million. This estimate is based on the lowest safe water prices observed in the case studies, which would allow covering operational costs and capital expenditures. In this case, the estimates are based on the assumption that the annual flat fee for a village of 250 people would hover around US$15 for services and basic spare parts provision.*

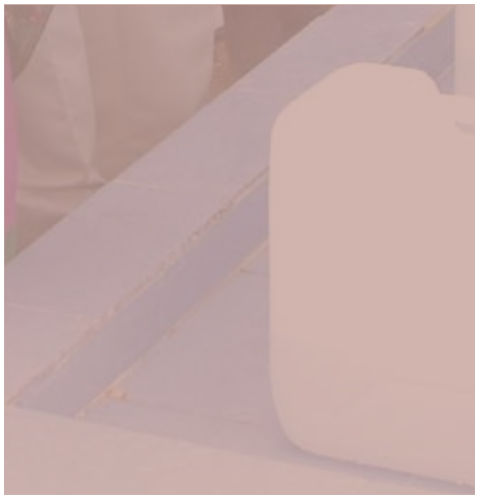
*50 Profit before tax realized at the end of year 5, with a 20% interest rate on debt (with principal repayment over 5 years).*

# PLANTS & KIOSKS








# PLANTS & KIOSKS

**Collective, mini-treatment plants for highly polluted and/ or brackish water. Treated water is sold at the kiosk, or delivered to the home in containers**

## Highlights:

- Kiosks provide affordable, safe water to millions of poor who live in heavily polluted areas, in a sustainable manner.
- There are many successful projects, with distinct operating models.
- The sector is buoyant with innovations, mostly in the field of governance, operations management and marketing.
- The kiosk industry could serve over 40 million people in need, mostly concentrated in Asia.
- While the basics are sound, the industry needs restructuring to reach further scale.
- A possible scale-up strategy would be to evolve the regulatory framework and create a new type of support platforms to support the development of village-level kiosk operators.

**Kiosks provide affordable, safe water to millions of poor who live in areas where water is heavily polluted, in a sustainable manner**

Mini-water-treatment units today offer safe water to thousands of communities in areas experiencing heavy water pollution or brackish water infiltration. There is already widespread, yet anecdotal evidence of improved health outcomes among user communities.

Encouragingly, existing examples indicate that operating a small kiosk can be an attractive business for a village-level entrepreneur.

Most Plants & Kiosks have been established in villages of 1,500 inhabitants or more, but are also being considered as a temporary alternative in large cities' under-serviced suburbs and slums. Rapidly growing in some Indian states, they are also now being piloted in selected parts of Africa and South East Asia.

The Plants & Kiosks sector is still little regulated, even in India, where regional governments promote their establishment by issuing public tenders for Build-Operate-Transfer (BOT) contracts. In the remaining cases, the water kiosks are owned and operated by local entrepreneurs, or handed over to local communities when the infrastructure had been financed by donors.

However, to increase the impact of water kiosks even further would require achieving penetration levels beyond the average 30-50% observed today in mature operations. A way to do that would be to offer piped-water delivery: users readily have water at the tap, rather than having to go and pick up their daily container at the kiosk. Yet, despite significant advances in technology and operational effectiveness, it is not possible today to combine a kiosk with a piped-water network delivering large quantities of water to the home tap at a price that is sufficiently low for the BoP - even though this is the type of service that users would value most. It is therefore critical to stimulate innovation in this field.

### There are many successful projects, each with distinct operating models

The Hystra Project Team has selected three successful projects for further analysis (which can be found in case study section of this Report). These projects are run by social entrepreneurs backed by large foundations or social investors. While these projects are all based in rural India, they each illustrate different approaches to scaling-up their operations.

*Naandi Community Safe Water Services (India):* Naandi is among the largest water kiosk network operation in the world. Naandi follows a BOT-like (Build Operate Transfer) model whereby assets are financed (and belong) to public authorities (in some cases local communities[51]), but where operations and maintenance are managed by Naandi Water. Local plant operators are selected and paid by Naandi, and maintenance support is centralized. Naandi's social and product marketing approach has resulted in up to 50% penetration rates over time, on average.

*Sarvajal Reverse Osmosis Franchise (India):* is a privately owned and operated franchise of local water kiosk operators. Capital expenditures financing consists of 68% equity from Sarvajal – the franchisor – and 32% from the license fee paid upfront by the franchisees. Sarvajal leverages modern communication technologies to monitor and support its franchisees, against a monthly fee amounting to 40% of the franchisee's monthly revenues. Sarvajal aims to become fully financially sustainable, and recover of its capital investments.

*Health Services India E-Health Points (India):* combines the provision of health services with sales of treated water in state-of-the-art clinics. This combination of services allows increasing overall acceptance for payment for treated water. Sales of water also bring steady cash flow to the overall operation, which from the start has been a critical element since the health clinic requires significant capital expenditure investments. The water treatment units are entirely financed by grants and equity from e-Health Point, and are operated by E-Health Point staff. Maintenance is ensured by a central team.

All three projects mostly use Reverse Osmosis (RO) technology and bill their services through a monthly subscription fee that allows households to pick up 20 liters per day, per household at the kiosk. Home delivery in 20 liter containers is available, but carried out by independent entrepreneurs for a fee that hovers between 50% - 100% of the price of treated water.

A number of key performance indicators are reproduced below to illustrate the approach and results of each project. However, given that each project is being implemented under very different circumstances, straight comparisons may not be appropriate. More details about the cases discussed can be found in case study section of this Report.

*51 If community-owned, the kiosk is financed at 80-90% by donor grants, and 10-20% by community contributions.*

Table 5. Overview of Key Performance Indicators for case studies (end 2010 data)

| Service levels | Unit | Naandi | Sarvajal | E-Health Point |
|---|---|---|---|---|
| Average liters/person/day | *Liter* | 4 | 4 | 4 |
| Price/liter (without home delivery) | *US$ cents* | 0.20-0.40 | 0.60 | 0.25 |
| Proportion of safe water expense over BoP 500 family income[52] | % | 1.9 | 3.8 | 1.6 |
| Number of regular user households/ kiosk (current average) | | 300 | 110 | 450 |
| Total beneficiaries (actual) | | 600k | 66k | 23k |
| **Operational performance** | | | | |
| Start of operations | *Year* | 2005 | 2008 | 2009 |
| Location of operations | | 5 Indian states, rural areas | 4 Indian states, rural areas | Rural Punjab, India |
| Penetration in villages with kiosk (average at maturity)[53] | % | ~50 | ~30 | ~50 |
| Total kiosks installed | | 405 | 120 | 10 |
| Average monthly revenue per kiosk | *US$* | 540 | 400 | 675 |
| Monthly operational and maintenance cost per kiosk | *US$* | 320 | 2,607[54] | 250 |

## The sector is buoyant with innovations, mostly in the field of governance, operations management and marketing

Plants & Kiosks' success in scaling-up depends primarily on four factors. The following section highlights some of the innovative approaches adopted:

**a) License to operate:** communal water treatment and provision typically falls under the mandate of public authorities. For private operators to develop large networks of Plants & Kiosks, they need to obtain a license to operate from public authorities or the local community. Possible approaches to overcome this obstacle include:

- Naandi negotiates BOT-like contracts with Indian state authorities to build and operate and design water kiosks in a given territory. In other regions, they require the financial participation of/ or ownership by recipient communities, before engaging the rest of the necessary resources to establish a kiosk.
- In Senegal, ASUFORs (user associations of small water systems) elect local operators based on votes from various community representatives (farmers, livestock owners, traders), thus ensuring support from the whole community.

*52 BoP 500-3000 classification scale of 2002 was adjusted on U.S. Consumer Purchasing Index with latest 2010 available data (ftp://ftp.bls.gov/pub/special.requests/cpi/cpiai.txt). Prices of water and family incomes were converted following Purchasing Power Parity conversion factor for private consumption (LCU per international $) 2009 (http://search.worldbank.org/data?qterm=PPP%20conversion&language=EN).*

*53 Overall average is lower as many kiosks are still in the start up phase.*

*54 Includes US$160/month franchise fee. The fee also pays for maintenance services provided by Sarvajal.*

b) **Quality control of local operations:** kiosks are essentially local businesses. It is therefore both crucial yet complex to ensure quality, consistency and integrity of service across operations spread in hundreds of locations. If one kiosk fails to deliver safe water, it calls into question the whole network. Innovations in quality control include:

- Sarvajal has designed and implemented sophisticated remote control devices on its machines to monitor performance and operations. It also has a toll free number for user complaints and queries. Equipment manufacturer Grundfos Lifelink is operating a similar remote management system in Kenya.
- Grundfos Lifelink manages customer payments directly, thanks to the 'm-pesa system', a platform that enables payments via mobile phones. The m-pesa system is not available in many countries, due to regulatory issues.
- In Mali, public authorities have imposed quality standards on all water installations in the country. Auditing is sub-contracted to private companies that bid for these contracts (2AEP).
- In Kenya and India, Paul Polak and Windhorse established a franchise of entrepreneurs that go and treat large tanks of water with chlorine. Local entrepreneurs then resell treated water.

c) **Promotion techniques that drive high penetration into communities and systematic use:** for water kiosk services to be effective, users need to be convinced that there is value in purchasing safe drinking water on a daily basis (as opposed to other publicly available sources of unsafe water). It is also important for the kiosk to be sustainable, that it serves as many users as possible. To do so, projects have to set up innovative marketing and payments schemes, including:

- Naandi hires a social promoter for every new kiosk, whose job is to educate and inform, door-to-door, each family in the village. The promoter also monitors water consumption of each user, and follows up on drop outs.
- Naandi, Sarvajal and e-Health Points offer monthly pre-payment cards, thus running against the generally accepted BoP rule of trying to minimize cash outlay.
- e-Health Points achieved remarkable levels of penetration in just a few months by locating water kiosks inside a health clinic, thus benefiting from the credibility associated with the health center.
- Gram Vikas maximizes health impacts by requiring 100% subscription and commitment to water and sanitation improvements for everyone, from the start of operations (see text box).
- 1001 Fontaines offers additional services to their beneficiaries in order to maximize health outcomes and increase perception of value. They deliver water in their own, disinfected containers. That way, they also ensure water safety until the very last mile.

*An example of integrated approach to water and sanitation: Gram Vikas*

***Orissa, India***

Gram Vikas is an NGO specializing in rural development. They use sanitation and water programs as the entry-point to encourage community ownership of collective development projects. They started their operations in 1979.

**Issues**

In Orissa, about 20% of the rural population lacks access to safe water, while only 7% has access to sanitation.

**Approach**

- Agreement that everyone in the community will participate and benefit from the project
- 'Carrot and stick' approach: water will be installed once sanitation is complete
- Capacity building for community-led installation and maintenance (e.g., masons)
- Integrated approach with other development interventions (e.g., microfinance, schooling, energy)
- Active marketing campaigns, showcase visits to model villages.

**Solutions**

- Average cost of water and sanitation solution per household: US$480
- Same technology for rich and poor households of the community. Use of protected dug wells instead of tube wells.

**Financial sustainability**

- Communities commit to pay 30% of the total cost (mostly in kind), while Gram Vikas finances the rest with grant money
- Gram Vikas helps to identify and develop income sources (e.g., fishing) to finance the community fund for the maintenance of the water and sanitation infrastructure.

**Social impact**

- 700 villages (45,000 families and 200,000 individuals, as of March 2009)
- Increased participation of women and other socially-ostracized casts to collective decision-making
- Significant drop in instances of diarrhea.

**d) Mobilization of financing for capital expenditure:** building and installing hundreds of kiosks requires mobilizing a lot of upfront financing. For instance, the Hystra Project Team estimates that Naandi had to raise well over US$5 million to build its current kiosk network. Innovations to overcome this high capital expenditures requirement include:

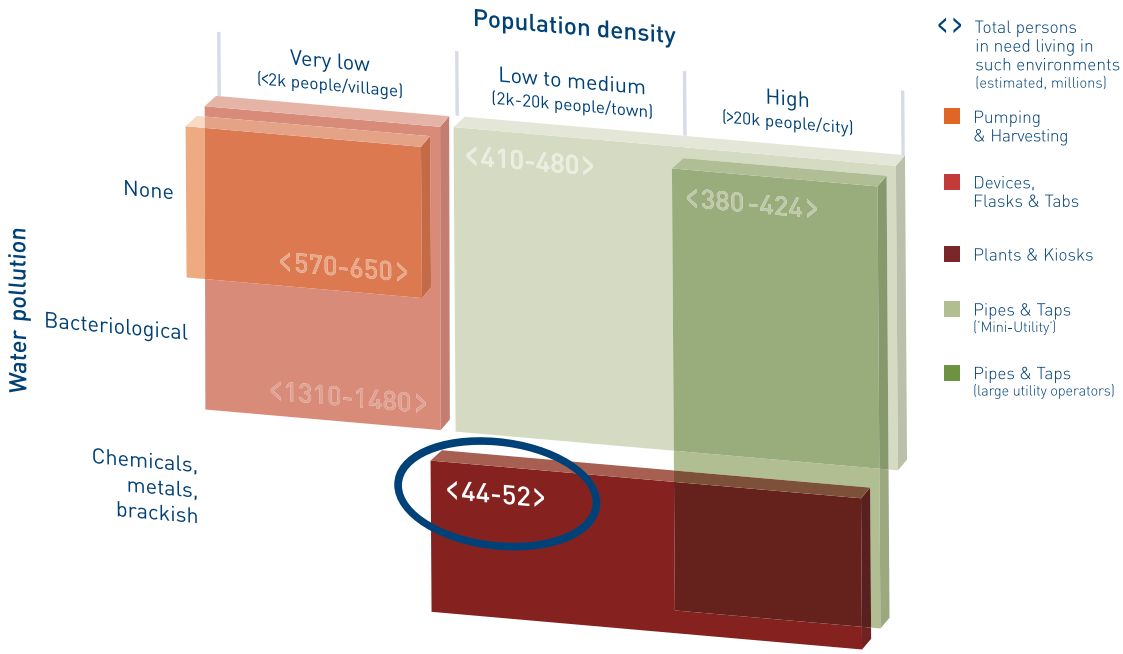
- Sarvajal managed to reduce its financing needs by reducing the cost of the installations: it designs and assembles its own bare-bone treatment plants, then uses existing buildings to host them.
- The Manna Energy Foundation is financing its operations through a carbon credit scheme. A number of water projects (such as Vestergaard Frandsen) are trying to obtain the same, for water filter products that substitute to water boiling (and corresponding use of fuels).

### The Kiosk industry could serve over 40 million people in need, mostly concentrated in Asia

Plants & Kiosks are important solutions, because they are the only low-cost alternative providing safe water access to people whose main water source is highly polluted and/ or brackish, down to villages numbering around 250-300 households (or 1300-1800 people).[55]

Other conditions for the applicability of this solution include: a) the water source being easily accessible, for free or at very low cost; b) the technology used in the projects studied requires a relatively reliable low-cost electricity supply.

**Figure 14. People in need who could benefit from Plants & Kiosks solutions[56]**




Plants & Kiosks could be an appropriate safe water solution for 44-52 million people in need worldwide, including 8-10 million who live in large villages, and 36-42 million living in under-serviced urban areas.[57] If water kiosks were made available in all these areas, and given penetration levels of today's kiosks, one could estimate that about half of these people in need would adopt kiosk services, (i.e., 22-26 million people). As a result, improved health outcomes could possibly translate into 11-13,000 lives saved and 350-450,000 DALYs averted annually.[58]

*55 Assumptions based on Sarvajal model: A kiosk must have at least 130 households as regular users to break-even. Given an average penetration of about 50%, that makes for an average village size of about 250-300 households (1300-1800 people).*

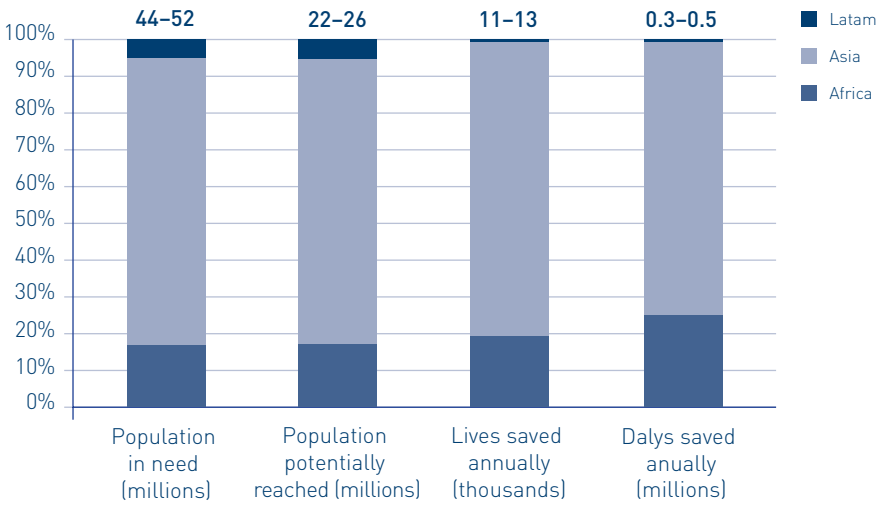
*56 Sources: Team analysis; WHO/ UNICEF Joint Monitoring Programme for Water Supply and Sanitation; United Nations Environment Programme, Global Environmental Monitoring System/Water Quality Monitoring System; Outside the Large Cities; The demographic importance of small urban centres and large villages in Africa, Asia and Latin America, IIED, 2006.*

*57 For Plants & Kiosks, it only includes populations living in areas where water is highly polluted and/ or brackish).*

*58 According to WHO 2008 country data on deaths and DALYs relate to diarrhea, there are 0.14% of people without access to safe water who die out of diarrhea every year. 25% of these deaths (and DALYs) could be saved by interventions improving water access (UNICEF estimates).*

The need for Plants & Kiosks is overwhelmingly concentrated in Asia, with 80% of all people who could benefit from this solution worldwide.

**Figure 15. Potential impact of Plants & Kiosks[59]**




## While the basics are sound, the industry needs restructuring to reach further scale

Plants & Kiosks can offer treated water in areas where water is highly polluted or brackish, at an affordable US$ cents 0.30 per liter. When such services are made available in villages, up to 50% of the population adopts it over time, as demonstrated by the case studies.

The provision of treated water by Plants & Kiosks can be done on a sustainable basis by village-level entrepreneurs: a kiosk operator serving 1,000-1,500 beneficiaries would have US$5-6,000 in annual revenues and over US$200 profit before tax[60] (including the repayment of the loan to finance the upfront US$3-4,000 capital investment).

However, as some of these projects reach significant scale they struggle with a number of issues:

**a) Kiosk operators need to become 'technology-agnostic':** Initially, many of the larger kiosk players were vertically integrated (and still are to some extent). For instance, Water Health International started establishing kiosks, as a way to promote its own technology.

For Plants & Kiosks to reach all the locations where they are required, the manufacturing and operating roles have to become distinct, so that kiosk operators can source the cheapest and most appropriate technology from a range of manufacturers.

*59 Sources: Population in need targeted: WHO/ UNICEF Joint Monitoring Programme for Water Supply and Sanitation; United Nations Environment Programme, Global Environmental Monitoring System/Water Quality Monitoring System; Outside the Large Cities; The demographic importance of small urban centres and large villages in Africa, Asia and Latin America, IIED, 2006); Population reached: Hypotheses derived from case study analysis; Lives saved and DALYs saved: Deaths and DALYs database, WHO, 2010.*

*60 Profit before tax realized at the end of year 5, with a 20% interest rate on debt (with principal repayment over 5 years). This estimates accounts for one salary to the operator, 0.5 salary to the village promoter, and 1 salary to the entrepreneur himself.*

b) **Fully-owned network models that rely on subsidies struggle to raise sufficient funds for capital investments. They also find it challenging to control their employees in hundreds of hard-to-reach locations:** This is the case of Naandi (which has installed over 500 kiosks as of the end of 2010). Naandi Water runs itself all operations, starting from fundraising, local operators hiring and management, down to marketing and quality control. Naandi relies on government funding (or large donor grants) and depends on its ability to successfully lobby government for new contracts. Its success also depends on its ability to quickly build geographically dispersed and staff-heavy operations (whenever it wins a new contract), and manage those operations over time.

c) **Franchising models struggle to retain the best local operators who quickly realize they would make more money by setting up their own kiosk:** The Sarvajal model (over 120 kiosks as of end 2010) may seem attractive at first, as it relies on local franchisees to achieve faster growth. However, after a couple of years of operation, Sarvajal now struggles to retain its best franchisees. This can be explained by the fact that franchisees get the most value from the franchisor during the first one to two years of operations: they get support in setting up the kiosk, learn the trade, and get problems fixed by the franchisor until they build up a regular clientele. After that, the main value-add that the franchisor can provide is maintenance support, while the franchise fee only increases with additional sales. As a result, the best kiosk operators are tempted to free themselves from what has become an unattractive franchising agreement. Having learned operations and basic maintenance, they would prefer to purchase and operate their own equipment and pocket the full profit.

d) **Proliferation of low-quality water kiosk operators:** As the industry is relatively new, there are not yet clear quality standards or related regulations. As a result, both models are challenged by small independent operators that compete on low price and are unable to guarantee consistent water quality. Such operators put at risk the health of their users, and threaten the reputation of the whole industry. These can be local entrepreneurs who want to piggyback on the success of a branded kiosk in their village, or even former staff and franchisee, who started their own business.

### Recommended scale-up strategy: evolve the regulatory framework and create a new type of support platforms to drive the development of village-level kiosk operators

There is an opportunity to rethink the structure of the kiosk industry to enable it to reach the scale that is needed, in a way that ensures systematic water quality to all users. A possible vision for the industry would entail re-defining roles as follows:

- As the industry reaches a critical mass, it is crucial that public authorities set and enforce strict quality standards for treated water provision (which are not exclusively targeted at water kiosks or rural areas). This entails developing appropriate licensing agreements for water kiosks. The auditing of these standards can be outsourced to private players that would bid for portions of the territory. An interesting model for such a scheme has been developed in rural Mali, whereby auditing and technical assistance for local water system operators is sub-contracted by public authorities to local companies, who get paid a commission of 3-10% on the water sales of the local operators. Such a scheme is interesting, because it entices the auditing companies to effectively support the operators, and it creates a lot of transparency on the performance of each of them.

- Kiosks should be owned and operated by village-level entrepreneurs, as it presents an attractive business opportunity for them, if they can increase the penetration of their services among their fellow villagers. The most entrepreneurial and successful operators may end up managing a number of kiosks on their own. Loan financing for the upfront capital investment should be provided through local banks.
- Industry platforms should be set up to facilitate and accelerate the dissemination of kiosks among local entrepreneurs. The platforms would provide a number of services including:
  - 'Turn-key' packages for new kiosk operators, including training and examination towards an official water kiosk operating license (if required by law), sourcing and installation of equipment, and support for the launch of promotional and user education campaigns
  - Maintenance contracts
  - Intermediation for financing from third parties (including helping entrepreneurs to submit business plans and loan requests)
  - Audit operations, if mandated by public authorities.

  These platforms could be instrumental in building the capabilities of the kiosk operators on community mobilization, book-keeping, distribution management etc.

  These platforms would function like social businesses (i.e., proceeds are reinvested into growth until they can service a large number of kiosks within a given perimeter).
- Manufacturers of water treatment equipment, most likely with international scope, will start competing to offer the best low-cost technology through these platforms.

Implementing such an industry transformation will require a concerted effort from public authorities to evolve the regulatory framework and provide the necessary support for the set-up of the industry platforms.

The investment required would be relatively modest, given that kiosks are financially sustainable businesses for village-level entrepreneurs, requiring little upfront investment. Furthermore, we propose a model of industry platform that is operated as a social enterprise. Financing would solely be required for the following elements: Set up of nationwide support platforms, and loans to local kiosk operators.

On the basis of best practice observed in the case studies, we estimate that US$1.5-1.7 million will be needed to promote and build this industry gradually in a hypothetical country of 30 million people, over a period of five years (out of which two thirds in grants, the rest in equity and loan). However, assuming that acute pollution levels would be concentrated in a few cities and rural areas, as little as 1% of the total country population could be in need of water kiosks. According to penetration levels observed in the case studies, about half of those individuals (i.e., 100-150,000) would end up adopting kiosk services.

Given that Plants & Kiosks are most suitable in highly polluted areas that cannot be connected to piped water networks, they should first be scaled up in countries such as India, where problems of brackish water infiltration are concentrated in certain areas.

In addition, penetration of kiosk services should be boosted beyond the average 50% observed today in mature operations. A way to do this would be to increase service value and offer piped-water delivery systems: users will then have water at the tap, rather than go and pick up their daily container at the kiosk. Yet, despite significant advances in technology and operational effectiveness, there is no large-scale existing model that combines a kiosk with a piped-water network at a price that is sufficiently low for the BoP to afford (whilst still allowing for recovery of investment and operational costs without any major form of subsidies). It is therefore critical to stimulate innovation in this field.

## Implications for private and public players

### Role of government

Public authorities have a central role to play in professionalizing this nascent industry, by establishing an appropriate regulatory framework, including licensing requirements for water kiosk operators and standards for the provision of treated water.

### Implementation of intervention

Overall orchestration of this initiative would best come from a CSR unit of a large corporate (utility, healthcare or beverage company) or a social impact fund. Such institutions have the capacity to provide the necessary blend of philanthropic and business support, while achieving high social impact with limited financial investment.

In addition, these players will need to have their own local team, or hire a strong local partner to manage the intervention (i.e., a dedicated Program Management Organization - PMO). The PMO should be identified using a competitive bidding process. That organization could turn out to be an NGO (e.g., PATH, BRAC, or TechnoServe), a local company, or an impact investment fund interested in developing a network of water companies. The industry platforms should ideally be set up in partnership with (or by hiring) local entrepreneurs, with a view to transferring the platform over to them over time.

The fund or CSR unit should also finance impact measurement surveys. This would allow for the performance of all partners to be monitored, adjusting the program approach if necessary.

### Funding of intervention

Wherever possible, the CSR unit or social impact fund should finance all the grants and equity required to get the scheme off the ground. Loan packages to local kiosk operators would be best provided by local banks or finance institutions (to minimize currency risk), with a guarantee from a donor or development agency to facilitate access by small entrepreneurs.

### Business opportunities

a) **Manufacturers of low-cost water treatment technology:** With a global demand for Reverse Osmosis (RO) membranes estimated at 2,500-3,000 units a year,[61] water kiosks could be of interest to large international equipment manufacturers interested in investing in this niche, and for specialized players already present in a number of developing countries.

b) **Support platforms for kiosks:** The proposed support platforms are social businesses (where all proceeds reinvested into growth), that are complex to manage but with high social impact. Extrapolating from case study data, it appears that by year five, a platform with 100 kiosks (each serving 125,000 people in total) could have revenues of US$50-70,000, and thus breakeven. About US$100,000 would be required to finance each platform's capital expenditure.

   Given these estimates, there would be room for two such platforms in a hypothetical country of 30 million inhabitants.

   Platforms would be run by local entrepreneurs, ideally with a background in water provision and community development.

   A platform would be organized through a network of local centers, conducting prospection and sales, training and demonstrations, as well as handling maintenance operations. The central team would focus on business development, project management and impact monitoring.

*61 Extrapolating from case study data, it appears that there is potential for US$1.3-2.7 million sales a year, assuming about 1250 beneficiaries per kiosk, over 20 million potential kiosk users globally, a lifespan of the membrane of 6 years, and US$500-1,000 price point for a membrane. The estimated global economic opportunity would add up to about US$80-100 million. This only accounts for the need for RO technology, which is the main low-cost technology available for the treatment of brackish, heavily polluted water, as the Project Team believes that demand for Plants & Kiosks will first pick up in these areas.*

**c) Local water kiosk operator-entrepreneurs:** The proposed scale-up strategy could lead to the emergence of thousands of village-level kiosks, which would each become a source of livelihood for a village-level entrepreneur with a couple of employees. Transport of containers and bottles can also be added to the services provided.

In countries where regulation allows water kiosks to bottle the water, bottling and sterilizing could be integrated to the kiosk's operations. This would ensure that there is no recontamination of the water prior to use.[63]

With an investment as low as US$3,000 to 4,000 per kiosk, each installation can quickly serve more than 1,000 users, generate annual revenues well over US$5,000, and profits of over US$200.[62]

The entrepreneur may be an individual (for instance, a local shop owner), a community-based organization, or a municipality. A good reputation and credibility amongst the community will be essential. Other physical assets, such as a well-situated building, will be a plus.

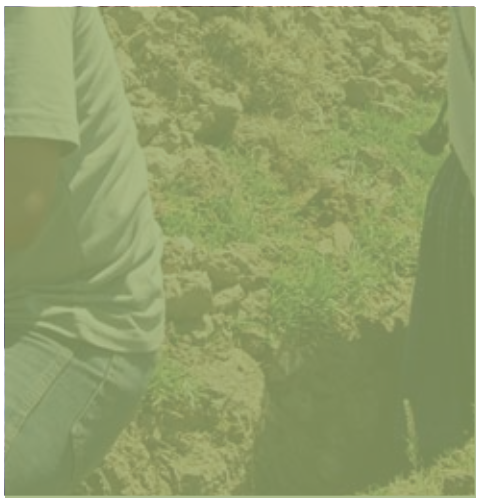
*62 Profit before tax realized at the end of year 5, with a 20% interest rate on debt (with principal repayment over 5 years). This includes payment of salary of 1 operator, 0.5 promoter/community education specialist, and the salary of the entrepreneur himself. These estimates are based on the assumption that water is priced at US$cents 0.3/liter without home delivery, and US$ cents 0.54/liter with home delivery. Case studies show that about 50% of the users pay for home delivery. These are the lowest safe water prices observed in the case studies, which would allow covering operational costs and capital expenditures. As a result, the estimated global economic opportunity would add up to about US$130-170 million.*

*63 Adding bottling/ sterilization would bring operational and capital expenditures costs up an estimated 30-50%.*

# PIPES & TAPS









# PIPES & TAPS

**Piped-water networks that distribute treated water to a home connection, collective meters, or to stand posts**

## Highlights:

- Pipes & Taps provide water to over 1.7 billion people in developing countries. What is at stake for the public authorities administering to these populations, however, is the expansion of network infrastructure to under-serviced and often fast growing areas, and still ensure water safety.
- There are many successful examples of large and small utilities serving the BoP.
- Supportive government and innovative financing schemes are among the key factors that underpin furthering scale in this cluster.
- Finding innovative solutions to expand Pipes & Tap solutions is critical for fast growing cities, both large and small, of Africa and Asia.
- A new type of mid-scale utility is emerging which offers an alternative approach to the way large mainstream utilities have been serving BoP populations until now.
- The spread of these mid-scale utilities could be accelerated, to complement the work of large mainstream utilities. A possible strategy to scale them up would be to demonstrate their potential and the viability of their approach by creating a 'BoP Utility'.

**Pipes & Taps provide water to over 1.7 billion people in developing countries. What is at stake for the public authorities administering to these populations, however, is the expansion of network infrastructure to under-serviced and often fast growing areas, while still ensuring water safety**

Public authorities play a central role in organizing and regulating the provision of water in this cluster. In cases, they call on private operators to invest or operate the water network, but this is rather exceptions: as of 2007, private operators were only present in 41 countries, providing less than 10% of all utility services to the developing world.

It is also important to note that not all of these utilities provide safe water, nor do they reach everyone in their service area. According to a survey from the UNICEF-WHO Joint Monitoring Program, safety of piped-water can range from 39% to 99% (with an average of 89%). Today, more than 1.7 billion people have access to water through piped-networks in developing countries.

But with 180,000 people added to the urban population every day, informal suburbs and smaller towns are swelling at a rate which makes it impossible to accommodate this rapid inflow of migrants. To increase piped-water provision at such an un-precedented scale clearly requires a massive acceleration of the work capacity of utility companies, be they public or private. It would also require developing adaptable solutions for wastewater management, so that local communities are not exposed to contaminated water.

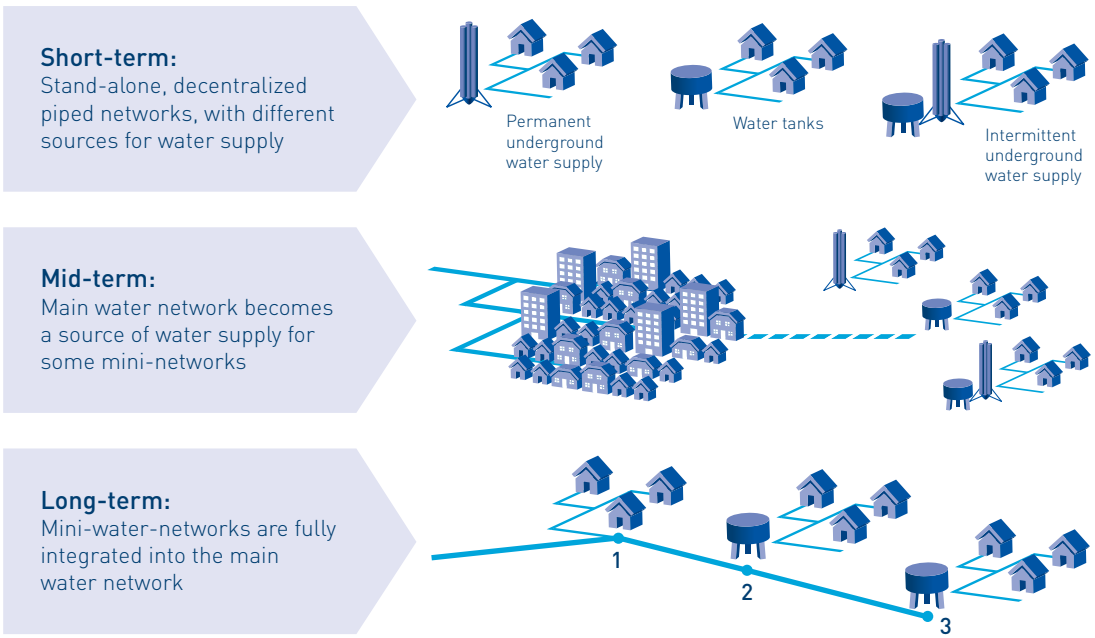
In this Report, we broadly distinguish between:

**a) Mainstream utility operators** (publicly-managed entities, or private companies mandated by public authorities), and;

**b) 'Mini-Utilities'**, which are stand-alone, modular, low-cost and small networks that can be fed either by a local source of water, or connected to the main water supply, and mostly distribute water to private connections.[64]

'Mini-Utilities' typically flourish, have also flourished in urban and semi-urban areas not yet sufficiently catered for by public water services. While many of these operations are informal, a number of the larger, more professional entities operate legally, through contracts with local authorities. To maintain low prices, these 'Mini-Utilities' only perform basic water treatment, such as chlorination and filtration. Hence, they could not operate in areas experiencing heavy water pollution. These installations also do not offer wastewater treatment solutions. However, these networks are modular, in the sense that they can be connected to the main water network at a later point in time (see figure below).

**Figure 16. Illustration of how 'Mini-Utilities' can be connected to the main water network over time**




*64 In this Report, we differentiate 'Mini-Utilities' from small water networks, such as the ones that can be found in many parts of Africa, which consist of a borehole, pumping station, water tank, and which pipe water to collective stand posts mostly.*

### There are many examples of large and small utilities successfully serving the BoP

Some large utilities (public and private) have been successful in expanding the water network to poor users in slums, suburbs and smaller towns. These utilities innovate in terms of community outreach and mobilization, use pioneering technology, billing and collection methods, and propose facilitated financing of new connections for poorer households.

'Mini-Utilities' are distinctive in many respects: they manage to significantly lower operational costs, and have developed innovative technologies that significantly reduce infrastructure costs. Many of them have strong community support, and offer services tailored to user needs (e.g., daily billing to users not able to spend large amounts on a monthly basis, or water delivery by flexible hose for households not able to afford a permanent connection).

In this cluster, the experiences of four large utilities were analyzed in-depth: Manila Water Corporation (Manila); Sénégalaise des Eaux – SDE (largest cities in Senegal); SUEZ Environnement PALYJA Water for All program (Jakarta); and Veolia Environnement Social Connections Program (three cities, Morocco). These cases are not analyzed on a comparative basis. As public authorities play a central role in organizing and regulating the provision of water, the performance and offerings of these large utilities is dependent on the specific regulatory and contractual framework within which they operate.

In addition, three other 'Mini-Utility' projects are described in the case study section of the Report: AGUATUYA Agua para Todos (Cochabamba, Bolivia); Balibago Waterworks (Balibago, and other areas around Manila); and 2AEP (rural Mali). These projects, run by private companies and a foundation, are examples of local players being called in by public authorities to support the water provision of smaller municipalities.

### Large utility operators

*Manila Water Company Tubig Para Sa Barangay program (Manila, Philippines):* This program led to the massive expansion of water provision by Manila Water into informal and low-income settlements in East Manila. This program is an integral part of the operators contract and strategy. The success of this project lies in the strong involvement of user communities, the participation of local authorities (notably to waive land title requirements), and the application of innovative user-payment schemes and cost-sharing strategies, such as collective metering for informal areas.

*Sénégalaise des Eaux (SDE) program for Ensuring Sustainability of a Pro-poor Approach via Efficiency Gains (Senegal's main 50 cities):* this program comprises a number of strategic initiatives that allowed SDE to undertake a systematic and sustainable network expansion to poor neighborhoods as part of its leasing contract. The program consists of waves of social connections as well as the revamping of city stand posts (often through partnerships with NGOs and local communities). Significant investments in technology helped bring costs down significantly, while maintaining high performance and service levels.

*Suez Environnement PALYJA Water for All program (Jakarta, Indonesia):* this program includes all initiatives undertaken by PALYJA to increase access to treated water in low-income areas. These initiatives comprise of: social connections (mostly for formal neighborhoods), community-owned mini-networks connected via collective master meters, and water kiosks (mostly for informal neighborhoods). Community outreach and mobilization is done with NGO partners, which are also instrumental in helping users organize for and manage the community's water infrastructure. These initiatives have been undertaken by PALYJA within the framework of its utility contract with the authorities of Jakarta.

*Veolia Environnement AMENDIS and REDAL Social Connections Program (Rabat, Tangiers and Tetouan, Morocco):* the Social Connections Program provides subsidized water and sanitation connections to low-income households. In addition, it proposes an additional offering of automated stand posts called 'Saqayti', which aims to provide an alternative to stand post users. The new stand posts are individually accessible at any point of the day to the owners of pre-paid chip cards. Amendis and Redal – the local subsidiaries of Veolia Environnement– collaborate with local NGOs to conduct population surveys and education campaigns on the importance of hygiene and safe water. The objectives and modus operandi of these initiatives are defined in separate contractual agreements with the local authorities.

## 'Mini-Utilities'

*AGUATUYA - Agua para Todos (Cochabamba, Bolivia):* a Public-Private-Partnership scheme initiated by a local water systems equipment manufacturer. This partnership aims at financing and installing stand-alone, community-managed mini-piped networks in the city's suburbs. At the first stage, these networks receive water from a tank vehicle, or pump water from a nearby water source. In the second stage, they can be connected via collective meters to the main municipal water supply. The partnership is formalized in the form of contracts between the municipality, the community, the main utility and the equipment provider. Works are financed both by the municipality and the communities, and are supervised by the main water utility.

*Balibago Waterworks System (Philippines):* a network of 31 decentralized low-cost mini-networks installed and/ or operated in semi-urban areas by Balibago, a local, mid-sized utility operator. Balibago functions under contracts negotiated with each municipality, who sets the tariffs and performance targets. In 80% of the cases, Balibago finances, installs and runs the new infrastructure. Very low operational costs are achieved through lean, decentralized operations and management.

*2AEP (rural Mali):* a private company sub-contracted by the national water authority to audit and support clusters of decentralized, locally-run water networks of different types and size. 2AEP charges its services to the operators of the local networks in the form of a percentage of their sales revenues. 2AEP not only publicizes the performance of each operator, but also offers technical and business advice to its clients, which often results in improved yields, lower operational costs and tighter financial management.

A number of key performance indicators are reproduced below to illustrate the approach and performance of each project. However, given that each project is being implemented in very different circumstances, direct comparison of performance may not be appropriate.

## Table 4. 'Mini-Utilities' - Overview of Key Performance Indicators for case studies (end 2010 data)

| Service levels | Unit | AGUATUYA | Balibago[65] | 2AEP |
|---|---|---|---|---|
| Liters/household/day | *L* | 250 | 180 | 50 |
| Price/liter | *US$ cents* | 0.114 (with bulk water from utility), or 0.05 (with local water source) | 0.05 (average) | 0.10 (average) |
| Price/ water connection (excl. subsidy) | *US$* | 250 (average) | 63 (average) | 200 (average) |
| Proportion of safe water expenses over BoP 500 family income[66] | *%* | 2.8 | 2.9 | 1 |
| Total new beneficiaries | | 23k | 370k | N/A. |
| Operational performance | | | | |
| Start of 'BoP program' | *Year* | 2005 | 1998 | 2005 |
| Average penetration achieved in areas of operation | *%* | 90 | 27 | N/A |
| Number of mini-networks | | 33 | 31 | N/A |
| Source of financing for home connections | | 45% from households, 55% from municipal grants | Households | Various grants (municipalities, donors) for core infrastructure. Households for individual connections |

*65 For Balibago, levels of consumption typically differ between a mid-income family (average of 780L/day/household), and a poorer family (180L/day/household). The very high levels of consumption recorded here can be explained by the fact that in semi-urban areas water needs are often more diverse (e.g., small gardens, breeding stock, etc.) than in urban areas. Average penetration rate today, given networks' expansion is 27%, but reaches 90% in well-established networks.*

*66 BoP 500-3000 classification scale of 2002 was adjusted on U.S. Consumer Purchasing Index with latest 2010 available data (ftp://ftp.bls.gov/pub/special.requests/cpi/cpiai.txt). Prices of water and family incomes were converted following Purchasing Power Parity conversion factor for private consumption (LCU per international $) 2009 (http://search.worldbank.org/data?qterm=PPP%20conversion&language=EN). For AGUATUYA, it was calculated on the basis of the price of water given a nearby water source. Percentage for water provided by main operator would be 7.9%, and 15.8% in the case of water tanker delivery. For Balibago, percentage of consumption is representative of expenses of poorer households, which consume typically less volumes.*

### Supportive governance arrangements and innovative funding schemes are among the key factors that will underpin further innovation and growth in this cluster

Lack of supportive governance and incentives, as well as lack of financing are among the main factors that hamper the fast expansion of piped-water networks to under-serviced areas. The following paragraphs list the innovative strategies adopted by various large and smaller utility players to overcome these obstacles.

a) **Lack of supportive governance and regulatory framework:** while some utilities operate within a regulatory and contractual framework that puts serving the poor as a top priority, many still do this at the margin of their main contractual obligations, in the form of donor-promoted pilots for selected neighborhoods. Even when the public authorities clearly require the utility to serve poor communities as part of their core mandate, they struggle to solve land title issues in informal areas (since a home water connection is often the first step to obtaining a formal title of land ownership). To overcome this challenge, innovations often combine simplifying regulatory requirements and restructuring of financial incentives for the utility:

- In close collaboration with authorities, utilities have designed a facilitated or simplified application process for new connections, including blanket or temporary exemptions for specific neighborhoods (Manila Water, SDE, Veolia Environnement).
- In addition to stand posts, some operators expand their network into informal areas by offering collective meters to groups of households. The collective connection itself belongs to an officially registered community-based organization (Manila Water, Suez Environnement).
- AGUATUYA mobilizes communities to put pressure on local authorities in order to have the water utility expand network coverage after installing modular mini-piped networks.
- The Senegalese Government designed the leasing contract for SDE in such a way as to incentivize the company to serve the poor efficiently (by remunerating the company on volumes sold and new connections, independently from the user category). Water authorities in Mali hired a private company to audit, benchmark and emulate better performance among the local water network operators (2AEP).
- Veolia Environnement helped establish a high profile governing body for its BoP programs, including representatives from public authorities and local representatives, to coordinate its interventions and remove implementation bottlenecks.
- Terra Nova specializes in securing land rights for low-income communities by finding agreements between illegal settlers and legal owners, in collaboration with local authorities (see text box).

*How to sustainably solve the land titles issue? – Terra Nova*

***Brazil***

Terra Nova is a private company that specialized in securing land rights for the poor since 2001.

**Issue**

- 1.8 million households live in informal settlements in Brazil
- Given the lack of official residence and/ or property documents, households cannot request connections to public utility services.

**Solutions**

- Relocation of families living in risky areas (e.g., at risk of environmental hazard)
- Mediation between informal settlers and legal owners to set a sales price for land (and property rights) that is mutually agreeable to both sides
- Development of collective infrastructure: water, energy, basic sanitation.

**Financial sustainability**

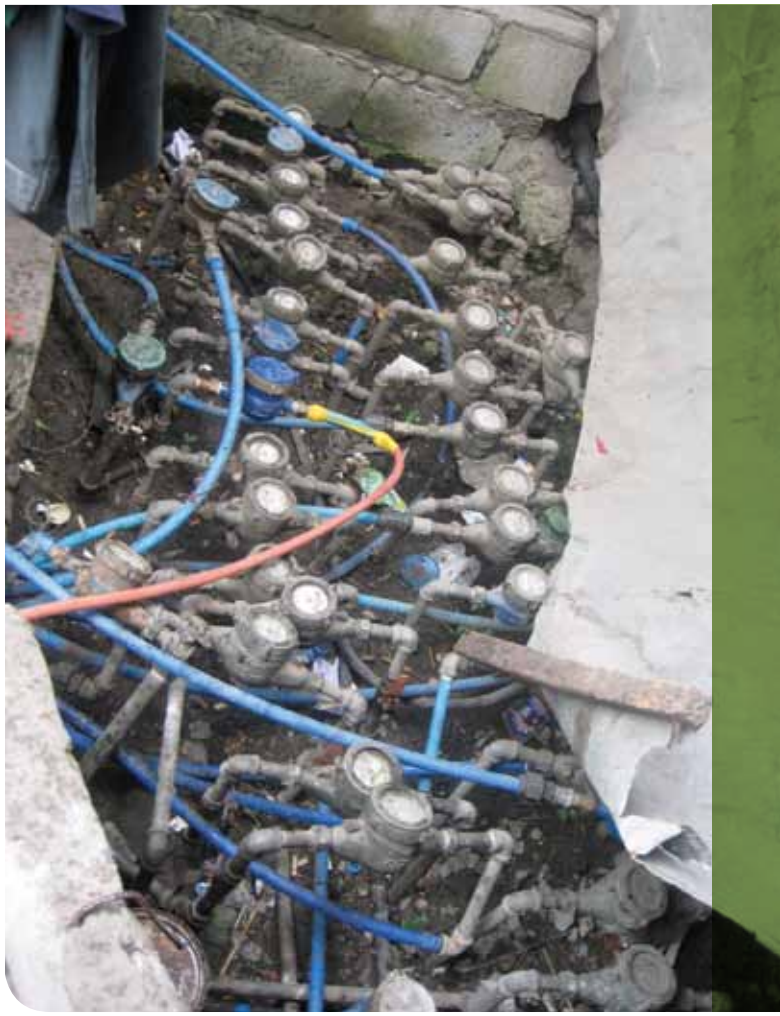
- Terra Nova levies a fee on each successful transaction (on average US$2,900 per house)
- Average negotiated price for plot is US$65-70 per month for 5 to 10 years (including Terra Nova's fee).

**Social impact**

- Helped or is helping actively 11k families
- Allocation of 20% of mortgage payments to a fund promoting community development
- Municipalities save on relocation costs and regularize entire settlements.

**b) Financing the connection cost:** BoP users have difficulties in paying the full price of home connections. Innovations combine the reduction of infrastructure and equipment costs, while offering adapted payment options:

- A number of players use low-cost technology, adapted to low-income neighborhoods (AGUATUYA, Balibago, Manila Water).
- Communities are offered an opportunity to contribute to infrastructure works using 'sweat equity', i.e., providing free labor in order to reduce the connection cost (AGUATUYA, Manila Water).
- In addition to subsidized connections, most operators offer multiple payment options such as payment in installments, micro-loans, etc. (AGUATUYA, Suez Environnement, Veolia Environnement). The Water Credit Initiative is one such micro-finance scheme, which aggregates individual financial contributions towards larger infrastructure loans for water and sanitation (see www.water.org for more information).
- Veolia Environnement has set up a revolving fund to subsidize connections to poorer households. The fund is financed using a variety of sources, including a share of the connection fees and taxes paid by richer households.
- As an alternative to expensive individual meters, Enersol Aguasol designed a mini-network installation that connects pipes with the top half of a storage tank. Once the water level goes into the below half, users have to walk to the tank to tap water from the bottom half. This scheme has the added advantage of discouraging excessive consumption.
- In the area of power provision, Fundacion Pro Vivienda Social has designed a community-based approach to financing gas connections in Buenos Aires, whereby 70% of a local community has to commit to get a gas connection and is collectively responsible for repaying the loan as part of their monthly gas bill (see text box).



### *An innovative way to finance individual connections: Fundación Pro Vivienda Social*

***Gran Buenos Aires, Argentina***

The Fundación Pro Vivienda Social is a non-profit organization that has worked to expand access to gas connections among BoP populations since 2,000.

**Issue**

- Low-income households have limited access to public utility services
- Households use propane for cooking and heating, which is unreliable and inconvenient.

**Solutions**

- Formation of an Association consisting of 45 local community organizations in charge of promoting the program to their communities
- Minimum 70% of the local community has to commit to get a gas connection and is collectively responsible for repaying the loan to finance the connection as part of their monthly gas bill
- Establishment and administration of a trust fund (US$1.7 million) financed by FONCAP and the World Bank and owned by gas-connected users, that give loans to new beneficiaries
- Loans are repaid from the savings generated by switching from cylinders to in-home connections.

**Social impact**

- 4,000 families (20,000 inhabitants)
- Decrease by 75% of fuel expenses, and 7% of total expenses, for user households
- 10% increase in the value of properties connected to gas, as a gas connection is a first step forward towards a legitimate claim of house ownership.

c) **Low attractiveness of BoP users segment:** Poorer populations are often located in areas without infrastructure, leading to higher investment requirements. In addition, they consume less water on average, and can be more costly to serve given the informality of these areas. Innovations include:

- Balibago has built a very low-cost operation across clusters of mini-networks, by combining economies of scale in back-office and advanced maintenance, with lean decentralized management in daily operations, billing and collection.
- 2AEP drives adoption of best practices by local water operators, by publishing audit and benchmarking results. As local operations improve, costs tend to go down.
- SDE has invested in RFID technology to detect leakages in the network early on. This has reduced water losses and optimized reactive maintenance interventions
- A number of players minimize their distribution, billing and maintenance costs by offering collective meters to informal neighborhoods, whereby communities and/ or NGOs manage the 'last-mile' operations (AGUATUYA, Manila Water, Suez Environnement).
- Enersol Aguasol is operating water pumps on solar energy, to reduce energy costs.

A specific issue relate to the billing and payment collection costs. Informal neighborhoods are often more complex and costly to serve (e.g., given the lack of financial services infrastructure, and the need for more frequent billing). Solutions include:

- Veolia Environnement and SDE have developed mobile agency vans to reach out to communities and facilitate payment collection. Veolia Environnement and Manila Water offer bill payments through partner pay-shops.
- Veolia Environnement combines bills for water, sanitation and electricity.
- SDE is developing e-reading meters and mobile phone payment schemes.
- Aguas de Cartagena and IWADCO outsource billing and collection operations to local entrepreneurs who work on commission.
- The Director of Phnom Penh water utility insisted on big spenders paying their overdue bills, including public administrations and politicians, before striving for better collection rates among poorer users.
- Veolia Environnement has introduced pre-paid cards for stand post users in Morocco, to lower management costs and water wastage.
- Outside the water industry, Codensa, an electricity utility, dramatically expanded the range of services it provided to poor neighborhoods, by leveraging its existing sales and administrative infrastructure (see text box).

**d) Lack of 'BoP expertise':** serving the poor requires a unique skill set and approach. Utilities most experienced in serving poor neighborhoods mobilize dedicated teams to do so:

- Suez Environnement and Veolia Environnement adopt socio-anthropological approaches to community outreach and mobilization, and work with NGOs and researchers to do socio-economic surveys.
- Utilities create specific programs (e.g., Water for All for Suez Environnement, TPSB for Manila Water), or even divisions (Veolia AMI) to serve BoP users.

### *How to turn poor users into valuable customers? Cross-selling by an electricity utility: Codensa*

***Bogotà, Colombia***

Codensa, a subsidiary of Endesa, the leading electricity provider in Spain and Latin America, decided to offer additional services to its BoP customers, including credit services to purchase electrical appliances. Started in 1997, their consumer-lending program was so successful that Codensa sold it to Multibanca Colpatria in 2009 (for €175 million).

**Issue**

- Colombian legislation sets market concentration limits of 25% on companies in energy distribution, limiting avenues for revenues growth
- BoP customers often have limited access to financial services
- Given they have few home appliances, poor households' bills tend to be low.

**Solutions**

- Introduction of new products and services to increase revenue per customer, including credit to purchase electrical appliances (average loan size of US$370 per household), insurance services, magazine subscriptions, and classifieds journals
- Billing and collection through utility bills means lower administrative costs
- Partnerships with 18 retailers, 120 electric appliance manufacturers.

**Financial sustainability (2007 data)**

- Codensa scheme represented 31% of all electronic appliances sales in Bogotà
- Average revenues generated from the clients using credit increased by 40%
- Energy consumption increased by almost 5% in every household with outstanding loans
- Default rate of 2% (equivalent to the average banking default rate).

**Social impact**

- 650k users for the credit service and 180k users for the micro-insurance service. 95% of those were low income households
- These low-income households built up a credit history (35% of clients were previously unbanked), which helped them access more financial services.

*The challenging role of being an intermediary between the utility operator and users in informal neighborhoods: an interview with Sean Granville-Ross, Country Manager, Mercy Corps*

***Indonesia***

**Background**

Mercy Corps has been working with Jakarta's utility, PALYJA, since 2008, as a key partner for its 'Water for All' program. Its work included community awareness activities, mobilization campaigns and community surveys. Mercy Corps was also instrumental in setting-up community-managed master meters in areas where households could not get an authorization for a formal home connection. The infrastructure consisted of a communal reservoir and master meter, sufficient to provide 400L a day per household, for 60 households. Mercy Corps provided both financial and operational support to the community. Minimum consumption was 215 liters a day per household for the installation to be sustainable.

***What have been your biggest challenges?***

*"With regards to the social connections program, it was the mapping of communities. We needed to ascertain which ones were entitled to a connection. But given the lack of formal registration procedure, and the lack of clear criteria for how to define a legal settlement, it became very difficult. For instance, a neighborhood could have a local official representative, a population residing there for the past 25 years, be already connected to the electricity network, but would not be considered as legal. Overall, it was very difficult to work with these communities, as we started asking them for proofs of their right to live there. They became very suspicious."*

*"With regards to the community-managed master meters, challenges were many. We helped set up Community Based Organizations (CBOs). They were trained in calculating and setting up the tariffs, managing the mini-network, and doing billing and collection. CBOs were also to become the main interlocutor to PALYJA upon our departure. Sustainability proved difficult, given the low financial literacy and community cohesion: water losses and illegal connections increased, overall volumes were insufficient to fund the refurbishing of infrastructure, and so on."*

***What would you do differently, next time?***

*"Since the start, clarify every term, define expectations, targets, criteria, and agree on what is possible, or not."*

*Interviews conducted on 03.03.2011*

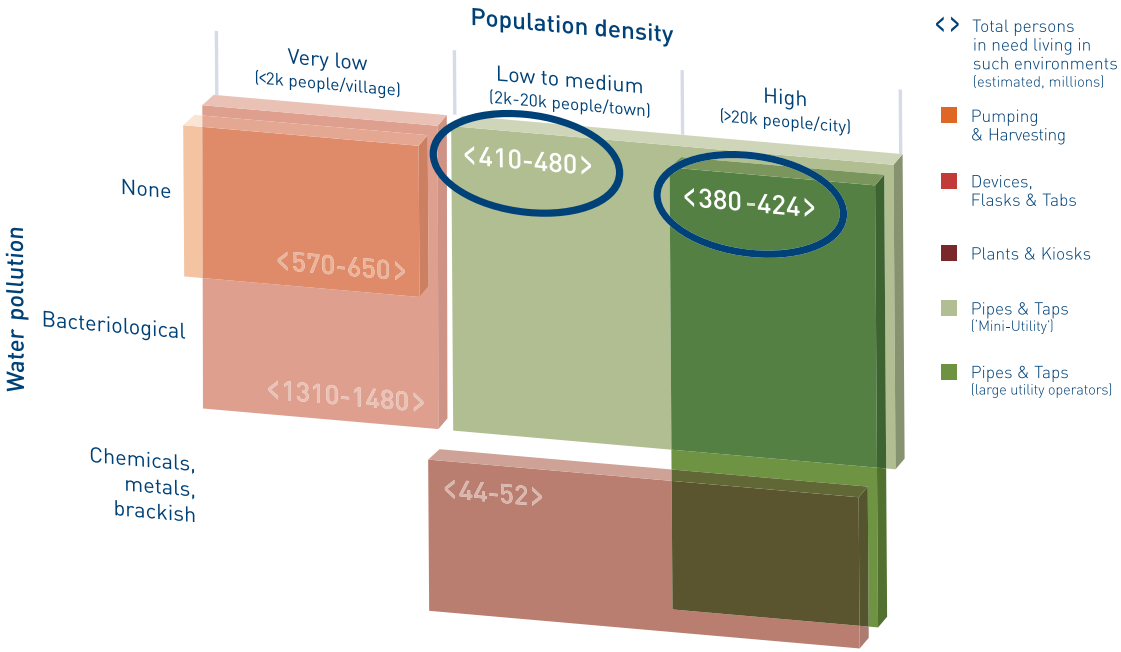
**Finding innovative solutions to expand Pipes & Taps is critical for the fast growing cities, both large and small, of Africa and Asia**

Today, for the half billion poor living in slums and suburbs of cities or smaller towns, without permanent access to safe water, extension of piped-water networks, and in particular home connections, would represent the most cost-effective and convenient alternative to water trucks, vendors, and long queues at stand posts.[67]

In areas where the main water source is highly polluted, only large utilities make economic sense, given that one needs to invest in large treatment plants. However, in areas where simple treatment is possible, 'Mini-Utilities' could also be appropriate to develop water infrastructure in a more decentralized fashion. Plants & Kiosks could also be considered as temporary alternatives in highly polluted areas which remain beyond the reach of the main water smaller in the mid-term.

67 *A minimum of 500 connections is needed to make a mini network financially sustainable, assuming economics based on the Balibago model.*

**Figure 17. People in need who could benefit from Pipes & Taps solutions[68]**




Pipes & Taps (large and small utilities) could be an appropriate solution for an estimated 440-526 million people in need in Africa, Asia and Latin America. Out of these, an estimated 70-88 million live in smaller towns. If Pipes & Taps were made available in all these areas, it is estimated that 80% people in need could actually be reached (based on the penetration levels observed in the case studies), resulting in 360-420 million people with access to safe water. As a result of such interventions, improved health outcomes could translate into 100-130,000 lives saved and 3.5-3.9 million DALYs averted annually.[69]

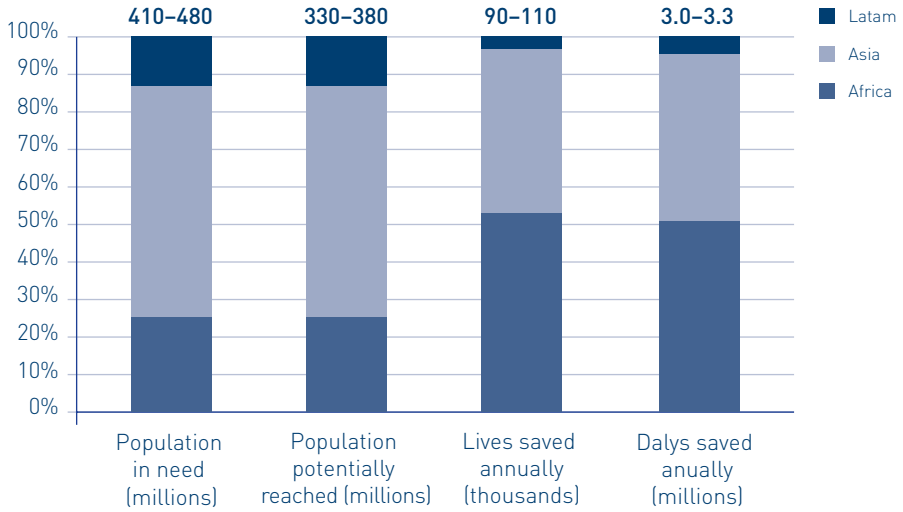
*68 Sources: Team analysis; WHO/ UNICEF Joint Monitoring Programme for Water Supply and Sanitation; United Nations Environment Programme, Global Environmental Monitoring System/ Water Quality Monitoring System; Outside the Large Cities; The demographic importance of small urban centres and large villages in Africa, Asia and Latin America, IIED, 2006.*

*69 Assumptions based on WHO 2008 country data on deaths and DALYs related to diarrhea: There are 0.14% of people without access to safe water who die out of diarrhea every year. Out of those deaths (and DALYs), 31% could be averted by safe water interventions (UNICEF overall estimates).*

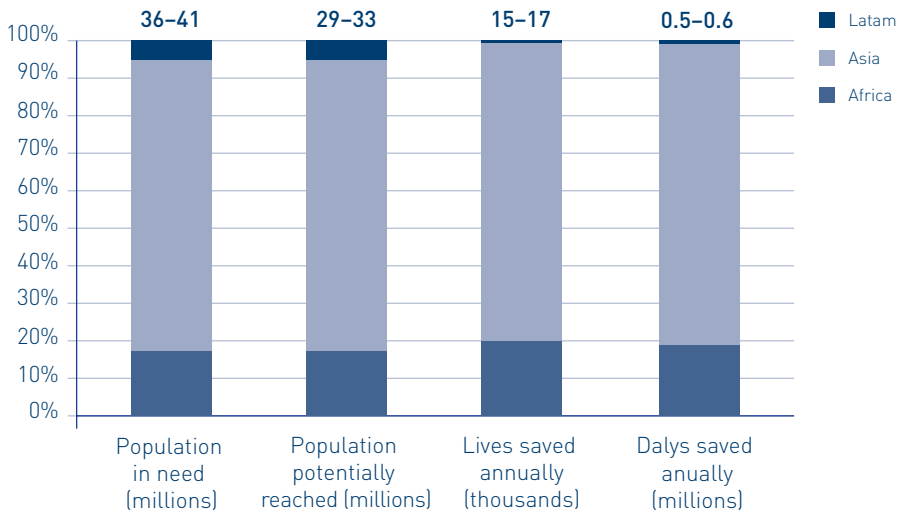
The need for Pipes & Taps solutions is concentrated in Asia mostly, and to some lesser extent in Africa.

### Figure 18. Potential impact of Pipes & Taps[70]

#### 'Mini-Utilities'




#### Large utilities only[71]




*70 Sources: Population in need targeted: WHO/ UNICEF Joint Monitoring Programme for Water Supply and Sanitation; United Nations Environment Programme, Global Environmental Monitoring System/ Water Quality Monitoring System; Outside the Large Cities; The demographic importance of small urban centres and large villages in Africa, Asia and Latin America, IIED, 2006); Population reached: Hypotheses derived from case study analysis; Lives saved and DALYs saved: Deaths and DALYs database, WHO, 2010.*

*71 In order to avoid double-counting the potential impact of large vs. 'Mini-Utilities, the Project Team only took into account populations living in large cities with heavily polluted water. Would large utilities cover the entirety of all large cities, it could offer safe water to 390-420m people in need, potentially serve 310-340m actual users, and save 90-110k lives (annually) and 3-3.3m DALYs (annually) as a result.*

**A new type of mid-scale utility is emerging, that proposes an alternative approach to the way large mainstream utilities have been serving BoP populations until now**

Mainstream utility operators (publicly-managed entities or private companies mandated and contracted by the public sector) already deliver piped water to 1.7 billion people in developing countries; water which is safe in an estimated 89% of the cases.[72] In addition to the estimated 190 million people who do have access to piped water but where water is unsafe (IN ITALIC), add up the 300 million urban dwellers who do not have access to piped water or any other improved water source. This worrying situation will become more dramatic with the explosion of the urban population in Africa and Asia, which is expected to increase by almost 70% by 2030. In total, there will be an estimated 1.7 billion additional people living in cities then, most of them poor. The bulk of this growth is likely to be in smaller cities and towns, whose capabilities for planning and delivery of public services will be stretched even further.

These migrations, coupled with increasing water scarcity and higher pollution levels may lead to dramatic water and sanitation crises, particularly in areas where current water tariffs do not allow sufficient investment into infrastructure maintenance, renewal and expansion.

This situation presents a formidable challenge for them at the national and municipal levels. The magnitude of this challenge forces public authorities to think beyond conventional solutions and imagine new ways of harnessing the capabilities and resources of civil society, aid agencies, local entrepreneurs and international water players.

Hence, while a number of public and private utilities have proven today it is possible to sustainably expand the services (through individual connections, stand posts and other arrangements) to poor urban areas, progress takes time, and requires overcoming a number of obstacles:

- Lack of solutions (and financing) for wastewater collection and treatment in new, informal areas, where the water network has been extended and users start consuming larger quantities of water. Technical constraints are more complex and costs are much higher for sanitation, than for water.
- Most contractual and regulatory frameworks in place for water operators do not provide sufficient incentives to serve the growing number of poor residents and newcomers:
  - Most contracts are structured in a way that forces operators to finance network extension to the poorer neighborhoods through cross-subsidies with the richer segments. While these cross-subsidies have been very effective at enabling cash constrained authorities to extend services to the poor without having to devote a part of their budget to direct subsidies, they tend to 'freeze' the situation. Indeed, the more a utility expands into peripheral or poorer areas, the more difficult it is for it to maintain a sound economic balance.
  - Some leasing contracts manage to partially address this issue by paying the utility a fee that is linked to volumes of water sold (rather than tariff payments collected). But such arrangements do not create strong incentives to accelerate the provision of services to the poorest in particular. Indeed, they merely transfer the problem to the public asset management companies, which often do not have the technical, managerial or financial resources to take on such responsibilities.
  - In addition, utilities (public and private) need to follow a number of administrative requirements related to property titles and urban development. Typically, applications for a home water connection need to be accompanied by a proof of house ownership or legal residency, automatically disqualifying populations living in informal areas. In those areas, stand posts, water tankers and water resellers often remain the norm.
- The political and social instability of informal, poorer areas, often adds to the technical difficulties that underpin large infrastructure works in these zones.

72 *According to data from WHO and UNICEF Joint Monitoring Program for Water Supply and Sanitation Rapid Assessment of Drinking-Water Quality (in press), the mean samples from a six-country survey show that 89% of pipes (with a range of 39-99%) provide safe water.*

- Successfully serving BoP users requires developing very specific and distinct technical, societal, operational and marketing expertise, and mobilizing dedicated financial and human resources. Such expertise is difficult to consolidate within mainstream utilities, be they public or private, without dedicated structures and processes.

Hence, while public and private utilities will continue to expand their services to BoP areas in large cities of developing countries (over a 20 to 30 years period), their efforts could be accelerated by using alternative approaches. A source of inspiration could come from smaller, local utility players such as Balibago and IWADCO, which are sustainably serving large numbers of low-income populations in previously under-serviced areas, through a consolidated cluster of smaller piped-networks established through contractual agreements with the beneficiary communities and authorities.

The most interesting features of such operators are summarized below:

a) **No need for cross-subsidies:** each piped network is conceived as a standalone business, tailored to the situation of each municipality or neighborhood authority.

b) **Centralized management and strong capabilities:** because they are organized in clusters, these operators can centralize key processes and develop a strong level of professionalism. As a result, they are able to offer a whole set of services to any municipality or neighborhood willing and empowered to work with them; ranging from refurbishing an existing network, to installing a new one, or simply taking on the operations in an area where public authorities do not have yet the capabilities to run the infrastructure. Given their size, they can also set up central, advanced maintenance and engineering teams.

c) **Well anchored in the local community:** while many processes are centralized, each network is run by a local team. Belonging to the communities they serve, these teams know the users, and are often able to better respond to their needs (e.g., by providing payment or credit terms adapted to their ability to pay).

d) **BoP-focused:** given their proximity with their users and their focus on BoP and under-serviced populations, they develop innovative solutions specifically adapted to these communities.

e) **Speed in serving populations that would remain otherwise out of the reach of the main network expansion in the mid-term:** because they are decentralized, such networks can be directly set up where needs are greatest. Once the main network finally reaches out to these areas, such networks present the advantage of being sufficiently modular to be directly connected to the main water supply at once.

f) **Sustainable operations, given the availability of patient capital:** such operators are local, medium-sized businesses typically serving a few hundreds of thousands of users. While their operations are sustainable, they require patient equity capital. Extrapolating from case study data, an average player operating a cluster of about 60 mini-networks, serving almost 500,000 users in total, would require a capital investment of US$8-10 million (only to finance new water infrastructure development), generating US$3-4 million annual revenues after more than five years of operation. In addition, subsidies and soft loans may be required for very low-income users who cannot afford the full connection cost, or who need time to repay their connection.

## *What innovations do clusters of small, stand-alone networks bring? IWADCO*

***Philippines***

**Background**

IWADCO (Inpart Waterworks and Development Company) started as a small family-owned construction company specializing in the production of water tanks for small towns and municipalities in and around Metro Manila. In 1997, when the government-owned Metropolitan Waterworks and Sewerage System was privatized, IWADCO started providing water services to urban poor and middle-class families in areas not yet covered by the two large concessionaries. More than 10 years later, IWADCO now serves over 100k people (through 25k connections) spread over 8 communities. Out of the 14 networks it operated since, already 6 were successfully turned back to the communities. Going forward, it plans to add on 1-2 new communities a year. Maynilad (one of the two utilities for Metro Manila) also asked IWADCO to help them install master meters in informal settlements within their concession area.

**Target communities**

Out of the 8 communities served by IWADCO, 4 are small cities, 2 are located in suburbs, and 2 in slums. The population in these communities is typically segmented in 3 layers: 50% low income, 30% middle income, and 20% high income households.

**Contractual framework**

IWADCO operates under different contracts, of different durations (typically ranging from 15 to 20 years):

- Management contracts with local government: IWADCO finances the infrastructure for the expansion or refurbishment of existing piped-water systems, and operates them against a fee (based on revenues) paid to the local government. Typically, existing systems were previously managed by local community associations.
- Build-Operate-Transfer contracts with local community associations (also against a fee paid to the association).

**Services**

IWADCO guarantees round-the-clock water supply, treatment (chlorination), and monthly water quality testing and monitoring for the five communities where water is not purchased in bulk from the main utilities. For households that cannot afford home connections, it provides water delivered at home (with flexible garden hoses). Households consume typically 300-400 liters per day for poorer households, 500-600L per day for middle income households, and up to 1,000 liters per day for high income households. IWADCO does not provide sewage solutions, for which the responsibility lies with the municipalities.

**Prices**

The water tariff bands are set by the national water agency, however, actual local tariffs vary depending on capex invested, operational expenditures and length of contract. On average, the tariff is US$0.37/$m^3$ for home connections. This is higher than the rate of large utilities, but lower than water delivered by water tankers. For manual delivery to households without a connection, tariff is up to 3 times higher. The home connection fee amounts to US$99, payable in installments (without interest, and as frequently as daily payments), after a down-payment of US$22.

...

...

**Innovations**

a) Decentralized operations: each community is managed by a small team of four to six staff, in charge of operations, maintenance, accounting, billing and cash management. The central office consolidates and monitors daily data from its branches.

b) Billing and collection: adapted to low-income families, it is done on an 'as needed' basis (daily to monthly frequency). Meter reading, bill delivery and payment collection are done by a local coordinator, resident of the community, appointed for each 100 households (for which there is a collective master meter he is in charge of). The coordinator is also responsible for manual water delivery. Coordinators earn a commission that amounts to 10% of water sales for billing and collection, and 25% in the case of physical water delivery. A coordinator earns US$150-200 on average a month. This system allows for close monitoring of connections and consumption (non-revenue water amounts to 5-10%).

c) Tailored technology: for urban, mainly informal poor communities, IWADCO uses flexible hoses; for formal areas it uses standard pipes. Pumps have an average lifetime of 2-3 years, pipes more than 10 years. Given this relatively short periods, installations have been renewed during the lifetime of the contract.

d) Community outreach and participation: IWADCO organizes extensive consultations with the target community on the type of system, benefits (in terms of services, billing frequency, payment options, but also in terms of royalties paid to the local government/ community) and tariffs, in order to develop a proposal that is acceptable to the community (minimum 50% signing off before the start of the project), including to water resellers and existing small water operators (to whom new jobs are proposed, so that they have a place in the new system). The target is a 100% penetration in every community, after 3-6 months. In fact, IWADCO seeks to convince the community first, so that they can go and convince the local authorities next. Customers can also provide feedback (on illegal connections, leakages, etc.) via the community officials and sms messaging. This way the community helps keep water losses to a minimum.

e) Commitment to local development: every year, IWADCO reserves certain funds for community development programs. Also, coordinators are selected among those who are most socially excluded (often with criminal records). IWADCO believes that it is exactly because no one else is prepared to give them a chance that they are so dedicated to their job. This approach helps IWADCO build trust and support with the local communities.

**Barriers to scale**

IWADCO is now regularly approached by communities that seek its expertise and services. Despite this, IWADCO struggles with a number of obstacles:

a) Capital expenditures financing: IWADCO, despite a strong track record and financial viability, is unable to attract long-term financing from local banks.

b) Changes in leadership at local governments: there is always the risk that the new leadership will seek to change the original contract.

c) Bulk price of water purchased from main utility: it should be low enough to allow IWADCO to make a margin on operations. Typically, the main utility is reluctant to give lower rates for informal, poorer areas, as consumption volumes may be lower. They only do so after the partner local operator proved able to organize billing and collection efficiently, while maintaining acceptable consumption levels.

**Some financial data on IWADCO**

- Total capital invested into the 8 communities: average US$220 by household
- Net profit (after tax) of 30-40% from the monthly gross sale
- Break-even: a minimum of 500 home connections is needed to break-even on operational costs, and 1,000 connections to achieve overall profitability.

*Note: 1Php=0.022US$*

*Interviews with Elsa D. Mejia, Managing Director IWADCO, conducted on 21.03.2011 and 04.04.2011*

Obviously, Filipino companies like Balibago and IWADCO have flourished in a specific environment. While being a source of inspiration, they need to be adapted in order to suit a broader set of geographical, demographic, regulatory and political environments. Furthermore, adapted solutions should be found to combine smaller networks with wastewater management services.

The Hystra Project Team could identify a number of initiatives trying to grow and professionalize very small, existing operators (often informal ones), so that they can achieve the scale and performance necessary for them to become partners with, or even an alternative to the main utility operator in delivering water. Some of these attempts are described below.

- Creation of a small operators' association, to provide capacity-building to its members and lobby for more supportive regulations. NAWASA (see text box) is one such example. However, the association struggles to find the required financing to federate more members and provide them with appropriate training, given that members' size ranges from 25 to 50,000 connections per operator.
- Learning and exchanging networks (e.g., Solidarité Eau), to share best practices in a cost-effective way. However, these networks are often insufficient to actively accompany the development of geographically-dispersed small operators.
- Formalization and financing of selected private operators (e.g., FIPAG in Maputo). This initiative struggles to find operators with sufficient expertise and scale, who are prepared to leave their 'informal' status to enter into regulated arrangements with the main utility. In the case of Maputo, a number of entrepreneurs preferred to keep their own, smaller-scale installation and businesses, rather than enter into a leasing agreement with the main utility to operate a system that would not be their own.

However, the Hystra Team could not identify any specific project with a proven approach leading to large-scale industry transformation and development.

### *What do successful small, informal operators want and need: NAWASA*

***Philippines***

In an attempt to have the work of small private operators acknowledged by the government and the large utilities, IWADCO was instrumental in the creation of the National Water and Sanitation Association (NAWASA) in 2007. Elsa Mejia, Managing Director of IWADCO, is the President of the Association.

The association has 250 members (out a total 5,000 small private operators in the country). It aims at providing a platform to help professionalize its members, and also act as a representation body for negotiations with the government and large utilities. For instance, the association lobbied for lighter regulation and registration requirements, better adapted to small operators.

According to the President of the Association, the main hurdle is not financing (even if all private operators need funding to expand operations), but the need for technical assistance: most of its members are small (from 50 to 25,000 connections), informal, and provide inconsistent service levels to their customers. Hence, the association has focused on providing training for its members. However, the organization has limited funding from sponsors and donors, which limits its outreach and effectiveness so far.

*Interview with Elsa D. Mejia, President NAWASA on 21.03.2011*

The crux of the issue is that what makes these small operators attractive (e.g., low-cost, embedded in local communities) is also what prevents them from scaling up:

- Few have the skills, resources, focus or appetite to bring their enterprise to scale, and even less so to formalize it. Public authorities struggle to develop a regulatory framework that would entice them to do so.
- Large-scale financing for so many and still small-scale operations would prove to be extremely risky and difficult.
- To engineer multiple and tailored contracts between these operators and the main utility provider would be extremely complex.

So, if the main utility struggles to expand into lower-income areas in the short-term, and if existing very small informal operators cannot be grown into reliable, large-scale alternatives, what type of utility operator could offer a solution for under-serviced suburbs, urban slums or small cities?

**Recommended scale-up strategy: accelerate the emergence of this new type of mid-scale utilities, to complement the work of larger mainstream utilities. A possible strategy would be to demonstrate the potential and viability of their approach by creating a 'BoP Utility'**

While a number of public and private utilities have proven today it is possible to sustainably expand the service to the BoP, their efforts could be complemented and thereby accelerated by alternative approaches. A possible strategy to do so would be to set up a new type of mid-sized 'BoP Utility', which would:

- focus and specialize in providing safe piped-water to the poor, whom the main utility will not be able to reach in the medium term: in that sense, it should be complementary to the work of the main utility operators, rather than competitive.
- seek supportive regulatory support: a supportive political environment and regulatory framework are necessary to connect families living in informal neighborhoods (and which lack the often necessary property titles to apply for a home connection). Similarly, regulation should allow private players to offer and negotiate tailored solutions to clusters of small cities that need to refurbish or expand their water network.
- explore new ways to channel subsidies: the tariff policy and contractual framework would have to be structured in a way that incentivizes the 'BoP Utility' to expand its services to the most difficult and costly areas first and foremost. 'Forcing' mechanisms could also be envisaged, e.g., the obligation to reinvest profits into network expansion beyond a certain profit threshold. Furthermore, subsidies will be necessary to finance expansion of the network in some areas. Innovative financing mechanisms should be developed to channel and allocate these subsidies. These could consist, for instance, of supporting public authorities to set up public financing agencies, or a revolving fund financed upfront by government and donors, which would manage subsidies and cross-subsidies (and which could possibly also guarantee arrears from government).
- set up 'hybrid' governance and performance indicators: the dual social and commercial objective of this 'BoP Utility' should be reflected across its functioning. For instance, the Board should include public sector and donor representatives, to help strike the right balance between objectives of universal public service and economic viability. Finally, the success of this utility should also be measured through hybrid indicators that track financial viability as well as health outcomes.
- develop a specialized, financially sustainable operation focused on serving the BoP: this includes low-cost operations, dedicated teams and distinct approaches to infrastructure development and service delivery. Such an operating model would require a 'rethink' of the mainstream utilities centralized model, and rather be based on consolidated clusters of stand-alone, smaller, modular networks.
- tap into social investment capital: until now, raising funds for water utilities has been difficult. Public and donor money is limited, and private investors find it unattractive, given low returns and the high risks involved in such businesses. In contrast, a 'BoP Utility' could possibly raise significant amounts among social impact investors, i.e., investors that are ready to forego some financial return if social impact is high.
- continue evolving low-cost technology: until now, smaller decentralized piped networks could not integrate with advanced water treatment technology, or wastewater solutions without bringing costs up significantly. Technological advances are needed to make such networks higher performing and versatile, at a price that remains affordable for the poor.

Putting in place such a novel model of utility requires strong support from public authorities. In addition, the investment required would be relatively large: extrapolating from case study data, an average player operating a cluster of about 60 mini-networks, serving almost 500,000 users in total, would require a capital investment of US$8-10 million for water infrastructure development only.[73]

*73 The capital investment expenditures are based on infrastructure costs observed in the case studies, and more specifically on that of an average installation whereby groundwater is pumped to the surface through pumping stations and chlorinated before stored or/ and pumped into the network. It assumes that 80% of the networks would be newly installed, greenfield operations.*

An estimated 8% of the population in a hypothetical country of 30 million inhabitants would find themselves in need of such an intervention, and about 80% of them could actually benefit from it if successfully rolled-out (given performance levels observed in today's 'Mini-Utilities'). On that basis, there would be a need to invest over US$40 million in infrastructure development, as well as an estimated US$10 million to get a number of 'BoP Utility' operators started. In addition, subsidies and soft loans may be required for very low-income users who cannot afford the full connection cost, or who need time to repay their connection.

## Implications for private and public players:

### Role of government

The development of public water infrastructure and the provision of safe water for all is a key responsibility for the public authorities in every country.

The emergence of BoP utilities will therefore only be made possible, if public authorities welcome and encourage it at different levels:

- Contractual aspects: the public water authority has to issue bids for the award of 'BoP Utility' contracts, carefully carving off the perimeter to be covered, in partnership with the main utility provider and beneficiary municipalities.
- Tariffs and remuneration of 'BoP Utility': it is essential that the 'BoP Utility' can recoup its costs at the level of each mini-network so that it is incentivized to expand its operations to all under-serviced areas rather than the more lucrative ones first. In countries where tariff bands can be adjusted locally, the tariffs could be adapted on case-by-case basis. Alternatively, in countries where the same tariff is imposed across geographies, the utility's remuneration should take into account significant differences from network to network.
- Governance and oversight: the water authority should oversee overall contract implementation by the 'BoP Utility', and ensure coordination between the 'BoP Utility' and the main utility. Similarly, it should be instrumental in overseeing and/ or facilitating local contractual arrangements between the 'BoP Utility' and local authorities.
- Political support: a number of solutions are possible to connect informal neighborhoods whose inhabitants are without formal land titles. These range from blanket waivers to commercial negotiations between land owners, illegal squatters and local authorities. In any case, political support and collaboration from public authorities is needed.

Donors would have a critical role to play in supporting public authorities (nationally and locally) in delivering on all these aspects.

### Implementation of intervention

The creation of a mid-scale 'BoP Utility' should be attractive for three types of commercial players who wish to strengthen their credibility and expertise in serving the BoP, and attract talented managers passionate about the field:

- A local conglomerate: as proven by Pasudeco, a business group based in the Philippines specializing in sugar milling and refinery, which acquired Balibago in 1997 and built it into a company operating in 31 towns and generating US$7 million revenues annually. Pasudeco is now also entering the field of waste management.
- A utility player that already has a contract in the main city (ies) of a country could create a dedicated, specialized spin-off or subsidiary whose objective would be to accelerate the expansion of the service into under-serviced suburbs, smaller cities, and possibly the city's informal slums. This BoP unit would operate under a different contract and with a dedicated team.
- A utility player that does not have a strong foothold in a country. This player would cover clusters of mid to small sized cities, and/ or large city's under-serviced neighborhoods. This player would again operate through a dedicated subsidiary, which it could set up by acquiring local mid-level players to gain immediate expertise, whenever they exist.

The success of such an endeavor would mostly rely on three factors:

- Management:
  - Ability to attract managers who combine a passion for social issues with a hard nose, pragmatic management style, and are able to develop appropriate low-cost and flexible approaches
  - Ability to manage effectively and efficiently decentralized operations, through local teams.
- Governance, including the composition of the Executive Board, and the design of key performance indicators.
- Financing, including the structuring and channeling of the various investments and subsidies, as well as guarantee mechanisms against country risks and government defaults.

### Funding of intervention

Long-term, patient equity capital should be raised to finance the operations of BoP utilities, as well as finance new infrastructure. Another possible way to raise important amounts of capital would be to issue government-backed social bonds.[74]

In addition, subsidies might be needed to cover for losses in those communities where the infrastructure requirements are such that investments cannot be recovered with the level of tariffs the local communities are able and willing to pay. These subsidies could come from the government or from international donors. In addition, financial guarantees would be required to protect the 'BoP Utility' against delays in payment (of subsidies or water bills) from public authorities. A potential avenue to channel this financing would be the creation of a revolving fund, financed upfront by the government and donors. A share of the fund could also be blocked and be used as guarantee against arrears and defaults.

### Business opportunity

While a detailed plan would need to be developed, the Hystra Project Team has tried to outline what the economics of such a utility might be. Obviously, the actual feasibility of a 'BoP Utility' would depend on the needs and requirements put forward by the public authorities in each given country.

Extrapolating from case study data, an average player operating a cluster of about 60 mini-networks (of around 1,500 connections each), serving almost 500,000 users, would require a capital investment of US$8-10 million. It would generate US$3-4 million annual revenues after more than five years of operation.[75]

Typically a 'BoP Utility' would be organized through a network of branches, where local staff does operations and maintenance, meter reading, billing and collection. The central team would focus on supervising and assisting the branches, as well as legal, accounting and finance, and business development. New infrastructure development and specialized maintenance would also be centralized.

*74 Social Impact Bonds address barriers to public sector spending in prevention and early intervention, contributing to overcome the lack of sufficient and dependable funding for service providers that deal with root causes. On the one hand, a bond-issuing intermediary promises to deliver improved social outcomes that generate future cost savings for the public sector. On the other hand, a public sector agency agrees to pay a pre-determined price - a proportion of the cost savings that would result from a particular improved social outcome. Importantly, the government entity would only be required to make the payment if the agreed-upon performance targets are achieved. In this case, large donors could shoulder the payment from government, by contributing themselves a share of the success fee. For more information, see: http://www.socialfinance.org.uk/*

*75 The revenue estimates are based on the lowest safe water prices observed in the case studies, which would allow covering operational costs and capital expenditures. The capital investment expenditures are based on infrastructure costs observed in the case studies, and more specifically on that of an average installation whereby groundwater is pumped to the surface through pumping stations and chlorinated before stored and/ or pumped into the network. It assumes that 80% of the branches would be greenfield operations.*

*The estimated global economic opportunity would add up to about US$2.9-3.3 billion for 'Mini-Utilities'.*

# RECOMMENDATIONS FOR WATER PLAYERS









# RECOMMENDATIONS FOR WATER PLAYERS

## Government: the cornerstone for the participation of the private sector in safe water

National and local authorities are bestowed with the mandate to regulate and organize water provision. They will be essential to defining and framing how new private players may operate. They can for instance, call on philanthropic or for-profit organizations to help manage public services, or leave private initiative to fill the gap in places where elected officials have not yet managed to provide a sustainable public service (e.g., in rural areas).

Governments can engage and stimulate corporate and non-profit sector involvement, by:

### a) Ensuring the quality and reliability of low-cost solutions proposed for the poor

Governments have a difficult role to play in regulating new safe water industries. For instance, some of the low-cost filters may not be highly effective at removing viruses, but do remove bacteria. Hence, should governments allow any home filter technology, or promote only the more effective ones? The balance is difficult to strike, but whichever way has significant implications. For instance, a player like Hydrologic – a social enterprise manufacturing filters in Cambodia - is now starting to face low-cost competition from filters that are reportedly much less reliable. At the same time, Hydrologic filters are not highly effective against viruses, but have helped tens of thousands of Cambodian households to effectively treat their water on a daily basis against bacteria.

### b) Leveraging private sector resources to accelerate the scaling-up of low-cost solutions for the poor

Governments can use private sector resources to accelerate the provision of safe water to under-serviced populations in a competitive and transparent manner. For instance, they can issue tenders for platforms aimed at supporting a more vibrant and professional water kiosks sector. Similarly, they can sub-contract water infrastructure maintenance to local companies and NGOs. Or they can incentivize mid-scale utilities to go and invest in those secondary towns whose infrastructure crumbles under waves of rural migration.

### c) Maximizing effectiveness of interventions in terms of health outcomes

Governments can play a catalyzing role in enhancing the social impact of the strategies outlined in this Report. They can do so through:

- mass education: governments need to proactively take part and contribute to safe water awareness campaigns.
- cross-sector synergies: governments need to ensure maximum synergies and coordination between the Water, Health, Rural Development, and Urban Planning Departments.
- impact measurement: governments may require that private players engage more intensively into measuring the health impact of their initiatives, and ideally contribute to their monitoring efforts.

## Private corporations: engines to scale and accelerate innovation

Private corporations are uniquely positioned to accelerate the replication of successful innovations across countries because of their footprint, management processes, government relationships and local partnerships.

Their motivations to do so will undoubtedly be varied. A straight-forward business-profitability argument is not sufficient because even if they are financially sustainable, each opportunity is small, complex and risky. Corporations that engage in serving the BoP do because of a combination of factors:

- impact: the strategies we propose are sustainable ventures that are much superior to (generally) small-scale CSR programs because they are designed for scale-up.
- innovation: corporations learn new skills, build new alliances, explore new opportunities, and test new technologies and products.
- meaning: they improve their external reputation in the countries where they operate as well as with the broader public. These projects also increase employee pride and commitment.

Stepping back and looking at the clusters, there will be four main strategies for private corporations to apply their capabilities and contribute to solving the world's safe water problem. These are detailed below, starting with the CSR-like initiatives and concluding with more business-like ones:

a) **Help create local industries for home water treatment products (Devices, Flasks & Tabs):** as described in the *Devices, Flasks & Tabs* section, there is a need for a philanthropic intervention to design and fund effective social marketing campaigns, as well as identify and support local entrepreneurs. This intervention would last approximately five years and require an investment of over US$25 million a country of up to 30 million people, saving a cumulated 90,000 DALYs over that period. The corporations that would undertake this strategy will ideally possess:

- good relationships with the country's health authorities
- program management capabilities
- a health-oriented CSR budget and the ability to raise additional funds with donors or philanthropists, based on their credible management capabilities
- support from a corporate impact investment fund
- an effective employee volunteering program to provide technical assistance to local entrepreneurs.

b) **Help set up a network of support platforms for water kiosk operators:** as described in the *Plants & Kiosks* section, there is a need to set up a network of support platforms for local kiosk operators. These support platforms would be run locally, in the form of social businesses that break-even but do not generate profits. These platforms would need to be set up with a view to handing them over to local social entrepreneurs or NGOs in the mid-term. Effective corporations that undertake this strategy would possess:

- good relationships with the country's health authorities, to introduce regulations making it compulsory to ensure and control water quality
- an ability to effectively source the best and most cost-efficient technologies and secure appropriate financing for kiosk operators
- operational capabilities to recruit, train and support hundreds of local kiosk operators
- an effective employee volunteering program that provides technical assistance to the teams running the support platforms.

**c) Create a 'BoP Utility':** as described in the *Pipes & Taps* section, there is an opportunity to create a water utility dedicated to serving the BoP. Existing water utilities with international presence or ambitions are among the best candidates for such a strategy. In addition, utilities willing to undertake this strategy would possess:

- successful experience in serving BoP users, possibly in slums of the cities or towns where they operate. This experience will have helped them develop distinctive capabilities in areas such as working with local public authorities, engaging local communities, building and operating low-cost small networks, pricing and financing of home connections, effective payment collection practices, etc.
- a board willing to support the creation of a dedicated subsidiary, with hybrid (i.e., profit and non-profit) governance and financing
- a general reputation that would enable this 'BoP Utility' to easily engage in discussions with public authorities in cities or countries where existing water utilities fail to expand massively the network to slums, suburbs and fast growing provincial towns.

Given these criteria, a range of water utilities may become interested in exploring this strategy, from the largest international water utilities, to local public utilities.

**d) Design and manufacture mini-water-networks suitable for highly polluted areas:** as described in the *Plants & Kiosks and Pipes & Taps* sections, today's water treatment technologies do not allow for building low-cost, small piped network systems in areas where water requires complex, heavy treatment. These installations typically do not integrate wastewater solutions in areas where the existing sewage infrastructure is inappropriate. If the technology could be evolved in such a way to operate such networks sustainably with a price of water under US$0.05 cents per liter, these networks could become a highly appropriate solution to over 40 million people in need.

A corporation interested in this strategy would have strong technological capabilities. The attractiveness of such a strategy would undoubtedly increase for players that are both manufacturers of water treatment equipment and operators of utilities.

## Investors, development agencies and philanthropists: the necessary additional support for both public and corporate sectors

While there are a number of entrepreneurs and companies that provide innovative solutions at some scale, it appears that entire sectors need to be restructured to overcome the more systemic barriers these innovations are facing.

With a strategic perspective on the needs and solutions available as starting point, development players and impact investors should actively seek to engage businesses, big and small, in a more impactful manner, whenever and wherever users are willing and able to pay for essential, quality goods and services. Once competitive, sustainable players are in place, much needed philanthropy money can go in support of the very poor, for which commercial approaches are off limits.

The roles that impact investors, development agencies and philanthropists can play differ, depending on whether they aim to engage and help small or big business:

- **Supporting small (social) businesses**

**a) Invest in sector-wide interventions, which no individual company could or would, by:**

- creating awareness and demand for safe water: development agencies and philanthropists should finance social marketing campaigns to create deeper awareness about the importance of safe drinking water. As importantly maybe, they should also stimulate more innovation in the field of social marketing techniques. This strategy is particularly relevant in the field of home water treatment products, where higher penetration levels are necessary to build a local sustainable industry of Devices, Flasks & Tabs.

– paying for 'first-mile' infrastructure: the 'first mile' infrastructure in water is typically borne by public sector. It can be the large treatment plants upstream, or the pipes from the dam to the city. It can also be the borehole or first hand-pump in a remote village. Local companies can provide for the last mile, but often cannot ask their users to pay for the first. Donors can cover the costs related to this infrastructure. This is, for instance, the scale-up strategy recommended for Pumps: pump users are ready to pay for maintenance services, and possibly for chlorine dispensers next to the village pump, but cannot finance the replacement of all pumps that fell into disuse.

**b) Provide technical and business support, as well as seed capital:** small (social) entrepreneurs very often need a mix of grants, equity and loans to bring their operations to scale. But more importantly, they always need technical and business support. For instance in Kiosks, local operators need help in sourcing the most appropriate and inexpensive technology, and in maintaining their machines. Local pump maintenance operators will require assistance in mapping the pump parks they want to cover. Local chlorine manufacturers will want help in setting up effective direct sales channels.

There is therefore a need for investors and donors that can provide start-up capital (equity or loan), and/ or grants to finance business incubation efforts, and offer (or hire partners that can offer) business and technical support to these local companies.

**c) Advise and support public authorities:** in many cases, local social entrepreneurs have to either fight to grow out of informality or are reluctant to do so, because of regulatory issues. For instance, operators of water kiosks in India often operate in a legal vacuum, as they treat water without bottling it (only the bottled water is regulated). Until the sector reaches sufficient scale to attract political attention and trigger new regulation, they do not know whether their business will be legal and sustainable in the mid-term. Similarly, small pump maintenance operators can put great operations in place, until a new election triggers an influx of free-of-charge pumps in the villages where they operate, seriously undermining their users' willingness to pay. Finally, chlorine producers would find it much easier to convince populations of the benefits of their products if health centers and doctors would approve of and recommend chlorine as an appropriate water treatment solution.

Development agencies therefore have a central responsibility in encouraging the development of appropriate regulations, channeling aid financing into the right policies, developing public authorities' capabilities, and helping bring together public and private players in delivering basic services.

- **Catalyzing action from big business**

**a) Help strike a balance between financial and social objectives:** large corporates wanting to serve the BoP in a responsible and effective manner often need to question and adapt the very basics of their business. For instance, Elsa Meija, the Director of a mid-scale utility serving thousands of poor in the Philippines, manages to serve her clients because she offers them to pay their water bills daily. She does this by having marginalized people do bill collection on commission. That is an approach that is very different from what mainstream utilities do.

To be successful, large corporations need to be challenged constantly on why they do things the way they do. And they need a variety of views to strike a balance between the 'right' business answer, and more inclusive approaches. This is the role that socially-minded investors, such as development finance institutions could play, by co-financing and actively influencing the direction of corporate initiatives aimed at serving the poor (eg., by members of the board).

**b) Absorb the risk, in order to attract more financing and commitment:** large corporates hesitate to serve the BoP for all the risks it carries: regulatory or political risk, business risk, and reputation risk. For them, serving the BoP often means promising to deliver, without knowing how much revenues and costs they will get, while the rules of the game may change from one day to another.

Taking on a part of that risk is also what socially-minded investors, such as development finance institutions can do to have the corporate pioneers engage at a large-scale.

**c) Provide subsidies to ensure universal service:** because water is an essential good, utilities that want to serve the BoP will find that some segments of the population or geographies are simply not economically sustainable. They will need subsidies to pay for a part of the network infrastructure or for some of the poorest households' connections. To accelerate their reach to the poorest and most difficult geographies, donors and philanthropists could provide the grants or soft loans needed.

# CONCLUSIONS

# CONCLUSIONS

**Out of the two billion poor in need of safe water, about half could be reached sustainably by a new generation of safe water enterprises**

Over the past five years, pioneering enterprises and projects led by social entrepreneurs, NGOs, corporations have proven that innovative strategies can provide safe water to millions of people, in ways that are (partly) economically sustainable. They have also proven they can reach out to the poor. These solutions represent clear improvements against the status quo, especially in terms of water quality and affordability. Even so, some are temporary in nature – like filters that may be replaced by public piped services once these become safe and equally available to all users. By contrast, other solutions like 'Mini-Utility' networks can be integrated in a modular fashion into the main operator network, as it reaches peripheral areas.

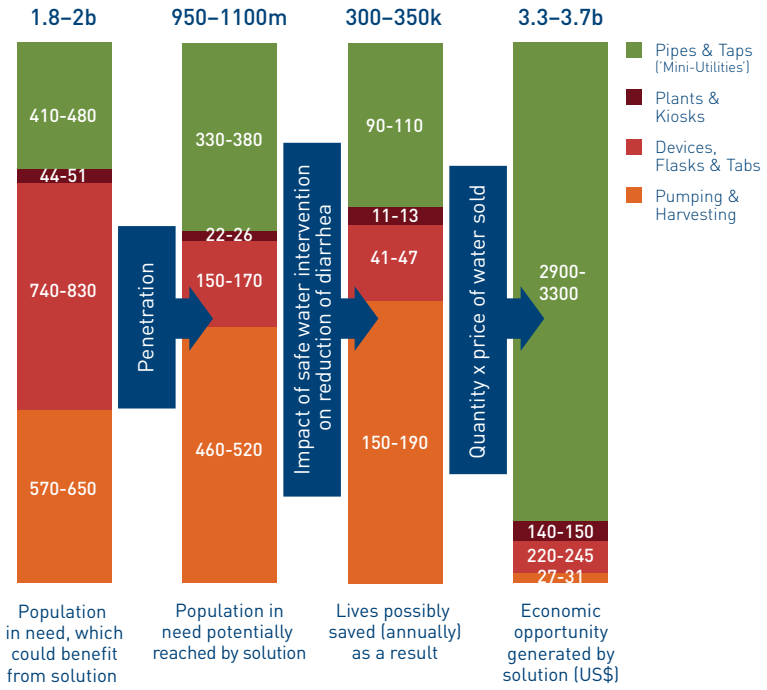
If these innovative approaches were successfully scaled-up in every developing country, they could effectively reach about 950-1,100 million people in need, or about 50% of today's total poor population without access to safe water, including:

- 600-700 million people living in rural areas, thanks to a combination of pump rehabilitation, provision of home water treatment products, and water kiosk services where water is highly polluted;
- 300-400 million people living in urban areas, thanks to piped-networks, as well as water kiosks whenever appropriate.

As a result of the scaling-up and combination of these interventions, about 300-350,000 lives could be saved annually, averting deaths due to diarrhea and lack of safe water.

In addition to impacting people's lives, these clusters could create employment and business opportunities for thousands of local entrepreneurs and companies. To estimate potential economic impact, the Hystra Project Team calculated the potential revenues these entrepreneurs and companies could realize by offering their products and services (see Figure below).

**Figure 19. Estimated social and economic impact of each cluster[76]**

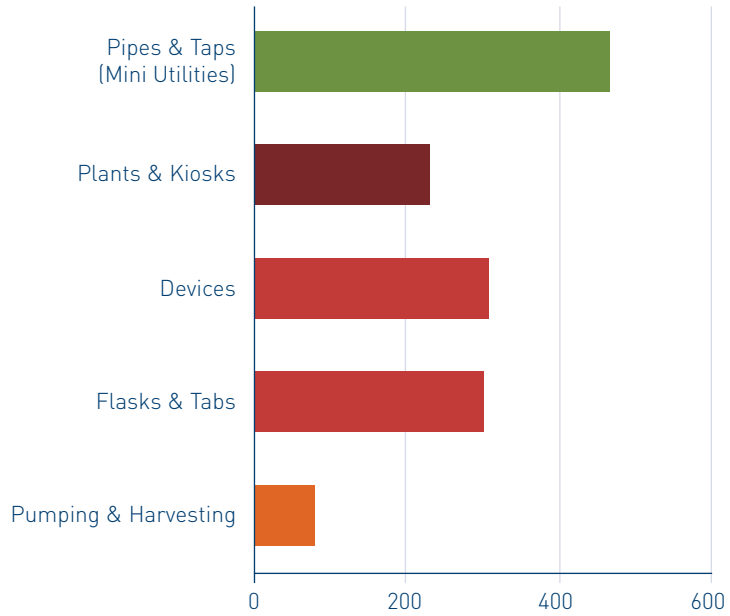



*76 Only the incremental impact of each solution has been considered, in rural and semi-rural areas order to avoid double-counting: The figures for Devices, Flasks & Tabs were limited to populations living in areas where raw water is bacteriologically polluted, while they could be considered in more areas. Similarly, Plants & Kiosks figures only include populations living in areas where water is highly polluted and/or brackish.*

Significant funding would be required to make this happen. Extrapolating from case study data, the Hystra Project Team estimates that over US$15 billion would be needed to accelerate the emergence of BoP-centered safe water industries across all clusters. About one third of this amount would be grants, while the rest would consist of loan and equity financing.

Interestingly, it appears that the proposed scale-up strategies have similar levels of spend effectiveness, in terms of DALYs saved per dollar spent by the investor/donor, with the exception of Pumps and Pipes & Taps.

**Figure 20. Total proposed scale-up intervention costs (to donor and investor)/ total cumulative DALYs saved over 5-years (US$)[77]**




In addition to the need for financing, financial innovation will be required to evolve the tariff and contractual frameworks that govern the work of utility operators, so as to create positive incentives to expand the water service to the most difficult and costly areas. In those areas where governments want to channel subsidies, innovative financing mechanisms should be developed to channel and allocate these funds. This could consist, for instance in setting up public agencies, or a revolving fund financed upfront by government and donors, which would channel (cross-) subsidies (and which could possibly also guarantee arrears from government).

## To bring these innovations to scale, hybrid partnerships, financing and strategies are needed

In all clusters, the role of public and not-for-profit players is central. They guarantee and promote universal service, and help harness the power of private players.

In addition, for all the scale-up strategies proposed above, there is a case for collaboration between for-profit and not-for-profit players:

- **Partnerships between not-for-profit and for-profit organizations:** not-for profits can help harness the resources of commercial players by contributing to industry building (Pumping & Harvesting, Devices, Flasks & Tabs), establishing support platforms (Plants & Kiosks), and actively steer the governance of corporations working for the BoP (Pipes & Taps).
- **Co-financing from philanthropic and mainstream investors:** grants will be necessary to attract additional equity and loan, and fund the scaling-up of enterprises aiming at serving the BoP. For instance, grants are required to build demand and new local industries (Devices, Flasks & Tabs, Plants & Kiosks), to absorb risk and offer subsidies when companies venture into difficult geographies (Pipes & Taps), and to pay for capital investments (Pumping & Harvesting).
- **Strategies aiming at achieving better health outcomes and financial sustainability:** public and not-for-profit players will also be instrumental in keeping health outcomes at the heart of these initiatives. They can do so by:
  - taking the lead in measuring and publicizing actual deaths averted by these interventions
  - bringing in players from other intervention areas such as sanitation, hygiene, education and health, with a view to multiplying effectiveness of water programs.

77 *Computed by adding total cost of intervention over time (grants, equity and debt), divided by estimated full impact of intervention, for five years, in terms of DALYs averted. Source: Team analysis*

**Figure 21. Summary of main resources and players needed for each cluster**

| Cluster | Key roles | Best owner | Financing |
|---|---|---|---|
| Devices  | Program Management Organization (PMO) | NGO or company specialized in business incubation | Grant for social marketing campaign and funding of PMO (foundation or donor) |
| | Local operator to manufacture and distribute Devices | Local entrepreneur (or NGO) | Loans/equity to operators (Foundation or Donor) |
| Flasks & Tabs  | Program Management Organization (PMO) | NGO or company specialized in business incubation | Grant for campaign and funding of PMO (Foundation or Donor) |
| | Local operator to manufacture and distribute Flasks & Tabs | Local entrepreneur (or NGO) | Loans/equity to operators (foundation or donor) |
| Plants & Kiosks  | National platform to support and audit kiosks (possibly set-up by PMO) | CSR unit/Foundation in short-term; Local entrepreneur in long-term | Grant to set-up platform (Foundation or CSR of corporations) |
| | Local operator to run kiosk | Village-level entrepreneur | Loans to operators (impact investors, or local commercial banks with donor guarantee) |
| Pipes & Taps  | 'BoP Utility' to run clusters of mini-networks | Local conglomerate or spin-off of international utility | Hybrid financing for capex (mainstream investor and donor) |
| | | | Possibly grant financing for subsidized connections (Government or donor) |
| Pumping & Harvesting  | Program Management Organization (PMO) | NGO or company specialized in business incubation | Grant for social marketing campaign and funding of PMO (foundation or donor) |
| | Local operator to manage pump park maintenance and renewal | Local entrepreneur (or NGO) | Grants to finance revolving fund for pump park renewal (foundation or donor) |
| | | | Grants, loans/equity to operators (foundation or donor) |

More generally, given the size and complexity of the safe water sector, this is a need for sector-wide interventions and unprecedented collaboration between various players, so that solutions are made available for all, where and as they are needed.

## However, proposed approaches do have their limitations

At the outset of this study, the Hystra Project Team identified exciting projects that expand access to safe water to millions of people in need. A lot could be done to scale those up.

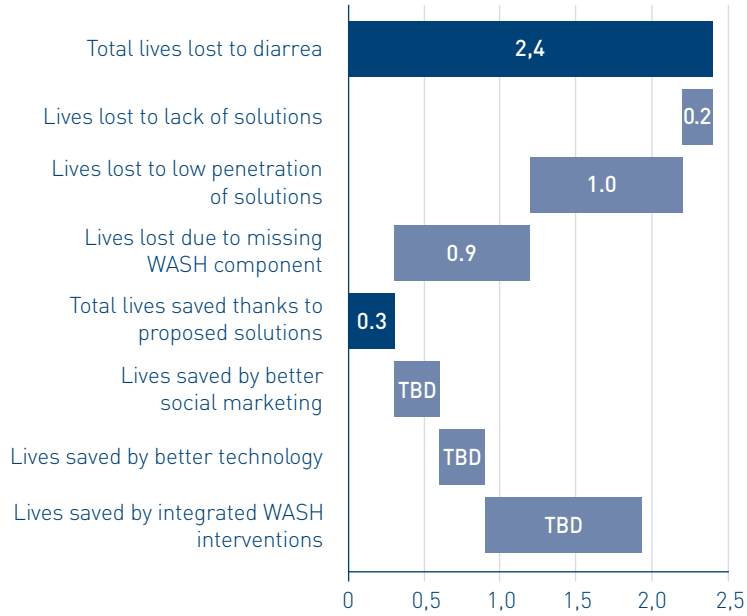
However, even the proposed scale-up strategies have their limitations: there are over 200 million poor that existing approaches cannot serve, and another estimated 800-900 million that existing approaches could serve but which will not be effectively adopted by users, given the low level of penetration they achieve today.

These limitations translate into about 1.3 million lives which cannot be saved by improving access to safe water, out of the 2.4 million people who die every year from diarrhea-related diseases.

More importantly, improving access to safe water only reduces diarrhea-related deaths by about 30%. To reach 100%, hygiene and sanitation need to be addressed concurrently. As a result, the remaining 70% of diarrhea instances will not be affected – resulting in about 900,000 deaths that will not be averted.

Henceforth, while the focus of this study is on safe water solutions only, we realize that similar solutions need to be explored in the field of sanitation and hygiene. This is particularly true for cases where safe water access translates into bringing large quantities of water into homes. In these cases, we also need to find solutions for the evacuation and the treatment of wastewater.

**Figure 22. Overview of limitations of proposed strategies in terms of lives lost (millions deaths, 2008)[78]**




78 *Source: Team analysis*

To overcome these limitations, we recommend investing into the following areas:

- **High impact social marketing campaigns:**

  In Devices, Flasks & Tabs and to some extend Plants & Kiosks, existing solutions struggle to achieve more than 20 or 50% (respective) penetration in the communities they serve. This can be partially explained by the fact that current marketing and user education approaches often fail to drive lasting behavior change.

  For these clusters of solutions which revolve around individual routines and regular decisions about purchase and use of safe water products, we need to continue investing into researching the actual impact of and promoting successful marketing techniques that make individuals and communities shift sustainably and consistently towards a better adoption of safe water practices and products at a large-scale. We also need to understand better how user education in water could be better effectively coupled with hygiene and sanitation messages. This development could be encouraged through 'challenge competitions' that reward social marketing techniques that result in lasting behavior change.

- **Low-cost treatment technology, and integrated wastewater systems for smaller communities:**

  Today, hundreds of thousands of households are reluctant to buy and pick up safe water every day from a water kiosk. However, experience shows that having large quantities of safe water available at the tap is the service that people value most, and would therefore be most willing to pay for. Yet despite significant advances in technology and operational effectiveness, there is no large-scale proven model that combines a water kiosk with a piped water network at a price that is sufficiently low for the BoP (while still allowing for recovery from investment and operational costs without any major form of subsidies).

  It would therefore be critical to stimulate innovation in this field. Similarly, more needs to be done to explore how existing small, decentralized wastewater systems could be integrated at very low cost with decentralized water networks in small towns, to evacuate the large quantities of water brought to homes.



# CASE STUDIES












# CASE STUDIES

In this section, the reader will find 15 safe water projects, described along a set template, and analyzed in the following four dimensions: social impact, economic sustainability, environmental impact, and scalability/ replicability potential. The Hystra Project Team also included a number of key operational and financial indicators, whenever available.

The Hystra Project Team gave, whenever sufficient information was available, a rating to each project. This rating (from 1 – lowest, to 4- highest score) is based on high level indicators, for each of the four dimensions mentioned above. However, given that each project is being implemented under very different circumstances, comparison of performance may not be appropriate.

More details about the analytical and rating methodology can be found in the Appendix of this report.

The projects are grouped and presented by cluster.

### Overview of case studies by cluster

| Cluster | Project analyzed | |
|---|---|---|
| Devices, Flasks & Tabs | • Antenna Watasol Tinkisso<br>• PSI Safe Water Systems<br>• IDE/Hydrologic Ceramic Water Purifier<br>• Unilever Pureit Filter | |
| Pumping & Harvesting | • Inter Aide Water Pump Operations and Maintenance | |
| Plants & Kiosks | • HealthPoint Services E-health Points<br>• Naandi Water Community Services<br>• Sarvajal Reverse Osmosis Franchise | |
| Pipes & Taps | **Utilities**<br>• Manila Water Corporation<br>• Sénégalaise des Eaux<br>• Suez Environnement (PALYJA) Water for All Program<br>• Veolia Environnement (Redal and Amendis) Social Connection Program | **Mini-Utilities**<br>• AGUATUYA Agua para Todos<br>• Balibago Waterworks Systems<br>• 2AEP Kayes Monitoring Program |

# TINKISSO / ANTENNA WATASOL

**Tinkisso/Antenna,** Guinea Conakry
www.antenna.ch

# EXECUTIVE SUMMARY

## ORGANIZATION:

Antenna is a Swiss NGO promoting innovative technologies for the poor. Their water treatment products – the WATA range – include three electro-chlorination devices of various capacities. They operate in countries like Guinea, Burkina Faso, Democratic Republic of Congo, Mali, Haiti, India, Nepal and Pakistan, and reach an estimated 10 million users thanks to the WATA. While their main clients are NGOs and international donor agencies, they run several pilots with social entrepreneurs to promote their products directly to local populations.

## PROJECT IN GUINEA-CONAKRY WITH TINKISSO:

In 2008, following a cholera outbreak, UNICEF purchased 15 Maxi-WATA (the largest device of Antenna's line) to improve the availability of drinking water through the free distribution of chlorine. UNICEF partnered with Tinkisso, a local NGO, and the Ministry of Health to install one Maxi-WATA in each of the eight regions of Guinea as part of its strategy to reduce water-borne diseases. In 2009, the work between Tinkisso and UNICEF ended as well as financial subsidies for the free distribution of chlorine. Antenna then decided to support Tinkisso to start the production and distribution of chlorine on a commercial basis. As a result, Tinkisso started producing and selling 250ml bottles of chlorine for US$0.43 each (GNF3,000), which can disinfect 1,000L of water over a one month period. Production is centralized in Dabola, where the team produces and bottles on average 107L of chlorine per day with 3 Maxi WATA. The bottles are then distributed through various channels (health facilities and hospitals, weekly markets, door-to-door and pharmacies mostly). Since the start of the project, the coverage has been scaled up from 17,5k regular users in the Dabola prefecture to 51,5k users in the entire region of Faranah.

## INNOVATION:

- Low-cost technology allowing for decentralized production, especially in rural areas where no other water treatment options are found: Antenna has developed a line of WATA devices (Mini – US$100; Standard – US$270; Maxi-WATA – US$2,300) that can produce from 1 liter of active chlorine in 10 hours (Mini-WATA) to 15L in 1 hour (Maxi-WATA). WATAs can be connected to the grid, to a generator, to a car battery or a solar panel.
- Partnerships approach to set up commercial operations: Antenna has developed the 'WATASOL approach', i.e., partnerships to create chlorine production and sales schemes, together with local operators or organizations.

## RATING 10/16:

- Social impact: Effective water treatment against bacteriological contamination only. Residual chlorine prevents recontamination. Achieved relatively high penetration across the Faranah region (6.5% of total population). Short product lifespan may however not be observed (active chlorine concentration drops 3-4 weeks after production). Active chlorine can be used for multi-purposes such as cleaning of latrines, disinfection of wounds, cooking, etc.
- Economic sustainability: For Tinkisso, US$3,500 average revenues/month. 86% of total operational expenses currently covered with revenues. Grant by Antenna covers operational losses and social marketing costs. Operational costs could however be further reduced (e.g., cost of packaging). The equipment has been fully subsidized by UNICEF, as it has been given to Tinkisso for free
- Scalability and replicability: Penetration level is currently limited by the lack of appropriate distribution channels. Expansion to other parts of Guinea would require the identification of appropriate partners/ NGOs to operate a similar scheme (as the government is trying to push such efforts in other regions). Replicability is possible mostly in regions where there is a good acceptability to chlorine as a water disinfectant.
- Environmental impact: Depending on its treatment capacity, WATA devices can be connected to different electricity sources, such as car battery, generator, and solar panel. For Tinkisso, the 3 Maxi-WATA are connected to a generator, requiring 17L of fuel/month. Attempts to refill the storage bottles have been unsuccessful. As a result, bottles remain un-recycled.

# PROJECT'S CURRENT STATUS

**DATE OF CREATION:** 2008

**PRODUCT/ SERVICE DELIVERED:**

Active chlorine bottled in flask of 250ml (1ml of chlorine disinfects 4L of water). This should cover 30L of drinking and cooking needs of a 5-person household for one month. Lifespan of the chlorine is about 1 month. After that, the concentration of active chlorine in the bottle decreases.

**GEOGRAPHICAL FOCUS:**

Tinkisso is located in Dabola Prefecture (200k inhabitants), but covers the entire Faranah region (800k inhabitants).

**COMPETITIVE LANDSCAPE:**

Project Sur'Eau (from PSI) sells chlorine, but 60% more expensive. UNICEF regularly distributes chlorine for free.

**PARTNERS, SUPPLIERS AND FINANCING INVOLVED:**

- Local implementation partner: NGO Tinkisso. The NGO was set up by Aboubacar Camara in 2008
- Funding: UNICEF donated the equipment. Antenna finances Tinkisso activities with a budget of US$15k-30k per year. This grant has been given to Antenna by private donors
- Retailers: Public health centers, pharmacies, door-to door sales, local markets

**TECHNOLOGY:**

The Maxi-WATA is an electro-chlorinator that transforms salted water (25g of salt/L) into 15L of active chlorine in an hour. Tinkisso operates the WATA on a fuel-based generator, as Dabola electricity supply is not reliable (and solar is not possible for this device). Water used for the production comes from local wells and taps. The solution is then bottled manually, and transported for sale by Tinkisso to the regional health centers, pharmacies or local markets. Maxi-WATAs have an estimated lifespan of 20k hours of use (8 years at current production of 105L/day).

**SOURCE OF REVENUES:**

- Antenna: Donations and grants (e.g., the Swiss Development Agency). Sales of WATA devices
- Tinkisso: Sale of active chlorine in bottles; grant funding from Antenna

**WATER SOURCING AND INSTITUTIONAL ARRANGEMENTS:** N/A

**BUILDING/ LAND SOURCING AND INSTITUTIONAL ARRANGEMENTS:**

Rent of office and production facilities for US$70/month.

**GOVERNANCE/ RELATIONSHIPS WITH LOCAL AUTHORITIES:**

Tinkisso has reached an agreement with all public health centers in the 4 prefectures of the Faranah region to promote and prescribe chlorine against diarrhea. All in all, some 1,200 health promoters were trained by Tinkisso on the production of chlorine and quality control. The local government also seeks support from Tinkisso to replicate their model across the region, as the Ministry of Health installed one Maxi WATA in each of the 8 regions of Guinea.

**REGULATORY FRAMEWORK:**

Public authorities have declared chlorine as an appropriate remedy for water treatment. The government also monitors the quality and concentration of chlorine.

**LEVEL AND DEPTH OF AWARENESS OF POPULATIONS IN NEED (REGARDING SAFE WATER, HYGIENE, SANITATION):**

The level of awareness is very low. However, UNICEF and PSI were and are very active with public awareness campaigns.

**MARKETING:**

- Both product and social marketing, aimed at beneficiaries and distributors
- For end-users, a mix of media have been used: Loudspeaker announcements, radio spots, print advertisement, flyers, door-to-door promotion
- Main messages are: a) awareness on the risks of drinking contaminated water; b) importance of hand-washing; c) need for use of active chlorine; d) chlorine use for different purposes (treatment of wounds, cooking, dish washing, cleaning toilets)
- Workshops and information campaigns have been organized to educate health care personnel and promoters on the importance of safe water and the correct use of active chlorine. In total, 1081 promoters and 116 health agents have been trained
- Positioning of product: Affordability and accessibility
- Value proposition: Low-cost water treatment method that provides entrepreneurs in rural areas with a sustainable business opportunity and end-users with a very cheap water treatment option
- Approach to developing consumer insights: Direct contact with end-users through door-to-door retail serves as a direct source of information. In addition, a customer phone line has been established

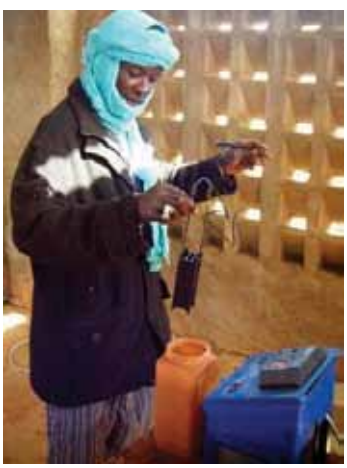
- Consumer life cycle: Use of multiple distribution channels (door-to-door, health centers, local markets). Each promoter regularly visits his/her pool of customers. Tinkisso also organizes promotion days where it sells chlorine at a discount rate
- Loyalty enforcement: N/A

## PRICING:

Prices set by Tinkisso have been calculated on a cost plus basis, given willingness to pay (estimated at GNF2,500 - 3,000 per month per household). Wholesale price to health centers and door-to-door retailers is GNF2,500 (US$0.33). They, in turn, sell to the end user at US$0.43. Selected door-to-door promoters also treat 20L jerrycans at public taps for GNF200 (US$0.027). It could be further reduced if cheaper packaging solution could be found (packaging accounts for one third of the operational expenses). These prices have been approved by Tinkisso and are communicated through radio spots. Vendors that have been reported to sell at a higher price are not provided chlorine bottles any more.

## STORAGE:

There are clear recommendations given by the retailers to the end-users to treat the water at least every 48 hours and to store it in a clean recipient.



## DISTRIBUTION AND DELIVERY:

- 5 channels carry the following volume share:
  - Direct sales on local markets by Tinkisso (34%)
  - 28 independent door-to-door healthcare promoters (24%)
  - 44 regional health centers and 121 health agencies/agents (27%)
  - 4 pharmacies (5%)
  - Other (e.g., NGOs) (10%)
  - Door-to door vendors work on an independent basis and take a margin on the wholesale price. The vendors must sell approximately 10 bottles per day to attain a typical household income in the region. The most successful vendors that have reportedly dedicated a substantial amount of their time on social marketing activities receive a bonus ranging from about US$6 to 20 from Tinkisso at the end of the month.

## ENTREPRENEUR AND RETAILER SELECTION:

- Antenna supplies WATA to any interested purchaser. Antenna also advises social enterprises on the technology, dissemination methods, and overall business plan
- Retailer selection by Tinkisso: The regional health centers, health agencies and pharmacies have been identified because people care about their health and are therefore willing to invest in water treatment. It also increases the credibility of the product. The door-to-door promoters are selected individually by Tinkisso based on their motivation and experience. Each retailer receives an introductory formation by Tinkisso.

## HOME DELIVERY:

Yes, through door-to-door retailers

## END-USER PAYMENT:

Cash (door-to-door distributors sometimes allow their users to pay at the end of month)

## END-USER FINANCING: None

## FRANCHISEE/ ENTREPRENEUR FINANCING:

None

## MAINTENANCE:

Maintenance is ensured locally. Devices must be rinsed with clear water after each uses or dipped in water with vinegar to take away the calcareous deposit.

## WATER QUALITY CONTROL:

Each WATA device comes along with two types of quality tests. The WataBlue controls the presence of free residual chlorine in the water and the WataTest checks the concentration of active chlorine produced by the WATA. Both tests are non-toxic and reliable. The tests are part of the equipment of promoters who sporadically conduct tests of water quality in the field.

## MONITORING AND IMPACT MEASUREMENT:

In general, limited monitoring from Antenna, given the difficulty to follow-up on the usage of every device sold. Limited impact measurement data from Tinkisso, besides of an external evaluation study on the project.

## FUTURE PLANS AND NEXT STEPS:

Reduction of operational costs. In particular, alternatives to the expensive PET bottles that account for 30% of total operational costs.

# IS THE PROJECT:

## SOLVING THE PROBLEM?

**Problem and magnitude:**

- As of 2004, there were 9,600 diarrheal related deaths (8.4% of total deaths), and 304k diarrheal related DALYs (7.7% of total DALYs) recorded for the country
- 2008 improved water access coverage: 71%

**Scale and reach:**

- Total sales have increased from 3,500 bottles/month in 2009 to over 10k/month in 2010
- Estimated regular clients have increased from an average 17,5k in 2009 to 51,5k in 2010 (average of 5-people/household)
- 6.5% penetration in the entire region of Faranah (800k inhabitants)

*NB: Only figures for May-Oct. 2010 are available*

**Quality of water provided:**

- Highly effective treatment. Log 3 for bacteria, viruses and protozoa
- Efficiency of water treatment is regularly controlled in the field by promoters

**Safe water needs addressed:** Drinking and cooking water (over 47L/day/household, assuming 5 people per household, and a bottle lifetime of 21 days maximum)

**Link with hygiene practices, sanitation and wastewater management:**

- Active chlorine can be used for multi-purposes such as cleaning of latrines, disinfection of wounds, cooking, etc.
- Awareness campaigns on the risk of contaminated water, the importance of hand washing and a hygienic household
- Users have been informed of the possible use of chlorine to clean latrines

**Acceptance and usage:**

- Users accept the taste of the chlorinated water
- Treatment is practiced correctly by users but problems with observance of lifespan of the product
- Important variations in usage, depending on the seasons

**Impact on health of beneficiaries:**

- No survey data on clients of Tinkisso available

## ECONOMICALLY SUSTAINABLE?

**Fully loaded cost of 1L of treated water:** US $ cents 0.044.

**Price of 1L of treated water:**

- Retail price: US$ cents 0.043
- Wholesale price to health centers, pharmacies and door-to-door promoters US$ cents 0.033

**At user level:**

- Average household income per day of beneficiary household: US$0.65-0.8 (GNF5k-6k), equals to Purchasing Power Parity $17-20 (2009 data)
- This project targets populations of the BoP 1000-1500
- Assuming 5 people per household with 9-10L/day/person, current prices would represent over 6% of a monthly BoP 500 household income and 3% of a BoP 1000 household
- What it would take to reach the poorest: Better distribution and stronger social marketing

**At Tinkisso level:**

- 10 people employed:1 coordination; 4 production; 4 promotion/ education; 1 security
- Revenues: US$3849/month
- Operational costs: US$4389/month
- Grants to Tinkisso from Antenna: 2008: US$27.5k; 2009: US$24k; 2010: US$16k
- Total capital investment: US$9k or $1027/year. Fully subsidized (by Antenna and UNICEF). Includes: 3 Maxi-Wata US$2300/Device (every 8 years/device); Generator US$400 (every 10 years); Battery US$1200 (every two years); Motorbike US$500 (every 5 years)
- Revenues/total costs (operational costs and depreciation of capital investment) per year: 86%

*NB: Only figures for May-Oct. 2010 are available*

**At ANTENNA level:** Revenues: 23 Maxi-WATA sold (to UNICEF in Guinea Conakry) at a price of US$2,300 each

## ENVIRONMENTALLY FRIENDLY?

**Water efficiency:** No water is rejected in the production process

**Energy consumption:** The WATA can be connected to generators, to electrical power or to a solar panel (for Mini and Standard). Given unreliable electricity, the Guinea plant is run on fuel leading to increased costs

**Chemicals used:** None

**Hardware recycling:** No existing plan

**Waste in production materials**: None

**Packaging:** PET bottle. Tinkisso tried to establish a refill system whereby used bottles can be refilled for only GNF2,000 (US$0.26). However, clients seem to prefer to purchase new bottles. Hence, no recycling system established so far.

## SCALABLE AND REPLICABLE?

**Requirements/ prerequisites for the project to scale:**

- Finding the right pricing points: Willingness to pay is very low, also partly due to the fact that chlorine has traditionally been distributed for free by donors and NGOs. However, the price of US$0.04/L is, comparatively to other alternatives, very low and substantial resources could become available with a slight price increase
- Distribution: The flacons need to be brought cost-effectively to the customer. Logistics (lack of roads, lack of means of transport, dispersed areas) are difficult in Guinea and an efficient distribution system has not been found yet.

**Additional requirements/ prerequisites for the project to replicate:**

- Awareness for the importance of safe water is critical for the willingness to pay for treatment
- Acceptance of chlorine. In other cultural contexts chlorine solutions might face more resistance
- Presence of reliable partners/ entrepreneurs, as production, control and distribution are done locally.

# THE PEOPLE

Aboubacar Camara is a medical and chemical biologist with a degree from the University of Conakry and post-graduate studies at the Universities of Dakar (Senegal) and Abidjan (Ivory Coast). At 23, he started working for NGOs such as "Médecins sans Frontières", where he worked for two years on an HIV project.

In 2007, after a cholera outbreak and contacts with UNICEF and Antenna, Aboubacar started his own NGO – Tinkisso, in order to promote the sales of active chlorine and spirulina, highly nutritious algae for children.

He decided to focus on WATASOL – a low-cost solution for the production of chlorine.

Choosing development as his career was an obvious choice for Aboubacar, despite being offered much more lucrative and easier jobs in the capital.

Thanks to Tinkisso, chlorine treatment has been widely adopted in public health institutions as an effective remedy to fight water-related diseases.

*Hypothesis: GNF7,500 = US$1; GNF299.9 = Purchasing Power Parity $1. BoP 500-3000 classification scale of 2002 was adjusted on U.S. Consumer Purchasing Index with latest 2010 available data (ftp://ftp.bls.gov/pub/special.requests/cpi/cpiai.txt). Prices of water and family incomes were converted following Purchasing Power Parity conversion factor for private consumption (LCU per international $) 2009 (http://search.worldbank.org/data?qterm=PPP%20conversion&language=EN).*

*Source: Interviews with Carole de Bazignan and Julie Bergamin (Antenna), Geneva, November 30, 2010; Interviews with Aboubacar Camara, December 2010.*

*Contact for the project: Carole de Bazignan/ Julie Bergamin (Antenna) cdebazignan@antenna.ch and jbergamin@antenna.ch; Aboubacar Camara (Tinkisso) - abscamara1982@yahoo.fr*

**Aboubacar Camara**
*Founder and Head of Tinkisso*

Why are you doing all this?

*I do this because I felt that with a little bit of will-power you can change the life of thousands of people. I kept being shocked at the fact that so many children are dying because of drinking contaminated water. Someone had to react.*

What was your 'aha' moment?

*I remember meeting a representative of the Health Ministry to show him that it is possible to produce chlorine in Guinea with a very simple technology. He started to laugh. When I gave him the demo, he was staggered. For him it had been unthinkable. That was a special moment for me.*

How are you motivating others?

*I give bonuses to my best sales agents. They also receive free chlorine for personal use.*

What were key challenges on the way?

*Most important challenges are: a) Integration of opinion leaders b) user behavior change c) logistics and transport*

What were key lessons learned?

*It is very easy to spread a message and knowledge about the risks of drinking contaminated water but it's much harder to trigger real behavior change. We saw for example a health center manager who subscribed to our campaign but who continued to drink contaminated water himself.*

# PSI POINT-OF-USE WATER DISINFECTION PROJECT

**Population Services International (PSI),** Kenya
www.psi.org


## EXECUTIVE SUMMARY

### ORGANIZATION:

PSI is an international health NGO, with programs targeting malaria, child survival, HIV, reproductive health and non-communicable diseases. Working in partnership within the public and private sectors, PSI provides life-saving products, clinical services and behavior change communications. PSI is headquartered in Washington D.C. with a local presence in 67 countries. In 2009, PSI estimated that its programs directly prevented nearly 150,000 HIV infections, 3.5 million unintended pregnancies, almost 270,000 deaths from malaria and diarrhea and 40 million malaria episodes.

For more than 10 years, PSI has conducted water, sanitation and hygiene programs, focused on children under five; WASH programs are now present in 32 countries. PSI produces, promotes and distributes household water treatment products to at-risk populations through the private sector, in schools and clinics, and through distribution by community health workers, while promoting safe drinking water storage and hand washing with soap. In 2009, with sales of more than 120 million units, PSI's programs treated over 18 billion liters of water, providing safe drinking water for millions of people and averted an estimated 7.4 million cases of childhood diarrhea.

# CASE STUDIES

## KENYA PROGRAM:

PSI Kenya was founded in 1990 as a locally registered NGO focusing on health. It focuses on increasing demand for, access to and use of essential health products, including water treatment products, through the use of social marketing techniques. In addition to water and hygiene, PSI Kenya runs programs in reproductive health, HIV/ AIDS, malaria and child survival. The safe water program was launched in 2003, and focuses on the promotion of three different chlorine-based water treatment products, as an effective way to ensure point-of-use water safety in poor Kenyan households. PSI plays an active role in the distribution through its national and regional warehouses, and operates in three supply chains: a) direct sales to key accounts, b) commercial wholesalers and retailers, and c) community-based organizations. In addition, PSI conducts extensive social marketing activities, including mass media campaigns and interpersonal communication. Mass media campaigns are aimed at increasing brand awareness, while interpersonal communication seeks to transform brand recognition into regular use. Today, about 1 million people in Kenya use PSI treatment products on a regular basis and WaterGuard, a locally produced hypochlorite safe water solution, is the best-selling water treatment product countrywide.

## INNOVATIONS:

- Social marketing: PSI follows a two pillar strategy to create brand recognition on one hand (mass media campaigns focused on the product), and product adoption and use on the other (inter-personal communication through partner community-based organizations on the need for safe water). This contrasts with earlier approaches that solely focused on product marketing through mass media. In addition, PSI participates in countrywide campaigns that highlight the need for safe drinking water. The positioning adopted is both rational - highlighting health risks and economic consequences of poor health, and emotional - appealing to the caregivers' sense of responsibility for the family.
- Hybrid supply chain: Since 2009, PSI has focused on managing selected parts of the supply chain, making way for commercial players wherever feasible. Presently, PSI focuses resources on marketing and promotion, and leaves production to commercial producers. Similarly, it organizes for warehousing and direct distribution to key accounts, but also leverages commercial suppliers (both wholesalers and retailers) and community-based organizations when possible.

## RATING 10/16:

- Social impact: All PSI water treatment products are effective against bacteria, viruses and most protozoa. At any given time, PSI manages to reach about 1 million users in Kenya. Although PSI helped build high levels of awareness on the importance of safe drinking water, consistent use remains a challenge, as many caregivers can only afford the product occasionally or will only purchase it during times of heightened risk.
- Economic sustainability: PSI operations, notably the social marketing efforts, are subsidized. The manufacturing and distribution of safe water products is commercially-based, and triggered the entry of other competitors into the market, broadening the range and availability of safe water products. PSI also covers part of the supply chain where commercial partners are less present (for example, warehousing and distribution to remote rural areas).
- Scalability/ replicability: The existence of a vibrant private sector and a widespread distribution network spurred the take-off of sales in Kenya. In order to increase consistent use rates, as well as penetration into rural areas, PSI requires additional subsidies for its social marketing activities, and the development of new outreach/distribution channels.
- Environmental impact: Detrimental environmental impact is limited given that household water treatment is a cost-effective and environmentally friendly alternative to boiling water. A point of improvement would be to implement a method to recycle and reuse polyethylene WaterGuard bottles.

# PROJECT'S CURRENT STATUS

**DATE OF CREATION:** 2003

**PRODUCT/ SERVICE DELIVERED:**

Promotion of household water treatment and hygiene practices, as well as promotion, communications and distribution of three water treatment products:

- WaterGuard: In 2003, PSI Kenya launched its flagship liquid chlorine product with technical assistance from CDC. The 150ml Kenyan bottle treats 1kL of drinking water, sufficient for 4L per day per person for 50 days (while the bottle has a shelf life of 1.5 years). WaterGuard's production has been outsourced to a local producer of household detergents (Haco Industries). WaterGuard sells through key account/institutional sales (20%), commercial wholesalers/retailers (70%), and CBOs (10%).
- PUR: In 2006, PSI/Kenya introduced PUR, which is an alternative water treatment product for those who rely on turbid drinking water sources such as puddles, etc. PUR is a calcium hypochlorite/iron sulfate powder produced by Procter & Gamble in Pakistan and delivered to PSI Kenya in sachets ready for distribution. The product is sold in sachets, each effective to treat and remove turbidity in 10L of water (with a shelf life of 3 years). PUR sells through key account sales (80%) and CBOs (20%).
- Aquatabs: In 2009, PSI Kenya introduced Aquatabs, an effervescent chlorine-based water treatment tablet, mostly used by urban dwellers. Aquatabs are manufactured by Irish manufacturer Medentech and distributed to PSI via their local agent Medipharm. The product is sold in strips of ten, of which each tablet treats 20L of water (with a shelf life of five years). Aquatabs sells through commercial channels only.

**GEOGRAPHICAL FOCUS:**

PSI Kenya is active nationwide, in all regions but the north-east (for security reasons).

**COMPETITIVE LANDSCAPE:**

Chlorine is regularly distributed for free by NGOs and government agencies, potentially undermining commercial channels. In urban areas, WaterGuard faces the increasing competition of Aquaguard, a product with similar branding, but costing 33% less than WaterGuard. Since its introduction, about 4 years ago, Aquaguard has captured ~10% of the urban market share.

**PARTNERS, SUPPLIERS, RETAILERS AND FUNDERS INVOLVED:**

- Funders: not disclosed
- Retailers:
  - 116 regional commercial wholesalers who deliver to more than 700 wholesalers, serving about 30k retailers from both the consumer goods and pharmaceutical sectors
  - 106 distributing community-based organizations, which buy from regional wholesalers and deliver products to local retailers or directly to households through door-to-door sales. These operate in both rural and urban areas.

**TREATMENT PROCESS:**

- WaterGuard: Users add one capful to a 20L container of water
- PUR: Users add the contents of 1 sachet into a 10L container. The water must be stirred for at least 5 minutes and then allowed to flocculate for 3 minutes. The water and dirt must then be strained with a cotton cloth into a new clean container
- Aquatabs: Users add one tablet per 20L container, which rapidly dissolves
- For all three products, the water is ready for drinking after 30 minutes

**SOURCE OF REVENUES:**

Sales of water treatment products to cover for operational expenses, and grants to cover for social marketing and overhead expenses.

**WATER SOURCING:**

Sources of water for the population are manifold, e.g. tap water, boreholes, private water vendors, surface water, rainwater, etc.

**LOGISTICAL INFRASTRUCTURE:**

For the whole of its Kenyan operations, PSI has rented eight warehouses close to Nairobi's local airport. One out of the eight warehouses stocks water treatment products. In addition, PSI has one head office in Nairobi and 6 regional sub-offices, including regional warehouses.

**GOVERNANCE/ RELATIONSHIPS WITH LOCAL AUTHORITIES:**

PSI/Kenya has a strong working relationship with the Kenyan government (Ministry of Health and Ministry of Water) on program objectives. This also includes support to a national campaign on diarrheal disease control by working with the Ministry of Health's promotion unit to develop communications messages and materials in consultation with their working group.

# CASE STUDIES

## REGULATORY FRAMEWORK:

The products must comply with minimal WHO standards. Government officials conduct sporadic quality assurance. PSI/Kenya conducts quality control testing as well.

## LEVEL AND DEPTH OF AWARENESS OF POPULATIONS IN NEED (REGARDING SAFE WATER, HYGIENE, AND SANITATION):

There is a high level of awareness that dirty water can cause diarrheal disease. In Eastern Kenya, for example, prior to PSI interventions, 45% of households with children under five identified contaminated water as cause of diarrhea. At present, this number has increased to 69%.

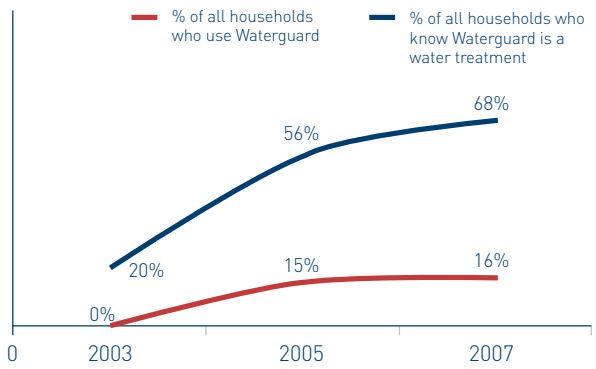
## MARKETING:

- Promotional concept:

  Prior to the introduction of WaterGuard in 2003, household water treatment was virtually unknown in Kenya – fewer than 7% of the population had ever used a POU water treatment product. Until 2009, PSI Kenya focused mainly on creating brand awareness for its household water treatment options. As a result of its campaigns, brand awareness for Waterguard stood at 78% in 2007. In late 2009, PSI Kenya began developing a communication campaign that sought to promote water treatment as a behavior, as opposed to the use of one particular brand. This direction was informed by the evidence that despite significant increases in brand awareness, the behavior of consistently treating household drinking water was not increasing at the same rate, and as fewer than 50% of households associated contaminated water with diarrhea, and diarrhea as a possible cause of death among children.

  The communications campaign evolved through the years. The initial emphasis of the campaign aimed to build on a mother's desire to care and protect her family. Yet, the program team discovered that behavior change was not motivated by the desire to be a good mother, as there was still a significant segment of the population who perceived that clear water is safe to drink. PSI revised its campaign in 2008 to address this belief by implementing the *"Linda kila tone"*, or *"Guard Every Drop"* campaign.

Evolution of users' brand awareness and brand usage (percentage)




- Promotional activities and media: PSI uses multiple channels such as radio spots and programs that reach a wide listenership, community outreach and targeted grassroots partnerships to reach smaller audiences in more remote locations, and point-of-sale support:
  - Mass media: Mix of radio spots complemented by interactive radio programs facilitated by local radio celebrities, and aired on regional and national stations.
  - Outreach through community-based organizations: PSI teams of health promoters specialize in identifying local community-based organizations and training them in conducting outreach sessions. The training is based on the 'Education Through Listening' technique which is an adult learning tool that uses participatory approaches, reflective listening and community-led dialogue to identify problems and solutions within a community. In turn, the community-based organizations conduct similar sessions with communities in need. Outreach activities focus on mothers of small children, and emphasize risks associated with untreated water and inform on price and location of products. Typically, a community-based organization conducts 10-20 sessions/month, including follow ups, on a voluntary basis, while PSI compensates for travel expenses.
  - Point of sale support: Trade outlets that sell the household water treatment products receive merchandising support (posters, wall branding and other material) to increase visibility at the point of purchase by the user.

- Value proposition:
  - WaterGuard – a cost-efficient treatment option for everyone
  - PUR – a niche-product for rural areas, where water is turbid
  - Aquatabs – a more aspirational solution for urban users; can also be sold cheaply in very poor areas as just one single tab can be bought at one time
- Methods to develop consumer insights: PSI projects use epidemiological, behavioral and market research approaches to develop interventions, including:
  - A survey-based monitoring and evaluation component, which focuses on segmenting populations to identify key behavioral determinants, monitoring changes in those determinants, and evaluating whether exposure to social marketing messages results in behavior change
  - A qualitative research component, which focuses on developing audience insight and multi-item scales
  - Material and concept testing for messages and materials used in behavior change communications and social marketing
- Consumer lifecycle:
  - Awareness: Mass media campaigns: During the early phases of the safe water program PSI Kenya focused on building brand awareness through mass media and point-of-sales materials. Higher levels of exposure to WaterGuard communications, for example, contributed to growing general user acceptance, an important step in establishing a new behavior and product category in the country
  - Trial: Giving opportunity to users to try the product during community sessions led by community-based organizations; sampling of merchandising materials at point-of-sale
  - Use: Follow-on promotions by community-based orginizations

## PRICING:

Prices are determined depending on: willingness/ability to pay of end users; wholesaler/retailer margins; prices of other competitive products. Retail prices by unit sold are:

| Product | Retail price (US$) |
|---|---|
| WaterGuard (bottle treats 1kL) | 0.25 |
| PUR (sachets treats 10L) | 0.0625 |
| Aquatabs (tablets treats 20L) | 0.0315 |

## STORAGE:

Correct storage of drinking water is part of the user manual (on the packaging) and a subject of discussion during community outreach sessions. PSI has incorporated broader messaging on hygiene promotion and safe storage of drinking water into its more recent campaigns.

## DISTRIBUTION AND DELIVERY:

PSI operates through 3 different channels:

a) key account/institutional direct sales, for organizations and public institutions that implement safe water programs in the country (50% of revenues)

b) extensive network of urban, peri-urban and rural trade outlets and pharmacies

c) community-based organizations, organizations such as SWAP (Safe Water for People Living with HIV/AIDS) (for which it is an income-generating activity)

The products move from PSI Kenya warehouses to distributors/sub-distributors/wholesalers and finally to the retailers.

## RETAILER SELECTION: N/A

## HOME DELIVERY: N/A

## END-USER PAYMENT: Cash

## END-USER FINANCING: None

## FRANCHISEE/ ENTREPRENEUR FINANCING: None

## MAINTENANCE: N/A

## WATER QUALITY CONTROL:

Products undergo internal quality checks from manufacturers. In addition, PSI hired Société Générale de Surveillance to conduct random checks of goods before distribution. This requirement is due to PSI's and donors' concerns around quality and consistency.

## MONITORING AND IMPACT MEASUREMENT:

PSI measures health impact based on products distributed, translated into number of DALYs (Disability-Adjusted Life Years) averted. These metrics are comparable across all PSI country programs.

## FUTURE PLANS AND NEXT STEPS:

PSI has considerably revised its marketing and distribution approaches in 2009. It will therefore wait and measure the impact of these, before proposing a new direction.

# IS THE PROJECT:

## SOLVING THE PROBLEM?

**Problem and magnitude:**

- As of 2008, there were 22k diarrheal related deaths (5.4% of total deaths), and 725k diarrheal related DALYs (5.4% of total DALYs) recorded for the country
- 2008 access to improved water sources: 59%

**Scale and reach:**

- Units sales in 2008-2009-2010:
  - WaterGuard bottles: 1.6m, 1.9m, 1.3m
  - PUR sachets: 2.4m, 4.39m, 7m
  - Aquatabs tablets: N/A, 145k, 139k
- Average number of users at any point of time: 2008) 1,15m; 2009) 1,38m; 2010) 0.98m (assuming 4L treated/day/person)
- Population served: Consumer segments C, D and E (i.e., poor households). These represent 23.5m of a total population of 39m individuals
- Rate of penetration: PSI reaches about 4.25% of the target segments mentioned above on a daily basis, and less than 3% of the total population

**Quality of water provided:**

- Log 3 for bacteria, viruses and protozoa

**Safe water needs addressed:**

- 20L/day/household of drinking water. Treatment product treatment capacity varies (assuming family of 5):
  - WaterGuard: 1kL/bottle, i.e., 50 days/family
  - PUR: 10L/sachet, i.e., 0.5 days/family
  - Aquatabs: 20L/tablet, i.e., 1 day/family

**Link with hygiene practices, sanitation and wastewater management:** Hygiene and hand-washing messages are integrated into overall campaigns and communications

**Acceptance and usage:**

- Resistance towards the taste of chlorinated water at project start: This aspect was addressed through extensive promotion of household water treatment products by the government and other institutions. By making treatment of water with a chlorine-based product a social norm, it increases acceptance of taste.
- Issues with correct use: PSI internal surveys show that only 30%-40% use the correct treatment doses and 40%-50% stir the correct amount of time. These issues are being addressed by instructions on the products and follow-ups by CBOs.

**Compliance:**

- Since 2009, with the introduction of the new, brand awareness rose up to 88% and 45% had used the product
- As of 2010 16.8% of the care-givers were consistently treating drinking water using promoted method

**Impact on health of beneficiaries:** A recent survey at the coast province (2009) revealed that 29% of households with children under the age of 5 were confirmed as having treated their water with chlorine on the day of the survey.

**Other impact:** N/A

# PSI KENYA

## ECONOMICALLY SUSTAINABLE?

**Fully loaded cost of 1L** (including purchase of products, but excluding social marketing costs and overhead):

- WaterGuard: US$ cents 0.0237
- PUR: US$ cents 0.44
- Aquatabs: US$ cents 0.9875

**Retail price of 1L of water:**

- WaterGuard: US$ cents 0.025
- PUR: US$ cents 0.625
- Aquatabs: US$ cents 0.1575

**At user level:**

- Average household income per day of beneficiary household: US$1-2.50/day (KSH80-200), equals to Purchasing Power Parity $1.6-3.9 (2009 data)
- This means that this project targets populations of the BoP 500
- Assuming 5 people per household with 4L/day/person, water expenses would therefore equate to the following proportions of the monthly income of a BoP 500 household:
  - <1% for WaterGuard
  - 2% for PUR
  - >4% for Aquatabs of the household's total budget
- What it would take to reach the poorest: More widespread distribution in remote rural areas

**At wholesalers and retailers level:**

- Wholesaler/ retailer margins vary considerably from product to product. Commercial distribution partners are incentivized to push the newer products with higher margins (up to 50% among wholesalers and distributors), while older, well established products command much lower margins (about 5% in total among wholesalers and distributors).

**At PSI level:**

- Hystra estimates for revenues from sales of products:
  - WaterGuard: US$323k (for 1.344m bottles at US$0.24 wholesale price)
  - PUR: US$334k (for 7.036m sachets at US$0.0475 wholesale price)
  - Aquatabs: US$3k (for 138.6k tablets at US$0.0204 wholesale price)
- Total revenues from grants: N/A
- Hystra estimates for direct operational expenses (including purchasing of products, quality insurance and supply chain costs, but excluding social marketing and overhead):
  - WaterGuard: US$319k (for 1.344m bottles at US$0.237 operational cost, out of which US$0.17 purchasing cost)
  - PUR: US$310k (for 7.036m sachets at US$0.044 operational cost, out of which US$0.03 purchasing cost)
  - Aquatabs: US$3k (for 138.6k tablets at US$0.01975 operational cost, out of which US$0.018 purchasing cost)
- Hystra estimates for social marketing costs: about US$1m
- Overhead: not disclosed
- Capital expenditures: not disclosed

*NB: Numbers projected at end 2010*

## ENVIRONMENTALLY FRIENDLY?

Household treatment devices have limited impact on the environment. If anything, such products provide a cost-effective alternative to water boiling with different types of fuel

**Water efficiency:** N/A

**Energy consumption:** N/A

**Chemicals used in production of liquid chlorine:** NaOH2 (Sodium hydroxide) + Cl2 (Chlorine gas): NaOCl2 (Sodium Hypochlorite)

**Hardware recycling:** N/A

**Waste in production materials:** N/A

**Packaging:** No refill system for the polyethylene bottles, and no recycling system

## SCALABLE AND REPLICABLE?

**Requirements/ prerequisites for the project to scale:**

- Additional subsidies for social marketing, or other mechanisms to drive regular use
- Increase accessibility to rural users through new retail channels, as commercial retail works best in urban areas.

**Additional requirements/ prerequisites for the project to replicate in other countries:**

- Extensive distribution commercial network
- General acceptance by population of the taste of chlorinated water
- Alliance of partners to conduct joint social marketing campaigns.

# THE PEOPLE

James grew up in Kwale district, south of Mombasa. He has a BA in Education, and completed various courses on community development and social marketing.

James joined PSI after college, where he has been working in different positions and regions of the country for the last nine years. Since 2009, he is a project coordinator in the Mombasa office.

For the future of the project, he would like to put an emphasis on the development of rural sales channels, where availability of PSI products is still not sufficient, and the right model is still to be found. His idea is to train hundreds of CBOs and establish them as a point of marketing and distribution for water treatment products.

*Exchange rate: KSH80 = US$1; KSH51.5 = Purchasing Power Parity $1. BoP 500-3000 classification scale of 2002 was adjusted on U.S. Consumer Purchasing Index with latest 2010 available data (ftp://ftp.bls.gov/pub/special.requests/cpi/cpiai.txt). Prices of water and family incomes were converted following Purchasing Power Parity conversion factor for private consumption (LCU per international $) 2009 (http://search.worldbank.org/data?qterm=PPP%20conversion&language=EN).*

*Source: Field visit to Nairobi and Mombasa, February 21-22, 2011. Throughout December 2010, January 2011 and February 2011, interviews with Cecilia Kwak (Child Survival Technical Advisor PSI), Daun Fest (Head of Office, PSI Kenya), Mbogo Bunyi (Head of Water Treatment section, PSI Kenya), Wanjiru Mathenge (Assistant Water Treatment Section, PSI Kenya), James Makiri (Project Coordinator, PSI Mombasa), Gerishon Gachoki (Supply Chain Officer, PSI Kenya), Isaac Onyonyi (Sales Officer, PSI Kenya); http://www.psi.org/kenya*

*Contact people for the project: Mbogo Bunyi (mbunyi@psikenya.org) – Water Section – Head Office Nairobi; Wanjiru Mathenge (wmathenge@psikenya.org) – Water Section – Head Office Nairobi; James Makiri (jmakiri@psikenya.org) – Project Coordinator – Regional Office Mombasa; Ashley Latimer (alatimer@psi.org)*

**James Makiri**
*Project Coordinator, PSI Mombasa Office*

Why are you doing all this?

*I have always wanted to give something back to the community. After graduating I decided to do some volunteer community work. I discovered and joined PSI after that. This has been a great opportunity for me.*

What was your aha moment?

*In 2002, during my first days with PSI, I recall visiting a village where I met the village leader. We told him that we had come to talk about condoms (another product promoted by PSI). His friendly behavior disappeared and he chased us out of the village. It became very clear to me that we had to overcome a lot of social and religious myths and traditions, and that this would take a long time. 10 years later, I think we came a long way.*

How are you inspiring others?

*We have monthly regional meetings of all staff members and that is when issues come on the table and need to be solved jointly. We try to act as a team and motivate each other.*

What were key challenges on the way?

*Popular believes is one: many people believe that diarrhea is given by nature, rather than a problem to be solved. Taste of the chlorinated water and affordability are also problems.*

What were key lessons learned?

*The key to success is the community ownership. The community has to realize as a whole (and not only individually!) that there is a problem with their source of water.*

# HYDROLOGIC RABBIT WATER PURIFIER

Hydrologic Social Enterprise

**Hydrologic/ IDE/ PATH,** Cambodia
www.ide-cambodia.org, www.hydrologichealth.com

# EXECUTIVE SUMMARY:

## ORGANIZATION:

Hydrologic is a social enterprise registered in Cambodia. Hydrologic has its roots in a ceramic filter project from the US-based NGO International Development Enterprises (IDE). In 2001, IDE Cambodia brought the ceramic filter under the name "Rabbit (Tunsai in Cambodian language) water purifier" from Central America to South East Asia. Thanks to donor support, dissemination scaled up quickly. In 2009, Hydrologic was created as a social enterprise, with the intention to make it fully sustainable.

## PROJECT:

Hydrologic now operates a new factory, worth US$90k (+30k land), which can produce up to 9k ceramic filters per month. As of end 2010, the enterprise was selling 3,500 filters a month, 2/3 of them to NGOs, and 1/3 via sales representatives and retail stores. Hydrologic has to triple sales to 9k filters/month in order to break-even.

## INNOVATION:

- Robust, attractive, and comparatively low-cost technology, allowing setting up local, flexible manufacturing facilities. Smallest production unit costs US$20k and can be scaled up. Multi-channel sales and distribution, including through NGOs subsidizing the product. Frontal competition is avoided through close coordination with manufacturing and distributing NGOs, in terms of geographical coverage and product range (NGOs will not be able to buy the upscale version of the filter). Cannibalization of commercial supply channels by NGOs that supply filters at subsidized prices is avoided by managing purchases from these NGOs centrally. Hydrologic therefore enforces contractually that NGOs do not serve populations covered by commercial retail (which becomes the sole focus of Hydrologic sales force). This collaboration also resulted in NGOs not giving away the product for free, as surveys demonstrated that beneficiaries of free products tended not to use the filters in the long-term. In addition, Hydrologic is launching a pilot with discount coupons, whereby NGOs provide discount coupons to selected parts of the population, which can be redeemed at commercial retailers. This ensures that NGOs serve poorer households, without undermining efforts to build a commercial operation.
- The company has recently launched, under the name of "Super Tunsai", a superior version of the ceramic filter, positioned as an aspirational product. This product should allow serving other segments of users.

## RATING 10/16:

- Social impact: Treatment effectiveness against bacteria mostly. Large-scale reached in Cambodia. Product design allows for appropriate usage, even though cartridge replacement (after 2 years or breakage) is low.
- Economic sustainability: The model has to triple current sales in order to break even. Presently, 60% of operational costs are covered by sales.
- Scalability and replicability: The model seems to be scalable with an extension of the retail network but only in regions where viruses do not pose a source of contamination. Access to micro-finance also is a pre-condition for increased penetration. The possibility of setting-up small-scale local manufacturing is an advantage to replicate filter production in other countries with smaller needs.
- Environmental impact: Filters operate without any source of electricity. The manufacturing process uses some 25kg of firewood per filter, but it is estimated that every filter saves up to 2 tons of firewood per year since people do not need to boil the water anymore. The project has filed an application for carbon finance.

# PROJECT CURRENT STATUS

**DATE OF CREATION:** 2009, as a social enterprise

## PRODUCT/ SERVICE DELIVERED:

- Ceramic pot filters (basic "Tunsai filter" and the new "Super Tunsai"), and the corresponding replacement cartridges (to be replaced every 24 months). The ceramic part (with colloidal silver lining) filters bacteria, and can absorb turbidity
- Basic Tunsai filter: flow rate is 2.5 – 3.5L/hour. The volume of the filter unit is 10L and of the storage container is 12L. Basic design. Price: US$12.50
- Super Tunsai filter (launched in January 2010): Flow rate is 2.5-3.5L/ hour. The volume of the filter unit is 10L and of the storage container is 14L. Attractive, aspirational design. Price: US$22

## GEOGRAPHICAL FOCUS:

Cambodia, urban and rural areas. Main initial focus is the larger provinces including Phnom Penh. There are no retailers yet in the most remote provinces like Mondulkiri and Rattanakiri.

## COMPETITIVE LANDSCAPE:

- RDI and Red Cross products in the ceramic filter segment (similar product). Their filters sell at a subsidized retail price of US$8.50. Together with IDE/ Hydrologic, these organizations have supplied an estimated 450k filters in Cambodia, out of which 125k should still be in function (covering 5% of total Cambodian population).
- Nicely designed mineral pots from Vietnam, sold in urban and semi-urban areas mostly. These filters cost US$17-25. An estimated 175k such filters are being used in Cambodia (7% of total population).
- Boiling of water. Cost is estimated at US$73-180/year in a typical Cambodian household of five people

## PARTNERS, SUPPLIERS AND FINANCING INVOLVED:

- Partners: PATH supports the project (financially and technically) in the development of products (product development and production tools). For instance, PATH led the product design team for the new, upper range product. In addition, PATH provides regular support in the areas of market research, sales development and marketing campaigns, and has dedicated two full-time staff to the Hydrologic team.
- Suppliers: Local manufacturing of the plastic components for both Tunsai and Super Tunsai. Ceramic parts are produced in the Hydrologic factory. Faucets are imported from China.
- Funders: Hydrologic has benefited from the many years prototyping, piloting and promoting of the product by IDE and PATH. Hydrologic has been established in 2009 with a new management team, and US$300k in grants from WaterSHED. In 2010, it received an additional grant of US$410k by WaterSHED Asia to finance construction of new factory and daily operation of the company. In 2011, Hydrologic will operate with a US$200k grant from WaterSHED and a US$170k grant from Path dedicated for piloting a direct sales force.

## TECHNOLOGY USED AND INSTALLATION REQUIRED:

Since October 2010 production is gradually moved from an old IDE factory to a new factory worth US$90k (life span: 20 years). The maximum capacity is 9k filters per month.

## MANUFACTURING PROCESS:

Powdered clay is added to rice husks and water. Pots are fired with firewood in kilns. The ceramic pots are impregnated with colloidal silver and the locally produced plastic housings added at the end. This plastic housing is the most expensive part, representing 50% of production materials costs. All these operations are manual, with the exception of plastic molding and filter pot pressing which are semi-automatic and need machinery to shape one unit at a time.

## SOURCE OF REVENUES:

Filter sales

## WATER SOURCING:

- Urban: 55% piped water, 26% other improved water, 19% unimproved water source
- Rural: 5% piped water, 51% other improved water source, 44% unimproved water source

## BUILDING/ LAND SOURCING AND INSTITUTIONAL ARRANGEMENTS:

US$30k has been invested in the purchase of land for the factory (in addition to the US$90k for the building and equipment).

## GOVERNANCE/ RELATIONSHIPS WITH LOCAL AUTHORITIES:

Mainly interaction with public authorities on a national level. Participation in national WATSAN sector activities.

# CASE STUDIES

## REGULATORY FRAMEWORK:

The rabbit filters meet Cambodian drinking water standard, assuming normal use. Hydrologic is a part of a working group to find ETV standards for certification in Cambodia. There is no local certification possible.

## LEVEL AND DEPTH OF AWARENESS OF POPULATIONS IN NEED (REGARDING SAFE WATER, HYGIENE, SANITATION):

Some basic knowledge exists in most parts of the country. Surveys indicate that about 40%-50% of the population does not regularly treat water, 55% boils water regularly, 7% uses mineral pot filters and 4-5% uses ceramic filters.

## MARKETING:

- Media: TV commercials/ parasols/ posters/ commercial material for retailers
- Positioning: product marketing, as social marketing is mainly done by the 3k NGOs in Cambodia
- Value proposition: Basic version of filter: affordability; Superior version of filter: desirability, convenience
- Approach to developing consumer insights: Extensive retail network. Pilot testing of new concepts in retail and direct sales with extensive monitoring and evaluation organized in collaboration with PATH. Regular sales meetings with retailers and sales reps. Field visits
- Consumer life cycle: Mostly focused on building awareness and encouraging purchase. After sales assumed by retail network
- Loyalty mechanisms: Not yet widely introduced.

## PRICING:

US$12.50 retail price for the basic version. The superior version will cost around US$22. Replacement filtering cartridge: US$6.50. These prices include 10% VAT. Prices are calculated on a long-term cost plus basis (meaning that operational costs will be covered with tripled sales by 2012). Prices for high volume orders to NGOs are lower than wholesale price to retailers, given their bargaining power and the volumes they command.

## STORAGE CAPACITY:

12 liters (basic version)/ 14 liters (superior version).

## DISTRIBUTION AND DELIVERY:

- Contracts with selected large NGOs (2/ 3 of all sales) who commit to a certain price and region. Contacts and supply with NGOs is managed centrally, to avoid cannibalization of other commercial channels (with distribution of subsidized filters)
- Retail (1/ 3 of all sales) through 14 -20 regional sales reps (employed by Hydrologic) who supply and coach about 600 retailers in the country with filters (19% margin). Retailers are typically pharmacies and kitchen supply shops, which carry filters as part of their inventory (no active selling)
- Since December 2010, own direct sales force (2011 target of minimum 50 people) for selling filters door-to-door in the villages.

## END-USER FINANCING:

A micro-finance package is available from Vision Fund (pilot since December 2010).

## RETAILER FINANCING:

Retailers need to purchase filters. They have up to one month credit for maximum 10 units. No other conditions are given to retailers to encourage carrying and turning around the product.

## MAINTENANCE:

While the plastic body of the filters typically lasts 5 years, the filtering cartridge has an average life span of 2 years. Users are recommended to change the filtering cartridge, once they detect an unusually high or low flow rate. However, these cartridges are typically not carried by the retail network, resulting in people having to purchase a new filter, if a part is broken or the cartridge is no more effective. However, over the next years Hydrologic aims at improving the accessibility to replacement kits through a much more extensive retail network.

## WATER QUALITY CONTROL:

Done by third parties. Research from the University of North Carolina assessed the treatment effectiveness of the filter as follows. Results: Log 2 E-coli reduction and Log 1 virus reduction. Hydrologic is currently doing flow rate test of every filter, and batch test for microbiological performance.

## MONITORING AND IMPACT MEASUREMENT:

Done through studies by third parties (WSP/ UNICEF, University of Carolina, NGOs). The WSP/ UNICEF study monitored the health impact of the ceramic filters and important obstacles to use (e.g. breakage).

## FUTURE PLANS AND NEXT STEPS:

Reach break-even by tripling current sales of 3,500/month (as of December 2010) by 2012. The company wants to constantly reduce the share of sales to NGOs and massively expand its retail and direct sales networks, in order to build better, and more consistent margins.

# IS THE PROJECT:

## SOLVING THE PROBLEM?

**Problem and magnitude:**

- As of 2004, there were 10,900 diarrheal related deaths (7.3% of total deaths), and 350k diarrheal related DALYs (7.0% of total DALYs) recorded for the country
- 2008 improved access to water coverage: 61%

**Scale and reach:**

- Growth of operations: From 2,000 filters/ month in 2007 (under IDE) to 3,500 as of end 2010 (2,450/ month on average in 2010)
- Total number of filters sold by Hydrologic as of end 2010: 80k
- Total number of beneficiaries: 80k households (400k beneficiaries) by Hydrologic and 125k households (600k beneficiaries) in total counting previous rabbit filters distributed by IDE
- Rate of penetration in terms of regular users of Hydrologic filters: 2.6% of total Cambodian population (over 4% if counting IDE filters too). If counting only the provinces where Hydrologic is present, Hydrologic has a 3.1% penetration

**Quality of water provided:**

- Limited effectiveness: Bacteria: Log 2; Viruses Log 0.5; Protozoa: Log4
- Removes turbidity of water

**Safe water needs addressed:**

- On average, 20L/day
- Drinking water

**Link with hygiene practices, sanitation and wastewater management:** None. Social marketing is mainly done by the 3k NGOs in the country. However, high awareness on the need to boil water

**Acceptance and usage:** A 2007 WSP/ UNICEF study among 500 households indicates that:

- After 12 months: 97% of all households use the filter; After 24 months: 88%; After 36 months: 75%; After 48 months: 31%
- Disuse is significantly related to breakage
- Filters are filled 1.8 times per day and cleaned 2.3 times per week. 71% of users practice safe storage

**Impact on health of beneficiaries:** According to same study, 49% less diarrhea and 61% less bloody diarrhea

**Other impact:** N/A

# CASE STUDIES

## ECONOMICALLY SUSTAINABLE?

**Operational cost (including overhead, but excluding capex) of 1L:** US$ cents 0.22

**Price of 1L:**

- US$ cents 0.09 assuming a life span of 2 years per filter, and water consumption of 20L/day/household/
- US$ cents 0.08 assuming a life span of 5 years per filter, and change of replacement cartridges every 2 years

**At user level:**

- Average household income per day of beneficiary household: US$1-5 (KHR4090-20450), equals to Purchasing Power Parity $1.4-6.8 (2009 data), through private retailers. NGOs sell to households with a daily income lower than US$1
- This means that this project targets population of the BoP 500
- Assuming water consumption of 20L/day/household, water expenses would therefore equate to <1% of the monthly income of a BoP 500 household
- What it would take to reach the poorest: Subsidies and grants

**At retailer level:**

- 1,000 filters are currently sold every month via 600 private retailers
- Per retailer: US$5 revenue/month (2-3 filters sold per month with about 30% margin)

**At project level end 2010:**

- Revenues/year from sales of filters and filter parts: US$282k
- Grants: US$408k
- Costs/year: US$469k incl.
  - US$115k inputs
  - US$170k salaries for plant staff
  - US$81k in transport costs
- Sales & marketing: US$43k
- Capex: US$120k, including 90k for the plant and 30k for the land
- Break-even would happen at 9k units sold/month

*NB: Numbers projected at end 2010*

## ENVIRONMENTALLY FRIENDLY?

**Water efficiency:** No water is rejected

**Energy consumption:**

- No use of electricity for the filters
- Production of 1 filter takes 25 kg of firewood

**Chemicals used:** Silver Nitrate coated on the filter to prevent growth of bacteria

**Recycling:** Wooden transport pallets. Hydrologic is seeking to reuse boxes for large NGO orders

**Waste in production:**

- 14% wastage of raw clay
- 3% wastage of rice husks

**Packaging:** Cardboard boxes

## SCALABLE AND REPLICABLE?

**Requirements/ prerequisites for the project to scale:**

- Reinforced commercial distribution network
- Micro-finance to penetrate lower segments.

**Additional requirements/ prerequisites for the project to replicate:**

- Strong and sustained social marketing campaigns to create necessary demand
- Well-educated work force for management and distribution
- Only an option where viruses are not the main source of contamination.

# THE PEOPLE:

Olaf is a Norwegian national who came to Hydrologic after 20 years in the private sector. He has a background in high tech marketing and business development for the semi-conductor industry throughout Asia.

Olaf started his non-profit career at the NGO Hagar where he was hired to build up the social enterprise Hydrologic. Soon he suggested making a joint venture with IDE, which had the Rabbit filter technology but was lacking the organizational set up to manufacture and distribute the product at scale.

As a Managing Director, Olaf took the lead in focusing the company on the production and sales of Rabbit ceramic filters and now seeks to lead Hydrologic to break-even before gradually handing-over the company to a local Cambodian manager.

Olaf lives with his family in Cambodia and is very enthusiastic about this opportunity to apply his professional experience to promote a life-saving product. To do this as a business venture and to become financially sustainable as a social enterprise is a real challenge for him and his colleagues.

He is very proud of Hydrologic new production facility, which has an optimized layout for scaling up production significantly.

*Exchange rate: KHR4,090 = US$1; KHR2,986.5 = Purchasing Power Parity $1. BoP 500-3000 classification scale of 2002 was adjusted on U.S. Consumer Purchasing Index with latest 2010 available data (ftp://ftp.bls.gov/pub/special.requests/cpi/cpiai.txt). Prices of water and family incomes were converted following Purchasing Power Parity conversion factor for private consumption (LCU per international $) 2009 (http://search.worldbank.org/data?qterm=PPP%20conversion&language=EN).*

*Sources: Visit to Hydrologic in January 2011. Interviews with Olaf Evjen Olsen, Managing Director Hydrologic, and Mike Roberts, Country Director IDE Cambodia; Business plan Hydrologic (Nov. 2009); Joseph M. Brown and Mark Sobsey: Evaluating HWT options (Nov 2010 – Draft); WSP/UNICEF – Use of Ceramic Filters in Cambodia (2007); Joseph M. Brown – Effectiveness of ceramic filtration for drinking water treatment in Cambodia*

*Contact for the project: Olaf Evjen Olsen (olaf@hydrologichealth.com and olafevjenolsen@gmail.com); Ros Kimsan (rkimsan@ide-cambodia.org)*

**Olaf Olsen**
*Managing Director, Hydrologic*

Why are you doing all this?

*It is a very interesting and complex challenge. It takes all what I have learned in my professional career to succeed in this. This job also allows me to do something ethically meaningful. The concept of establishing a legally registered company that pays taxes and does a similar job to an NGO to improve society without continuously depending on donor funds is rather exciting to me.*

What was your aha moment?

*There is no particular moment. Every day is very special and meaningful. One comes across a lot of problems, like the lack of education or the lack of infrastructure, and yet, when I come back from work at night, I feel so satisfied of having contributed to overcome some of these challenges.*

What were key challenges on the way?

*There are many. For instance, the lack of infrastructure, expensive fuel prices, costly distribution, corruption... we also found it quite hard to find professional employees with solid education and a commercial mindset.*

What were key lessons learned?

*NGOs oftentimes shape a lot of what we do. On one hand, they provide valuable social marketing activities that might create demand for our products. On the other hand, heavily subsidized products hamper heavily any attempt to get a local industry going.*

# UNILEVER PUREIT WATER PURIFIER

**Hindustan Unilever Ltd (HUL)**, India
www.pureitwater.com

# EXECUTIVE SUMMARY:

## ORGANIZATION:

Hindustan Unilever Limited (HUL) is the largest Indian fast-moving consumer goods company, with a focus on nutrition, hygiene and personal care. HUL has entered the water field in 2005, by developing a range of water purifiers under the brand Pureit. It decided to approach the BoP through partnerships with other organizations, and established a Partnership team to do so in 2009.

## PROJECT:

The first prototype of Pureit - a device adapted to treat surface water in India (functioning without running water or electricity), was field-tested in Chennai, Tamil Nadu. The region was selected for its problems of water scarcity and pollution. It was then rolled out nationally in 2008. As of November 2011, over 5m devices have been sold making Pureit the No. 1 water purifier in India by volume. The first product launched was Pureit Classic (current price US$40), with a replacement cartridge of 2250L costing US$11 or of 1500L costing US$8. In early 2010, Pureit Compact was launched at US$20 to enable the low income urban and rural poor families to access safe drinking water at affordable rates at half the price (half capacity but identical technology). Its replacement cartridge filters 1kL and costs US$6. Subsequent versions of Pureit include Autofill (running water tap device US$64), with the same replacement cartridge as classic and Marvella (fully automatic, US$138, with replacement cartridge of 2250L at US$13). Presently, two pilots are on the way to explore ways to improve distribution and penetration of the low and mid-range products in rural India. These include the Shakti project, which trains village level entrepreneurs (usually very poor ladies) to sell Pureit along with the other range of HUL fast-moving consumer goods; and the IVDP Micro-Finance Institution pilot in Krishnagiri, that promotes Pureit to SHG members, and offers a consumer loan to purchase it.

## INNOVATION:

- Device technology consistent across the Pureit range (only the appearance and the convenience level change), while providing international quality levels of safety at relatively low prices, not requiring running water or electricity, and with high durability (less than 1% of after sales calls regard maintenance or defects).
- Positioning of the product as aspirational (also for the BoP), with a strong focus on high levels of safety (across the product range), and supported by a global brand.
- Advanced multi-channel approach, allowing for quick and extensive penetration across segments, starting first by establishing the product in mid-levels user segments, before moving up and down the income ladder, allowing for cross-subsidization and therefore long-term investment in building up demand at the BoP.

## RATING 10/16:

- Social impact: Pureit achieved very high volumes of sales across the country, since its launch in 2008: 5m devices sold. A number of pilot projects are under-way to develop channels and approaches to reach the BoP. The two projects reviewed in this case achieved sales to approximately 150k beneficiaries. In operation areas, Pureit achieved 1% penetration (if no loan access), and 40% penetration if micro-finance scheme. Technology ensures very high levels of water safety, and strong acceptance in terms of image and taste. Need to invest further in educating users on safe use of device and regular change of cartridges. Hygiene education also provided to beneficiary self-help groups and Shakti women, in the BoP pilots.
- Economic sustainability: Long-term approach, where investments for the BoP are cross-subsidized by the margins made in the higher income segments. While BoP pilots have been successful in introducing the product among BoP users, the high cost of reaching out to these users is too high to still make those pilots financially sustainable.
- Scalability and replicability: Scalability has been driven by the introduction of micro-finance schemes, while replicability will mostly be a function of the ability to import, at low cost, the devices into those countries where the construction of plants is not economically sustainable or technically viable.
- Environmental sustainability: Water efficient filter, functioning without electricity. No harmful components. Pureit releases at least 80% less carbon dioxide compared to boiling and bottled water while providing comparable quality. The exhausted components largely comprise of carbon and do not pose any environmental hazard. The small quantity of plastic shell of one component is recyclable.

# PROJECT CURRENT STATUS

**DATE OF CREATION:** National Pureit rollout in 2008.

**PRODUCT/ SERVICE DELIVERED:**

Water purifiers with capacities varying from 5L to 9L purified water storage capacity.

**GEOGRAPHICAL FOCUS:**

India (bulk of the current business). Started rollout in Indonesia, Bangladesh, Mexico, Brazil and Sri Lanka. Focusing on all environments (rural and urban), sales-wise. BoP pilots focus on rural areas.

**COMPETITIVE LANDSCAPE:**

- Other devices with lower levels of germ and virus kill ability include TATA Swach (including a product priced at $24 - similar to the smaller sized Pureit), Eureka Forbes Aquasure (similar price), Usha Shriram Brita Waterguard (50% more expensive)
- Other companies sell products ranging from low-cost stainless steel drip pots to sophisticated products that use iodinated resin or UV purification. However, even in urban areas, penetration is so low that the real issue at the BoP is lack of demand.

**PARTNERS, SUPPLIERS AND FINANCING INVOLVED:**

Partners:

- IVDP - a Micro-Finance Institution and NGO based at Krishnagiri district of Tamil Nadu. Provides micro-finance to its members who wish to purchase a Pureit device
- PATH - An international NGO that helped HUL conduct a pilot experimenting with subsidy and installment models at BoP
- AED - An international NGO that helped HUL conduct a pilot experimenting with making Pureit available on installments to urban and rural poor families and studying the repayment trends.

**TECHNOLOGY USED AND INSTALLATION REQUIRED:**

- Manufacturing is rather complex and costly. Devices are assembled at Daman and Pondicherry in India, while many components are sourced from various manufacturers. The devices themselves consist of a 4-step purification system: a) micro-fiber filter for visible dirt, b) compact carbon trap for parasites and pesticides, c) sustained chlorination for viruses and bacteria, and d) a carbon block polisher for removing bad taste and smells
- Key functionalities include: safety and end of life indicators, as well as auto-shut-off mechanism when the cartridge requires replacement. Average flow rate of 9L is 1-5 hours, depending on the quality of input water
- While initial assembling of the filter is rather simple, regular cleaning of the different chambers and parts, as well as replacement of the 3 parts constituting the replacement cartridge requires initial training for users. A replacement cartridge of 1kL (for the Compact model) is lasting 3-3.5 months (based on utilization rate of 10L per household assumed by Pureit team). Lifespan of device is estimated at 5 years, while the replacement cartridge packaged life is 3 years.

**SOURCE OF REVENUES:**

Ongoing sales of devices and replacement germ kill kits. For a family consuming 10L of drinking water per day (the amount assumed by the Pureit team), they may require 1 to 4 replacement cartridges a year, on average, depending on the cartridge capacity.

**REGULATORY FRAMEWORK:**

N/A

**LEVEL AND DEPTH OF AWARENESS OF POPULATIONS IN NEED (REGARDING SAFE WATER, HYGIENE, SANITATION):**

Very low awareness at BoP level. Interestingly, awareness and acceptance is about the same across all income strata in rural areas, as quality of water is less easily detectable than in urban areas.

# HINDUSTAN UNILEVER

## MARKETING:

- Activities conducted and media used: Typical fast-moving consumer goods advertising for most segments (with the exception of the BoP). Training local entrepreneurs, or working through aggregators (i.e., micro-finance institutions) to reach directly to the BoP.
- Value proposition: Clear focus on product marketing for the device itself. Key selling point and positioning is 'as safe as boiled water' but more conveniently and cheaper than boiling. Design and prestige attached to the device is clearly a key element of the value proposition for the BoP. Awareness activities on the need of clean drinking water and hygiene also organized in the BoP pilots.
- Approach to developing consumer insights: Micro-marketing during prototyping of product, gathering info on price levers and economic drivers of purchase.

## PRICING:

Pricing has been set, given insights on willingness and ability to pay, as well as insights on the purchase drivers. Balanced approach for the pricing of the device vs. replacement cartridge (at least in terms of basic costs): not trying to excessively lower or increase a price of one or the other (inevitably leading to a loss on one or the other part).

## STORAGE:

Storage is available in the lower chamber of the product that receives the purified water. It can contain from 5 to 9 liters of water.

## DISTRIBUTION AND DELIVERY:

Ex BoP, distribution is ensured by retail and direct sales. For the BoP, acknowledging the too heavy costs to ensure direct sales in villages, 2 main channels were piloted: the MFI SHG and the Shakti network. The latter approach tries to maintain door-to-door sales, but with an extremely low cost distribution set up, shared with other products. The former works with MFI as aggregators of clientele.

## MAINTENANCE:

6 months warranty against manufacturing defects available under strict conditions.

## WATER QUALITY CONTROL:

HUL arranges for water testing by independent labs, for a fee and upon request.

## MONITORING AND IMPACT MEASUREMENT:

After-sales and surveys to assess a number of dimensions, such as: performance of devices at home, user behavior and feedback, extend and continuity of usage. In partnership with London School of Hygiene, conducting a number of studies on health impact.

## FUTURE PLANS AND NEXT STEPS:

Presently, the bulk of Pureit business is in India. The target is to build Pureit into an international brand over the next ten years.

# CASE STUDIES

## MFI SELF HELP GROUP PILOT:

**History of the project:** Prior to this pilot, HUL conducted various micro-finance institution pilots with different loan terms with different institutions (US$1/week for 50 weeks vs. US$2/week for 25 weeks; micro-credit scheme whereby the micro-finance institution gets no interest on the loan, but rather a margin from HUL, as an aggregator).

**Scheme:** Started in 2008, this pilot with IVDP micro-finance institution (IVDP MFI) is aimed at offering the US$40 and 20 filter models to their self-help group members. HUL does the marketing, distribution and promotion of the filters, as well as regular after-sales service during self-help group meetings. Beneficiaries are given many avenues to obtain their replacement cartridge and get assistance to replace it. IVDP MFI is clearly dissociated from the product and is positioned as an intermediary to the self-help groups (to avoid discontinuation of loan payment if there is a problem with the product). IVDP MFI approves the loan, pre-finances the purchase, and follows the reimbursement (it pays 50% upon ordering and 50% upon reception of the products). Loan accessible (for the device and replacement cartridge) to every self-help group member. Loan terms: US$1/week for 50 weeks (for the device); similar payment of US$1/week for the replacement cartridge.

**Reach:** To date, approximately 50k beneficiaries

**Partner:** IVDP has 140k members in 2 districts of Tamil Nadu. It grants commercial loans to self-help groups of about 8 members each, and provides other 'social' products at subsidized rates (e.g., paper sanitation napkins).

**Financing:** HUL discounts the price of the product, discount which is passed directly to the end user by the IVDP MFI. The latter takes 7-8% interest rate, and carries 7% operational costs. Therefore, it makes no margin on the loan (filters or cartridge), as HUL cannot grant a deeper discount. They therefore consider it as an additional free of cost service to their members.

**Marketing:** Social marketing material (leaflets and movies) on the importance of safe drinking water used regularly during self-help group meetings, independently from the sales. IVDP MFI staff in charge of reminding self-help groups to replace the kit. Limits however, on how to engage in the long-term in a sustainable manner.

**Impact:** Penetration of 40 to 50% within self-help groups vs. 1% otherwise.

**Key hurdles:** a) availability of finance for the micro-finance institutions, except for the large ones (top 20 that does 80% of volume), which are then reluctant to enter into product sales; b) size of the loan is too small; c) reluctance of micro-finance institutions to be seen as a product retailer, given their focus on productive loans, and as beneficiaries may stop repaying loans altogether if problem with the product, or if after-sales is not provided.

## SHAKTI NETWORK PILOT:

**History of the project:** Launch of pilot with the HUL Shakti network in 2010.

**Scheme:** Shakti network consists of small women entrepreneurs, present in 120k small villages (each lady covers 3-4 villages), and selling the whole range of HUL products (selected basket they like to promote in their villages). They undergo group training on water-borne diseases, Pureit and related promotional material, before they can sell it. Orders are consolidated and placed with regular distributor, which delivers in the upcoming 2-3 days. They carry no inventory.

**Reach:** Pilot has reached approximately 100k beneficiaries to date.

**Partner:** HUL Shakti Entrepreneurial network provides rural women with training in selling, commercial knowledge and bookkeeping. These women can then choose to set up their own business or to become Project Shakti distributors. Each woman who becomes a distributor invests INR10 –15,000 (US$200-300) in stock at the outset – usually borrowing from self-help groups or micro-finance banks facilitated by HUL. Each aims to have around 500 customers, mainly drawn from her village's self-help groups and from nearby smaller villages. Most generate sales of INR10,000-12,000/ month (US$200-240), netting a monthly profit of INR700-1,000 (US$14-20). To date, the network consists of 40k lady entrepreneurs, mostly active in villages with a population of less than 2,000 people in more remote parts of the country. As part of a parallel program (Shakti Vani), HUL trains these same women to give talks to villagers about basic health practices, such as good hygiene, disease prevention and pre- and post-natal care.

**Financing:** HUL sells the first device to the Shakti lady at a discount rate, for their own use and/ or as demo for their customers. They get the normal trade commission for devices and cartridges sold.

**Marketing:** Typical material/support provided include: movies, flipcharts and brochures. The device is also used as a demonstration tool. Own HUL staff regularly reaches out to motivate them to carry the filter in their basket of products.

**Impact:** Penetration of 1% (similar to that with other channels in rural areas). Compliance in terms of purchase of replacement kits is similar to that of the rest of the country

**Key hurdles:** Shakti ladies' are economically poor. Therefore, they feel mostly comfortable with families of the same background, which often cannot afford the device in the absence of loans.

# IS THE PROJECT:

## SOLVING THE PROBLEM?

**Problem and magnitude:**

- As of 2008, there were 402k diarrheal related deaths (3.9% of total deaths), and 13,644,200 diarrheal related DALYs (4.5% of total DALYs) recorded for the country
- 2008 improved water access coverage: 88%

**Scale and reach:**

- Growth of operations: Starting in 2008, cumulative sales of 3.6m Pureit devices
- Total number beneficiaries in India: 3.6 million devices sold
- 1% penetration in areas without loan access. 40% penetration if micro-finance scheme

**Quality of water provided:**

- 'International level' water filter treatment standards: log 6 bacteria, log 4 for viruses and log 3 for parasites. US EPA standard for microbiologically safe drinking water
- Product focuses on bacteria, viruses and parasites as main contaminants across different sources of water used in the testing. Product also removes pesticides and large impurities.

**Safe water needs addressed:** Drinking water only: 10L/day/household. The device needs to be filled at least 2 times a day (for Compact model), and at least once a day for the mid-range model. This only covers solely the basic drinking water of a household.

**Link with hygiene practices, sanitation and wastewater management:** Hygiene education provided to beneficiary self-help groups, as well as Shakti women

**Acceptance and usage:**

- Strong acceptance in terms of image and taste
- High cost associated with reaching and educating users is very high and is a key hurdle. Movies have been developed to better visualize required operations, for use with BoP clients, rather than the explanation notice.
- For a family consuming 20L of drinking water per day, they may require 1 to 2 and 3 to 4x Germ kill kits per year per device for Classic and Compact respectively, on average.

**Impact on health of beneficiaries:** One year intervention study conducted by the Indian National Institute of Epidemiology in Chennai slums showed 50% reduction in diarrheal episodes.

**Other impact:** Measured impact on others development problems: Not measured

## ECONOMICALLY SUSTAINABLE?

**Fully loaded cost of 1L:** N/A

**Price of 1L:** US$ cents 0.71 (assuming 10L/day/household usage) for both the Compact and Classic models. This amount goes down to US$ cents 0.65 if assuming a consumption of 20L/day/household

**At user level:**

- Average household income per month of beneficiary household: US$60-100 (INR3,000-5,000), equals to Purchasing Power Parity $156-260 (2009 data)
- This means that this project targets populations of the BoP 500-1000.
- Assuming 5 people per household with a minimum 10L/day/household (consumption level assumed by the Pureit team), monthly water expenses (about US$2.1) therefore represent about 2% of the income of the a BoP 500 household. Higher consumption levels (20/day/household) would bring up monthly water expenses to about US$3.9 (or about 4% of the monthly income of a BoP 500 household).
- What it would take to reach the poorest: Subsidizing the cost of reaching and educating BoP users

**At retailer level:** 10% margin for retailers.

**At project level:** N/A

*NB: Numbers projected at end 2010*

## ENVIRONMENTALLY FRIENDLY?

**Water efficiency:** 100% of water is treated

**Energy consumption:** None

Chemicals used: Carbon and chlorine are the main active components

**Hardware recycling:** Purifier is made of food safe, non-toxic, non-recyclable engineering plastics. The exhausted components largely comprise of carbon and do not pose any environmental hazard. The small quantity of plastic shell of one component can be recycled.

**Waste in production materials:** N/A

**Packaging:** Carton boxes used for the sale of purifiers

## SCALABLE AND REPLICABLE?

**Requirements/ prerequisites for the project to scale:** Financing mechanisms for both the purifier and the replacement cartridges

**Additional requirements/ prerequisites for the project to replicate:**

- Availability of dense, local distribution partners and/ or aggregators that allow direct access to/ interaction with BoP clients
- Ability to import filter components at relatively low costs (e.g., import tariffs and VAT)
- Diverse population, in order to be able to sell the whole range of products (including the upmarket ones), in order to finance the building-up of the BoP segment.

# THE PEOPLE:

HUL launched Pureit in India in April 2008 and established a separate team in 2009 to approach the BoP through partnerships with other organizations.

The Partnership team works under the overall guidance of Yuri Jain - V.P. Water business and is headed by Deepak Saksena – Head Partnerships, Water Business. Deepak has 28 year experience in business development, social marketing and public-private partnerships. Prior to joining HUL in 2009, he was Country Director-India of the USAID funded AED/POUZN project. Deepak works with three top managers.

The team also comprises over 10 managers & officers and over 150 external field staff.

The team is committed to serve the BoP via a sustainable business model rather than through limited CSR activities. To do so, it is forging partnerships with various organizations and businesses to create awareness, offer loans, ensure distribution and after-sales service, etc.

*Hypotheses: Exchange rate: US$1 = INR50; INR19.2 = Purchasing Power Parity $1. BoP 500-3000 classification scale of 2002 was adjusted on U.S. Consumer Purchasing Index with latest 2010 available data (ftp://ftp.bls.gov/pub/special.requests/cpi/cpiai.txt). Prices of water and family incomes were converted following Purchasing Power Parity conversion factor for private consumption (LCU per international $) 2009 (http://search.worldbank.org/data?qterm=PPP%20conversion&language=EN).*

*Sources: Interviews with Deepak Saksena, Head Partnerships, Water Business, November and December 2010, March 2011; http://www.hul.co.in/sustainability/casestudies/enhancing-livelihoods/Shakti.aspx; http://www.pureitwater.com/IN/*

*Contact for the project: Deepak Saksena (Head Partnerships, Water Business): Deepak.Saksena@unilever.com*


**Deepak Saksena**
*Head Partnerships, Water Business*
*Hindustan Unilever Ltd.*

What excites you in the job?

*Unilever has always been present in the lives of low income households. With Pureit, we believe that we are creating something new and exciting that can dramatically reduce the burden of ill health due to unsafe drinking water. While many experiments are going on, only a few good models are emerging, and we are taking a serious crack at serving the BoP.*

What were the biggest lessons learned?

*The poor thoroughly understand value for money and are not necessarily attracted by the cheapest products. While it is important to get the prices down, one must also develop and offer the supporting ecosystem - promotion, fast and reliable distribution, after-sales...*

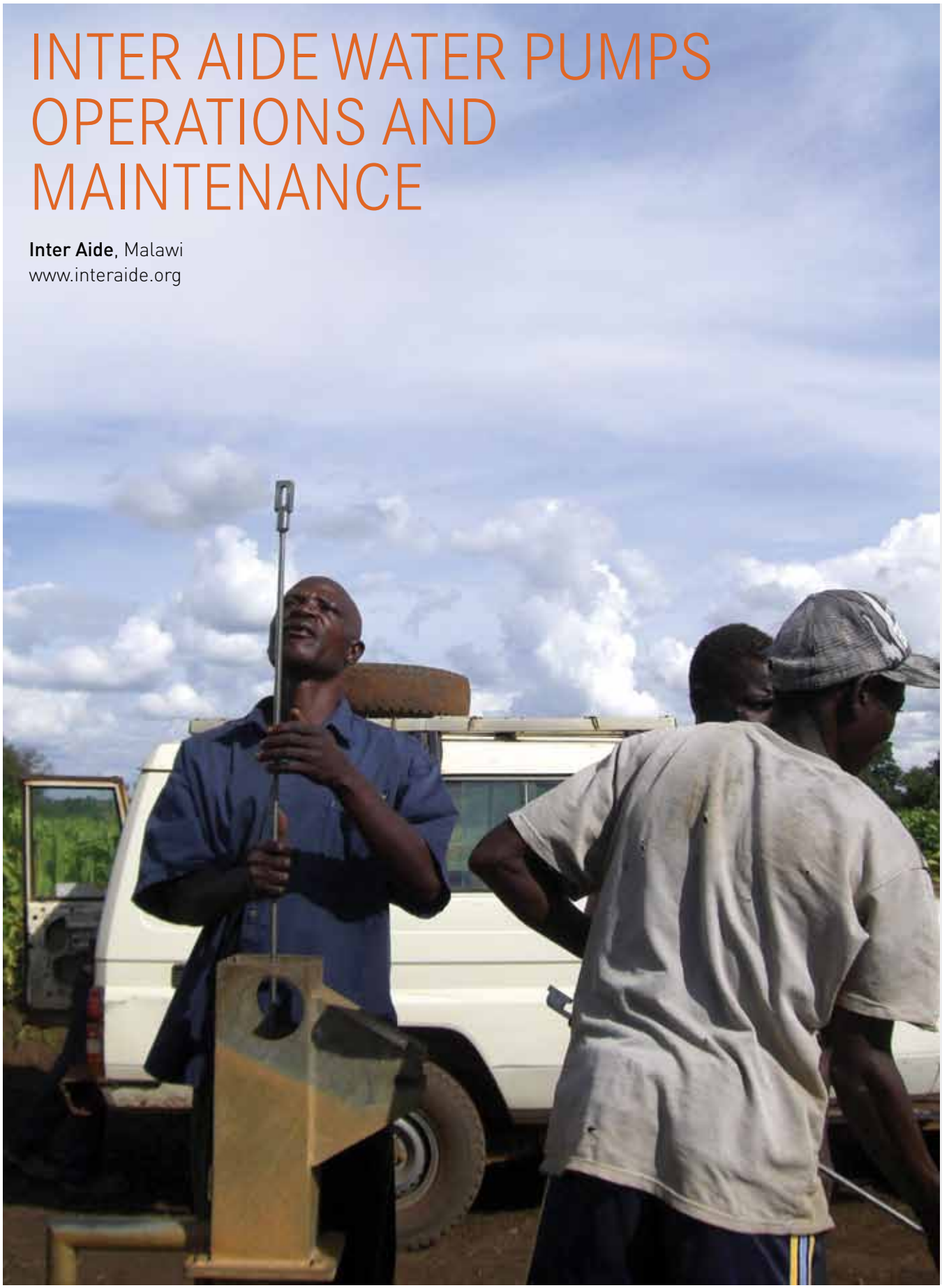
What are the main challenges?

*While traditionally, the BoP has been represented at the base of the pyramid, we see it more like a climb. It is a tough climb, it takes like-minded partners and provides tremendous satisfaction once accomplished. However, there are many challenges:*

- *Limited reach of traditional media*
- *More conservative, prudent customers who have often been cheated by unscrupulous operators. For instance, we offered Pureit for free in a field trial relatively few people took the free offering. The others were suspicious and probably thought they would be somehow cheated.*
- *Affordability – BoP families often do not have enough or regular enough* money to pay
- *Low demand, very dispersed, makes it way more difficult and expensive to promote, distribute, service, etc.*

# INTER AIDE WATER PUMPS OPERATIONS AND MAINTENANCE

**Inter Aide**, Malawi
www.interaide.org



# EXECUTIVE SUMMARY

## ORGANIZATION:

Founded in 1980, Inter Aide is a French non-governmental organization with programs in Africa, Asia (India, Philippines) and Haiti. The maintenance project started in 2002 as part of a larger WASH campaign and developed quickly into a separate large-scale project.

## PROJECT:

The project is based on a partnership between the private sector, local communities and the government. Inter Aide plays a catalyst and facilitator role, with the aim of ensuring overall rehabilitation of protected water pumps through training, mobilization and sensitization of communities and retailers, as well as the organization of sustainable access to spare parts and maintenance services. Having achieved total coverage of 2 districts (Lilongwe, Zomba) in 4 years, the model was massively replicated in 2008 to three other districts (Mchinji, Dowa, Salima). The 2 initial projects were then outsourced to the local NGO Baseda. Going forward, Inter Aide will initiate a new phase to cover 6 additional districts.

## INNOVATION:

- Sustainable approach to the rehabilitation of the hand pumps' park in rural areas, through the creation of a supply chain and a local service industry.
- Preventive and self-help maintenance scheme which reduces overall maintenance cost for communities (by avoiding major breakdowns), increases long-term use of the pumps and ensures a stable income for the area mechanics.
- Various innovations to incentivize the area mechanics (e.g., bikes, pump repair kit and maps), and build trust with beneficiary communities (e.g., ID cards for each area mechanic).

## RATING:

- Social impact: The maintenance project covers over 2.1 million people, corresponding to 7% of the total Malawi population (and 16% of the rural Malawi population). With the implementation of the project, the percentage of pumps in use has increased from 65% to 85%. The pumps are built over a protected source of water, resulting in provision of water deemed safe. However, the project does not check nor monitor the safety of water. Inter Aide's WASH initiative tries to tackle these problems through interpersonal education programs, meant to motivate the people for a hygienic behavior, including the protection of pumps and their environment from contamination.
- Economic sustainability: Inter Aide is aiming at making its scheme fully financially sustainable. However, a number of costs (e.g., training, supply chain management, controlling, and overhead) are not yet covered, and benefit from grants. Hence, going forward, costs should be further reduced, shared with public authorities, or charged onto the beneficiaries.
- Scalability and replicability: Scale is still reliant on the availability of grants to finance part of the operations. Furthermore, the project builds upon specific conditions in Malawi, such as a high population density and the widespread existence of pumps of the same type (Afridev).
- Environmental impact: With the implementation of the project, water losses, due to leakages in the pump, can be minimized.

# PROJECT CURRENT STATUS

**DATE OF CREATION:** 2002

## PRODUCT/ SERVICE DELIVERED:

- Increased accessibility of hand pumps spare parts for retailers and the population (organized through Inter Aide/ BASEDA warehouses, as well as training of/ support to retailers)
- Increased availability of maintenance services and support (provided through area mechanics, trained and supported by Inter Aide/ Baseda)

## GEOGRAPHICAL FOCUS:

Malawi, 5 districts in operation. To be scaled up to a total of 11 districts in 2011 (out of 28), in the Central and Southern rural areas.

## COMPETITIVE LANDSCAPE FOR SERVICES PROVIDED BY INTER AIDE/ BASEDA:

Other NGOs involved in similar operations include Engineers Without Borders (EWB), Concern Universal, Japan International Cooperation Agency (JICA) and Water Aid International, who mostly operate with a free-of-cost-distribution approach (of both pumps and spare parts). Since 2010, the African Development Bank has also financed in several districts an important water program covering the drilling of mechanical water wells and the creation and training of local District's Water Services teams. Occasional and localized pump rehabilitation is financed by politicians during political campaigns or eventually by the District's Water Services. Spare parts are commercially available in pump shops in the urban centers and in the Chipiku stores (biggest wholesale chain in the country) at 20%-30% above Inter Aide prices. However, these distributors often run out of stock, or carry a limited range of products.

## COMPETITION IN TERMS OF WATER PROVISION:

When the pump breaks down and there is no water committee to pick it up, communities start to rely on rainwater harvesting (in rainy season) and go back to unprotected sources of water. Prior to project implementation, only 65% of the pumps were in use.

## PARTNERS, SUPPLIERS AND FINANCING INVOLVED:

The main stakeholders of the project are:

- Certified hand-pump spare-part importers based in Blantyre and Lilongwe. Their main customers are NGOs, donors and companies ordering large quantities of pumps/ spare parts. Inter Aide acts as an intermediary as they do not sell spare parts directly to independent retailers. Instead, these importers supply Inter Aide's warehouses.
- 85 hand-pump retailers (both independent shops and the wholesale chain Chipiku): each store is provided by Inter Aide with a display shelf, advertising posters, fliers with spare parts prices and an initial stock of about MWK10,000 (US$70) of spare parts for the newly trained independent shops. Additionally, one delegate per store is offered basic sales training on Afridev spare parts. In exchange, the shop owner has to maintain his spare parts stock at an agreed minimal level (re-supply available at Inter-Aide/BASEDA warehouses or at the shop against a transport fee) and to sell to the communities at prices fixed by the project (15% margin on top of Inter Aide prices). From time to time, Inter Aide/BASEDA teams will visit the stores to monitor and provide advice on stock management.
- 149 Area Mechanics (AM) have been trained by Inter Aide/ Baseda to provide advanced maintenance and repair services to communities. Inter Aide also provides AMs with a bicycle, Afridev tools and documentation, a contract book, a map of their area and its different water points, as well as technical support (provided through a team of Inter Aide/ Baseda Maintenance Officers). In exchange, AMs are responsible for regular coverage of their area (maintenance, repairs and basic maintenance training), attend monthly meetings with Inter Aide/ BASEDA, and undertake a minimum of 12 repairs or maintenance contracts per year. Of note, AMs do not provide spare parts; it is rather the communities that purchase them in anticipation to the mechanic's intervention. Through this, AMs can inform Inter Aide/ BASEDA teams of any problems linked to retailers.
- Local communities: The retailers and AMs are selected in consultation with their respective communities (and Government extension workers operating in the area). The AMs help organize or revitalize a water committee who manages the pump and receives, on demand, a basic training on maintenance activities (e.g., changing the U-seal).
- Funding: 80% of operations financed by donors (Fondation Ensemble, UNICEF, and miscellaneous funds).

# INTER AIDE/BASEDA


## TECHNOLOGY USED:

Focus of the project is on hand pumps (mainly Afridev pumps, representing 80% of all hand pumps installed in Malawi) which require simple but regular maintenance. That involves the regular replacement of the fast wearing spare parts (U-seal, bobbin, o-ring, etc.) which protect the borehole bars. Non-replacement can quickly lead to a major breakdown and to water flow decrease. If well maintained, a pump can last for decades. Parts are mainly imported from India and sometimes from South Africa, Mozambique and Kenya.

## SOURCE OF REVENUES:

- For Inter Aide/ BASEDA:
  - Spare parts sales: 15% margin on sale of spare parts to retailers for Baseda. Inter Aide sells the spare parts without margin, but plans to increase prices next year
  - Grants: 80%
- For retailers:
  - Spare parts sales: 15% margin on sale of spare parts to communities
- For Area Mechanic:
  - Curative maintenance contracts: average MWK1,000/intervention (US$6.65) – 80% of all contracts
  - Preventive maintenance contracts: average MWK800-1,200/year (US$5.35-8 average) – 15% of all contracts
  - Basic training to communities: average MWK500-1,500/person (US$3.35-8 average) – 5% of all contracts

## GOVERNANCE/RELATIONSHIPS WITH LOCAL AUTHORITIES:

Partnership with local governments to facilitate the selection of retailers and AMs, to train them and to monitor the local water committees. In some areas, public authorities offer access to offices/ warehouses for the project operations.

## LEVEL AND DEPTH OF AWARENESS OF POPULATIONS IN NEED (REGARDING SAFE WATER, HYGIENE, SANITATION):

Depends mostly on local contamination issues and levels. Large sensitization campaigns by Inter Aide (WASH program) and other NGOs.

## MARKETING:

- Activities
  - Pre-launch of operations: In-depths interviews with local authorities and communities for the selection and geographical positioning of retailers, as well as the selection of AMs
  - Launch of operations: Event organized with local authorities, community, the selected AMs, and representatives from the District's Water Services, to publicize the service and deliver official ID cards to the AMs

# CASE STUDIES

- Value proposition
  - To community: Reliable access to safe water through increased availability to spare parts; reduced spending on maintenance thanks to basic maintenance training and preventive maintenance contract
  - To AM: Complementary source of revenues (typically +25%). Status given by the position also important. This explains why some "village Chief" assume in some places this role
  - To spare parts retailers: Higher profile among the community and a more complete product portfolio (increase in cross-sales); promotional support (fliers and posters); but only little monetary incentives (typically accounting for <5% of total turnover).
- Approach to develop consumer insights: Monitoring of retailers, AMs
- Loyalty reinforcement mechanisms: Offer of annual subscription for quarterly preventive maintenance visits

## PRICING:

- Spare parts: The prices of the spare parts have originally been set in accordance with the tariffs practiced by the wholesaler Chipiku. In the meanwhile Chipiku has raised its prices while the prices of Inter Aide and Baseda have remained constant
- Service contracts: Each AM typically negotiates the price of his intervention with the communities, based on service and transportation time required. This typically ranges between MWK800-1,500 (US$5.35-8)

## STORAGE:

The communities typically visit a pump with a jerrycan or buckets several times a day and do not store water for long periods of time. No disinfection of containers provided. In some Inter Aide/BASEDA's warehouses, bottles of chlorine (Water Guard) are available for distribution to retailers.

## RETAILER SELECTION AND PAYMENT TERMS:

Locally selected by Inter Aide or Baseda teams after consultation with local communities and authorities on criteria such as acceptance and geographical positioning (i.e., increasing penetration while avoiding direct competition). Retailers must provide upfront cash payment at the Inter Aide warehouse when they pick up the parts but receive at project launch an initial stock, worth US$70, for free.

## END-USER PAYMENT:

Usually upfront cash but sometimes the AMs and retailers allow the communities to pay in installments. The funds are collected from the families by the water committee. Collecting the user fees has proven difficult in some communities, used to NGOs or the government providing them in the past with free-of-cost support.

## MAINTENANCE:

AMs are each assigned a catchment area with a number of pumps comprised between 60 and 100, in a 10-15km radius perimeter. In partnership with the local authorities, they are selected according to their domicile (must be already living in the rural areas where they are selected), their skills level (typically they have done already similar tasks for NGOs or the government), and ratio of potential service sales turnover on overall turnover (typically around 25%).

## QUALITY CONTROL:

The AMs are supervised by Inter Aide and Baseda Maintenance Officers (around 12). The AMs are provided with ID cards to increase the communities' confidence in the project in areas where the AMs are not known among communities. The ID cards bear information about the card holder and an official confirmation that the AM operates with approval of public authorities – as measure of precaution to prevent fraud by pump robbers.

## IMPACT MEASUREMENT:

- Monitoring of book-keeping for all sales and service contracts signed by AMs
- Number of "U–seals" sold in relation to total number of pumps indicates the percentage of pumps reached within a year (as the U-seal needs to be replaced once in a year)
- Evolution of the pump functioning rate

## FUTURE PLANS AND NEXT STEPS:

Target for 2011 is to increase geographical coverage to 11 districts and 15k pumps. The long term target is to reduce operational costs to reach full sustainability by 2015 in Lilongwe and Zomba districts, as well as gradually hand over responsibilities to local partners (NGOs, private or government).

# IS THE PROJECT:

## SOLVING THE PROBLEM?

**Problem and magnitude:**

- As of 2004, there were 18k diarrheal related death (8.0% of total deaths) and 593k diarrheal related DALYs (7.8% of total DALYs) recorded for the country
- 2008 improved water access coverage: 80%

**Scale and reach:**

- Strong growth of operations: Started in 2002. Presently: 11 warehouses in operation and 10k pumps covered
- In the operation areas, the percentage of pumps in operation has raised from 65%, prior to project implementation, to 85%. Hence, the project effectively covers 8,500 pumps
- Around 2.125m people (16% of total Malawi population and 18% of the total rural population) have benefited from the project (assuming 250 beneficiaries/pump)

**Quality of water provided:** Installed pumps are engineered so as to offer a protected source of potable water. However, water quality and level of protection of installation is not tested before the rehabilitation of the pumps.

**Safe water needs addressed:**

- Capacity of Afridev pump: 18L/minute or 8'640L/day (consecutive use during 8 hours)
- Needs: About 10L/day per person (drinking, cooking, hygiene)

**Link with hygiene, sanitation and wastewater management:**

- Through complementary Inter Aide project only (WASH). The latter promotes the use of hand washing, the construction of improved sanitation facilities and the use of safe water. In areas benefiting from WASH work, communities might become more sensitive to becoming an AM client. No other synergies identified between both activities.

**Acceptance and usage:** Afridev pumps have been used in Malawi since the 1980's. Thus, the communities are largely accustomed to the technology.

**Compliance of retailers:** The compliance of retailers (in terms of spare part ordering and pricing) is challenging because the sales of spare parts represent only a minor share of their business, and comes with scrutiny (from Inter Aide/ Baseda, AMs, the communities), as well as book-keeping requirements. This results in some retailers dropping their participation. However, most retailers see the business as a good opportunity to increase cross-sales for other products in the shop

**Compliance of Area Mechanics:** Generally good. The AMs can significantly increase their income through the project (+25%)

**Impact on health or other aspects of the life of beneficiaries:**

- Measured through Inter Aide WASH program, in parallel with interventions to improve hygiene and sanitation practices. Combined impact of these interventions results in 25% less diarrheal diseases instances among children less than 5 years old

## ECONOMICALLY SUSTAINABLE?

**Fully loaded cost of 1L (ex. overhead):** US$ cents 0.002

**Price of 1L:**

- US$ cents 0.001 (assuming 250 people/pump and 10L/day/person)
- On average, US$8.7 expenses a year/pump (out of which 5.9 for spare parts)

**At user level:**

- Average household income per day of beneficiary household: US$0.5-2 (MWK75-300), equals to Purchasing Power Parity $1-4 (2009 data)
- This means that this project targets populations of the BoP 500
- Water expenses (assuming households of 5 people and a consumption of 10L/day/person) therefore represent way less than 1% of a BoP 500 household budget
- What it would take to reach the poorest: More effective campaigns on the need for drinking safe water from protected sources and the economic benefits from preventive maintenance

# CASE STUDIES

**At Area Mechanic level:** 149 AMs with revenues of US$13.5/month (MWK2,000) on average from their rehabilitation work (2-3 interventions at about US$5 per visit, every month, with a minimum of 12 interventions per year). However, this varies a lot between AMs. On average, pump services sales represent around 25% of AM's total revenues.

**At retailer level:** 85 retailers in 5 districts with revenues from spare parts' sales of US$49/month and profit of US$7.35/month with an average 15% margin on spare parts. However, the sales of spare parts usually contribute to less than 5% of total turnover

**At platform level:**

- Revenues: US$50k from sales of spare parts and US$24k from sales of maintenance, repair and training services
- US$200k grants from project donors
- Cost recovery level: a) Without headquarters overhead: 40% of operational costs covered
- Only minor capital investment required to purchase bicycles and initial stocks of spare parts: estimated at US$1,500/year (fully subsidized)

*NB: Numbers projected at end 2010*

## ENVIRONMENTALLY FRIENDLY?

**Water efficiency:**

- Regular maintenance reduces the water losses due to leaks
- No management of water resources.

**Limited fuel consumption:** required for the transport of the spare parts between warehouses and retailers.

**Hardware recycling:** No systematic recycling for both metal and plastic components but usually reused at community level

## SCALABLE AND REPLICABLE?

**Requirements/ prerequisites for the project to scale:**

- Further scale is dependent on subsidies. Dependency could be further reduced by passing on more costs to the users, either through the price of the spare parts, or the AM fees. Operations could also be outsourced to the local authorities
- Incentives for retailers should be increased (with higher margins). Otherwise, provision of spare parts could be organized directly through AMs

**Additional requirements/ prerequisites for the project to replicate:**

- Districts densely populated with pre-existence of hand pumps
- Small number of types of pumps with relatively basic maintenance requirements

# THE PEOPLE:

John Chimukho is the Executive Director of the NGO Baseda (Basic Services Development Agency), which implements the project in two areas (Lilongwe and Zomba).

Previously to the creation of "his" NGO, he worked as a Project Officer for Inter Aide, as well as other NGOs (Save the Children UK, Concern Universal and German GTZ).

John completed a degree in Public Health in Blantyre Malawi and went on a student exchange to the Liverpool School of Tropical Medicine.

At Baseda, he leads the pump project, along with a team of eight colleagues.

In the future, Baseda plans to expand the project to more districts, while finding ways to make the project more sustainable (e.g., linking retailers and importers, delegating to public authorities).

*Hypothesis: US$1 = MWK150; MWK75.1 = Purchasing Power Parity $1. BoP 500-3000 classification scale of 2002 was adjusted on U.S. Consumer Purchasing Index with latest 2010 available data (ftp://ftp.bls.gov/pub/special.requests/cpi/cpiai.txt). Prices of water and family incomes were converted following Purchasing Power Parity conversion factor for private consumption (LCU per international $) 2009 (http://search.worldbank.org/data?qterm=PPP%20conversion&language=EN).*

*Source: Field visit on February 16 and 17, 2011; Interviews with Olivier Celaries and Fabrice Vandeputte (Responsables Secteur Inter Aide Malawi), John Chimukho (Head of Baseda), Mr. Nkhalamu (Director of Nkhalamu General Supplies) in January/February 2011.*

*Contact for the project: Olivier Celaries, Responsable Secteur Inter Aide Malawi et Mozambique (olivier.celaries@interaide.org); John Chimukho, Head of Baseda (baseda2008@gmail.com)*

**John Chimukho**
*Executive Director of BASEDA*

Why are you doing all this?

*I know the needs of the rural population here, particularly in the water sector, and I would like to help them. 85% of the pumps in our district are working now and I think that this figure alone already legitimates our work.*

What was your 'aha' moment?

*Setting up Baseda in 2006 took a lot of effort and I was very happy when we finally got registered. For me, founding a local NGO meant that I can build up projects with a longer time frame than international NGOs.*

How are you inspiring others?

*I have to make sure that my employees are aware of the vision of the organization, problems to be addressed and understand and support our activities fully. I also try to organize trainings and refresher courses for my staff members to make them grow into better professionals.*

What were key challenges on the way?

*a) Lack of human resources: For instance, the lack of Water Monitoring Assistants at community level means less support for the Area Mechanics*

*b) I discovered that a major part of our work is about persuasion and that takes a lot of time. We need to convince project partners, authorities, communities, which is sometimes frustrating.*

What were key lessons learned?

*We need everyone - communities, local leaders, retailers and public authorities – to be involved, in order to achieve long-term impact. Hence, we need to address the needs of each of these groups.*

*Another important point relates to ownership: The communities must feel that the project supports and belongs to them. Once the communities accept the ownership of pumps and of the project in general as theirs, it becomes much easier to work. The best solutions to a problem always come from the community.*

# HEALTHPOINT SERVICES E-HEALTH POINTS

**HealthPoint Services India,** India
www.ehealthpoint.com

# EXECUTIVE SUMMARY

## ORGANIZATION:

Healthpoint Services is a social enterprise providing primary healthcare and clean drinking water to rural and semi-urban communities, by employing a delivery model that combines the benefits of technologies in healthcare, ICT and water. It builds, manages and operates E-Health Points (EHPs) that provide clean drinking water, medicines, diagnostic services, and advanced tele-medical services.

## PROJECT:

E-Health Points is a network of kiosks with basic healthcare (preventive and curative) and water treatment infrastructure. These kiosks are connected with a dedicated broadband connection with nearly 100% uptime. The project started in November 2009 and there were 10 health and water kiosks operating as of end 2010. An average kiosk covers 1200-1800 households, within a perimeter of 5km. By then, these kiosks had delivered: 22.5k tele-medical consultations, 9k diagnostic investigations, and 25k prescriptions. Safe drinking water was regularly provided to 5k users, for a monthly upfront payment of US$1.50 (INR75) for a volume of 20L/day/household. Safe water revenues represented one third of the total revenues. The water treatment plant is operated by a local employee of EHPs, who has been trained to run the machine, deliver the water and conduct basic maintenance.

## INNOVATION:

- Bundling of services and comprehensive approach to healthcare provision: EHPs combine health products and safe water provision, henceforth maximizing social impact for the communities. This set up also drives penetration. This is less a result of increased traffic, but rather because the safe water service is way more credible as an offering coming from a healthcare center. The fact of picking up water also acts as a 'cover' for people suffering from not socially-accepted diseases.
- Strong focus on compliance: Water is provided on a monthly prepaid basis thereby encouraging subscribers to long-term use. There are kick-off and regular follow-on social marketing schemes aimed at enlisting communities at large, and building a higher base of subscribers for both health and water points.
- Use of technology to lower cost: Automated dispensing of water, as well as automated management information system on water kiosk performance.

## RATING 10/16:

- Social impact: Still small-scale operation, started in 2009 (22.5k beneficiaries). However, there are plans to significantly increase operations by 2013 (200 kiosks in Punjab only). Achieved high penetration (50%) after 3-5 months operations (while the overall average across centers is still lower, due to ramp-up). This result can be partly attributed by the strong promotion efforts (dedicated promoter for each 500 households), as well as by the combined health+water kiosk set up, that positions the water treatment service favorably. Daily safe water consumption encouraged through monthly pre-paid cards with a fixed validity.
- Economic sustainability: Equipment is financed by debt and equity so far with some component coming from grants as well. Future plans include raising large-scale debt financing. Local direct, operational expenses are currently covered by sales proceeds of treated water.
- Scalability and replicability: Prerequisite to scale: a) fund raising and political support; b) stringent audit and operational processes to ensure constant water quality and strong social marketing delivery. Prerequisite to replicate: a) availability of local technology; b) availability of water and electricity; c) sufficient population density to support plant operations; d) a favorable political and regulatory environment.
- Environmental impact: Use of Reverse Osmosis technology, which results in about 30-40% water rejection, while energy consumption depends on water quality.

# PROJECT CURRENT STATUS

**DATE OF CREATION:** 2009

**PRODUCT/ SERVICE DELIVERED:**

Treated water, tele-medical consultation, advanced diagnostic, and medication.

**GEOGRAPHICAL FOCUS:**

Punjab, India. Villages of 8-12k inhabitants, as well as institutions, schools and clinics. These villages are selected through feasibility surveys which ascertain both technical and socio-economic feasibility

**COMPETITIVE LANDSCAPE:**

On the water front, other operators (private kiosks or other delivery mechanisms) are the main competition in some areas. On the health front, informal and unqualified service providers (i.e., quacks) represent the biggest threat. Some amount of competition is emerging from the free services extended by the public sector (even though quality is perceived as very low).

**PARTNERS, SUPPLIERS AND FUNDERS INVOLVED:**

- Financing: EHP has passed the 'seed' and 'A' rounds and is now into completing the 'A plus' round. Financial partners include: individual investors, equity partner (Ashoka), foundations, and limited liability companies. These parties provide equity, debt and convertible debt. As of date approximately US$2.5m has been raised.
- Partners: Village councils, which provide access to water and land for given periods of time; pharmacies, that operate in the center; public, private and informal health service providers, which mostly act as referral partners.
- Providers: Technology is sourced locally, from various vendors (e.g., Airtel, Reliance for telecom equipment), and Fontus Water Company (for water equipment).

**TECHNOLOGY:**

Since there is a high degree of chemical contamination in the groundwater in the program area, EHPs use Reverse Osmosis technology for water treatment. The average production is about 9kL per day and the average storage capacity is about 8kL per day. The Reverse Osmosis machine is located within the newly built kiosk. Connectivity, ensured through a dedicated broadband internet connection, is also used for a pilot of tele-monitoring on production performance and maintenance requirements. Estimated lifetime of the water treatment installation: 10 years for the body of the machine, 4 years for the pump, and 6 years for the membrane.

**SOURCE OF REVENUES:**

Sales of treated water is the largest income generator of all four activities with 25-35% of the revenues, while diagnostics and tele-consultation provide 35% and 25 % respectively. The sales of medication provides income to pay for the premises that partner pharmacies rent from EHP, in those cases where pharmacy management is outsourced to a local entity.

**WATER SOURCING AND INSTITUTIONAL ARRANGEMENTS:**

Access to water is granted by the local village council for initially for a period of 10 to 15 years.

**BUILDING/ LAND SOURCING AND INSTITUTIONAL ARRANGEMENTS:**

The land for the kiosk is also provided for by the village council for initially for a period of 10 to 15 years. Its location is chosen in consultation with the village council.

**GOVERNANCE/ RELATIONSHIPS WITH LOCAL AUTHORITIES:**

EHP works in close cooperation with the existing public services, by complementing government's efforts. It provides periodic reports and updates to the local government authorities on the status of the performance of the EHPs.

**REGULATORY FRAMEWORK:**

EHP follows standards on water quality from the Bureau of Indian Standards and WHO guidelines.

**LEVEL AND DEPTH OF AWARENESS OF POPULATIONS IN NEED (REGARDING SAFE WATER, HYGIENE, SANITATION):**

Awareness is high, knowledge is average, and actual usage is low.

**MARKETING:**

- Activities conducted and media used: Two types of social marketing are used (for all services provided by the kiosk): a) door to door marketing performed by a village-based promoter (one for every 500 households in a village, hired by E-Health points); b) An outdoor campaign which involves a good mix of 'edutainment'. Follow-on actions are regularly conducted.

# HEALTHPOINT SERVICES

- Value proposition: Health benefits from safe drinking water, as a way to prevent ailments. The value proposition of the kiosks actually covers benefits from a wide range of health hazards (anemia, tuberculosis, etc.)
- Approach to developing consumer insights: a) village promoters that regularly talk to users; b) supervisors who regularly visit villages; c) phone helpline; d) water communities selected within the village community who volunteer for spreading awareness about benefits of adopting safe drinking water
- Loyalty reinforcement mechanisms: Referral scheme whereby existing clients bringing new clients receive discounts or free water. This scheme works well and is often promoted jointly with health products-oriented schemes (i.e., whereby clients referring additional clients get financial or in-kind benefits).

## PRICING:

Pricing is done on an operating cost-plus basis. Prices were kept at the very minimum to drive up volumes and remain affordable for the poorest households of the area.

## STORAGE:

Clients who sign up for the water service receive a 20 liter container, specially designed to facilitate safe usage and transport. Cleaning is done by customers themselves.

## DISTRIBUTION AND DELIVERY:

Water is sold at the kiosks. However, home delivery is also available across all kiosks. It is provided by a local entrepreneur, monitored by EHP, who typically charges as much as the price of water for this service.

## STAFF IDENTIFICATION AND SELECTION:

The candidate operators are selected based on references provided by operators of existing kiosks. Reference checks are carried-out and often references are asked to provide guarantees about the conduct, qualification and supporting claims made regarding the previous work experience. Generally there is a staff turnover of about 10-12% per annum in EHP villages, which is one amongst the lowest in this sector.

## END-USER PAYMENT:

Monthly subscription fee of US$1.50, in cash for 20L/day. EHP is currently piloting a local financing mechanism as well.

## FRANCHISEE/ ENTREPRENEUR FINANCING:

None. All the kiosk staff is employed by EHP. Operators and field staff are given financial and non-financial incentives linked on performance.

## MAINTENANCE:

Regular maintenance is performed by the operator of the plant. A regional team provides periodic preventive maintenance and also attends to any breakdown. Pilot tele-monitoring scheme is being tested to help detect operational issues early on.

## WATER QUALITY CONTROL:

The water quality test reports are provided by an independent laboratory fortnightly; the water reports are displayed on the water kiosks and also shared during the discussions made in the community-outreach activities.

## MONITORING:

Carried through periodic supervisory checks (scheduled and unannounced), as well as pilot tele-monitoring devices.

## IMPACT MEASUREMENT:

An impact study from Columbia School of Public Health is being put together. Benefits that would be monitored are: health savings (travel, stay, diagnostic, medicines); employment opportunities; beneficiary productivity; early stage diagnosis of potentially life-threatening diseases/ailments, reduction of public sector health expenses, number of referrals to specialized health institutions.

## FUTURE PLANS AND NEXT STEPS:

Within Punjab, plans to increase the number of kiosks from 10 to 200 by 2013 (out of a target 500 across India by 2014). This plan could be considerably accelerated if the Punjab Government confirms its interest in EHP constructing another 600 kiosks in the State. Outside Punjab, plan to expand to 300 kiosks in 3 additional Northern India States by 2014. International expansion plans (Philippines and Mexico) starting in 2012.

# CASE STUDIES

## IS THE PROJECT:

### SOLVING THE PROBLEM?

**Problem and magnitude:**

- As of 2004, there were 454k diarrheal related deaths (4.4% of total deaths) and 15.4m diarrheal related DALYs (5.0% of total DALYs) recorded for the country
- 2008 improved water access coverage: 88%

**Scale and reach:**

- Growth of operations 2009-2010: from 0 to 10 kiosks
- Average village size: 1300+ households (5 people per household)
- Total number of regular, actual users: 22.5k people (4,500 subscribing households)
- 50% penetration rate at maturity, reached within 3-5 months operations

**Quality of water provided:** At the level of WHO guidelines and Indian Bureau of Standards.

**Safe water needs addressed:** Basic drinking water needs (20L per household of 5 people each on average).

**Link with hygiene practices, sanitation and wastewater management:** Hygiene and sanitation not elaborately addressed in the social marketing material at this stage. Working on including it in future

**Compliance, acceptance and usage:**

- Compliance is ensured through a pre-paid card scheme. The cards can be bought the first week of every month, for up to 30 pick-ups of 20L of water. Actual data shows that there is a considerable drop in frequency and consistency during the rainy/winter seasons
- Combination of water and health services allows heightening the perception of the value and safety of water. This set up also increases convenience for users of both water and health services

**Impact on health of beneficiaries:** Largely anecdotal evidence: reduction of 30-40% of diarrhea and schistosomiasis cases

**Other impact:** N/A

### ECONOMICALLY SUSTAINABLE?

**Fully loaded cost of 1L, incl. subsidies:** US$ cents 0.24/L (including US$205/month operating costs for the kiosks, plus US$330/month interest payment, plus US$45/month for maintenance and supervision, US$25/month for Headquarters direct operational expenses, US$50/month for other support costs from Headquarters(e.g., marketing). Does not include provision for equipment replacement

**Price of 1L:** US$ cents 0.25/L(INR0.125/L)

**At user level:**

- Average household income per month of beneficiary household: US$150-250 (INR7,500-12,500), equals to Purchasing Power Parity $390-651 (2009 data)
- This means that this project targets populations of the BoP 1000-1500
- Assuming 5 people per household with 20L/day/household, water expenses therefore represent 1-2% of the income of a BoP 500 household
- What it would take to reach the poorest: In beneficiary villages, 20-30% of the population earns less than US$200. More effective awareness campaigns on health benefits would be required to enroll a larger share of these potential beneficiaries

# HEALTHPOINT SERVICES

**At kiosk level:**

- For each EHP, there is 6 staff in total. For the water operations, there is one operator per plant and one village promoter for every 450 households (full time for 1st year)
- Estimated current average revenues: US$675/month
- Salary costs: US$70/month for operator and US$60/month for promoter
- Power and chemicals: US$75/month
- Other costs allocated to kiosk: 1/10 of supervisor and maintenance teams salaries = US$45/month/kiosk
- Capital expenditures (including equipment, set up infrastructure, and initial awareness campaign): US$13k (50% for the equipment, 30% for the building, 20% for the storage tank and pipes). Out of the US$6,500 spent on equipment, 1,500 spent on membrane, 2,000 on the pump, and 3,000 on the machine body. Contribution from revenues allocated for replacement of equipment within 15 years
- Typically 12-18 months for kiosk to break-even

**At project level:**

- Lead units are cash-flow positive, at unit level
- Total 2010 water revenues: US$90k
- Recurring operational expenses borne at regional Headquarters level (not linked to kiosk operations): N/A
- Recurring operational expenses borne at regional Headquarters level (linked to kiosk operations but not allocated to kiosks, such as marketing): US$6k (US$50/kiosk/month). Will go down after 1-2 years of kiosk operation
- Low cost synergies between health and water operations, which are treated as separate businesses
- Funding: US$100k used for capital expenditures. Rest is funded with equity capital mostly, as well as debt

## ENVIRONMENTALLY FRIENDLY?

**Water efficiency:**

- The machines which are used for treating water reject up to 40% water, depending on water quality. This water is drained in the common drainage system
- Source of water is checked before installation of the kiosk
- No specific water resource management

**Energy consumption:** The energy consumed in an average sized water plant is about 20 kW per day which translates into about US$50 per month

**Chemicals used:** The raw water used is in some cases contaminated and needs to be treated with chemicals before the water is treated in the plant. The raw water is treated with anti-scalants before the water is passed-thru the Reverse Osmosis unit

**Hardware recycling:** Not yet

**Packaging:** N/A

## SCALABLE AND REPLICABLE?

**Requirements/ prerequisites for the project to scale:**

- Additional financing for the equipment
- Hiring of additional key staff at headquarters, as well as a large number of employees at unit level
- Improved quality control processes to manage scaled-up decentralized operations
- Increased partnerships with public sector for accelerated take-up of proposed model
- Increased partnerships with private sector to expand range of products and services on offer.

**Additional requirements/ prerequisites for the project to replicate:**

- Supportive government policy around private sector provision of health-related services
- Availability of electricity and source of water
- Connectivity in terms of dedicated broadband at the respective EHP sites
- Presence of local, competitive providers of technology
- Existing willingness to pay for water and/ or awareness campaigns on link between health and water.

# THE PEOPLE

Amit Jain has graduated in Management from the IIFM with an Advanced Management Program done from IIM Calcutta. He has also completed the Global Social Benefit Incubator Program of Santa Clara University (California, USA).

Throughout his 16 years career, Amit has devised and run projects and businesses to bring products and services to the Base of the Pyramid, and developed a number of public-private partnerships. He worked for major corporate, consultancy, NGO and financial services players. His spikes lay in social marketing, supply chain, community-based development, natural resource management, mostly for rural communities.

Prior to running E-Health Point, Amit brought to scale the water business of the Naandi Foundation as President and COO (resulting in 500 units installed in less than 3 years).

He then established E-HealthPoint, along with two other co-founders - Al Hammond, Executive Chairman and Christopher Dickey, CFO.

Al Hammond has been a serial entrepreneur and is the author of the landmark analysis 'The Next 4 Billion'. Al has 10 years' experience scaling businesses for low-income communities.

Christopher Dickey is a Wharton graduate and doctorate in Public Health from Columbia University. He has over 10 years' experience in health services technology companies.

The ambition of EHP team is to expand dramatically the EHP model to 3 and then 10 other Indian states. International expansion is also planned in the mid-term.

*Hypotheses: Exchange rate: US$1 = INR50; INR19.2 = Purchasing Power Parity $1. BoP 500-3000 classification scale of 2002 was adjusted on U.S. Consumer Purchasing Index with latest 2010 available data (ftp://ftp.bls.gov/pub/special.requests/cpi/cpiai.txt). Prices of water and family incomes were converted following Purchasing Power Parity conversion factor for private consumption (LCU per international $) 2009 (http://search.worldbank.org/data?qterm=PPP%20conversion&language=EN).*

*Source: Interviews with Amit Jain in December 2010, as well February 2011*

*Contact for the project: Amit Jain, Co-Founder & President, Healthpoint Services Global Inc. (amit.jain@globalhealthpoints.com)*

**Amit Jain**
*Co-founder & President of HealthPoint Services Global Inc.*

Why are you doing all this?

*I am passionate about innovations and entrepreneurial solutions that improve access to the under-serviced. I feel it is high time to act and reach those who need it. I feel I can make it happen!*

What was your 'aha' moment?

*Seeing waiting-halls in cities brimming with patients from rural areas waiting to consult doctors, and customers queuing-up at the water kiosks set up in rural areas. I came to realize that even the poor patients are ready to pay for quality healthcare. I also believe that improving rural health would provide the best Return on Investment for a developing country like India.*

How are you inspiring others?

*To be successful I need to convince and inspire a lot of different people: other professionals in the sector, my colleagues, policy makers, venture capitalists, private foundations and the international aid agencies, by demonstrating the success and impact of our community-based social enterprise.*

What are the key challenges on the way?

*Fundraising growth capital; identification of trained human resources; quality management across large number of EHPs.*

What are the key lessons learned?

*There are many:*

- *Behavior change requires massive efforts, notably through community 'influencers'*
- *We need to customize products and services offering, and enroll/ respect informal sector providers*
- *We need to develop effective partnerships with the public sector*
- *We need to leverage technology and put it to efficient use to alleviate sufferings of humankind.*

# NAANDI COMMUNITY SAFE WATER SERVICES (CSWC)

**Naandi Water,** India
www.naandi.org

# EXECUTIVE SUMMARY:

## ORGANIZATION:

Naandi Community Water Services is a social for-profit JV between Naandi Foundation and danone.communities, span off from the water division of the Foundation in 2010.

## PROJECT:

The Naandi model is based on a partnership between the private sector, local communities/ governments, and donors. Naandi plays a facilitator role, ensuring overall coordination, organizing financing, community mobilization and sensitization. Financing of the equipment is done through a mix of grants, village contributions and state authorities' investments. Naandi launched its first Community Safe Water Center (CSWC) project in 2005. Following 3 years of R&D and piloting in partnership with WHI, the model was massively replicated in 5 Indian states (Andhra Pradesh, Karnataka, Rajasthan, Haryana, and Punjab) to become the largest non-governmental water provision scheme of the country. As of end of 2010, it counted over 405 plants serving over 600k users and 2.1m potential beneficiaries (calculated as total villagers living in areas serviced by a kiosk). As a result, Naandi water centers now represent 25-30% of the total CSWS installed base in India.

## INNOVATION:

- Business model: Launch and spread of a micro DBOT (Design Build Operate Transfer) model, which allowed for the creation of a broader kiosk industry, and which helped this industry evolve from an equipment provider approach to a service provider approach (for assets owned by the government and/ or community), and therefore lower equipment costs, through heavier competition between the technology providers selected for projects. This DBOT approach now works in a wide variety of settings. For instance, since 2008, Naandi entered into a Memorandum of Understanding with the Government of Punjab for the provision of 5-years tendered DBOT contracts for clusters of 20 plants, allowing Naandi to scale up extremely rapidly, with limited financing requirements. The bid winners are selected on the basis of the most attractive cash flows. Capital expenditures are financed by the government, which retains the assets at the end of the contract. While there is no clarity yet on the continued involvement of non-governmental players at the end of the 5 years contractual period, both for Naandi and the communities benefiting from these assets, these contractual arrangements provide a good political and financial foundation to Naandi for their activities. While government tenders are more common in northern India, the contractual partnerships remain very much local in the South, where they are negotiated at the local level with Gram Panchayats, or local funds/ schemes, (local community provides at least 20% upfront of the total US$10-20k equipment + installation cost).
- Focus on community ownership and education: When no government tenders are involved, Naandi insists on having communities participating in financing the plant – making them the owners of the service and assets from the start. Furthermore, no plant is established without considerable awareness and education activities, to ensure that a large share of the village is willing to pay for the service. This work is regularly carried out through local promoters, in charge of following-up usage patterns and volumes.
- Focus on compliance: introduction of monthly pre-paid cards with a fixed validity, which incentivize users to come and consume their daily allotted volume of safe water.

## RATING 10/16:

- Social impact: Large-scale scheme of drinking water provision, respecting WHO standards, to over 600k regular users. Low price allows for poorer households to spend typically 2-4% of their income on safe water. Rather high penetration (some of the well-established water centers reach over 50%, pushed by intensive safe water and hygiene education, as well as monitoring efforts. Daily safe water consumption is encouraged through monthly pre-paid cards with a fixed validity.
- Economic sustainability: Capital expenditures are financed by government, local communities or grants. Operational expenditures (excl. overhead) are covered by sales of treated water.
- Scalability and replicability: Prerequisite to scale: a) dependent of political or community involvement to fund the equipment, or alternatively strong fundraising for grants, b) stringent audit and operational processes to ensure constant water quality and strong social marketing delivery. Prerequisite to replicate: a) availability of local technology; b) availability of water and electricity; c) sufficient population density to support plant operations; and d) favorable political and regulatory environment.
- Environmental impact: Use of RO technology, which results in about 30-70% water rejection, while energy consumption depends on water quality.

# PROJECT CURRENT STATUS

## DATE OF CREATION:

Naandi Water activities started in 2005

## PRODUCT/ SERVICE DELIVERED:

Purified water for drinking and cooking (12 to 20L/day/household)

## GEOGRAPHICAL FOCUS:

5 Indian states: rural areas (current average village size over 1,000 households) and pilots in peri-urban slums

## COMPETITIVE LANDSCAPE:

In most areas, the challenge is to build a demand rather than compete for it, as the only alternative is untreated surface water. In some areas, the project has emulated independent entrepreneurs operating water purification units. Most of those, however, do not provide the same standards and transparency on the quality of the water offered as Naandi.

## PARTNERS, SUPPLIERS AND FINANCING INVOLVED:

- Range of preferred suppliers for every component of the water center (buildings/ pre-fab, water tanks, machines, consumables), to maintain low costs and ensure flexible provision throughout the different states
- Partners: State or local governments, which give license to operate and land for plant; local communities provide access to water and electricity
- Subsidized financing of capital investments only: In government tenders, financing of equipment is done 100% by the State, and equipment belongs to the State. In local settings, minimum community participation of 20%, and balance by donors such as FRANK Water, GPOBA, Global Water Challenge, Maganti Foundation, as well as local donors.

## TECHNOLOGY AND INSTALLATION:

Reverse Osmosis plants locally manufactured, and installed by manufacturers. The price of the equipment ranges from US$10-20k for a complete water kiosk depending on water quality, equipment capacity, and the quality of the components. Capacity ranges between 500-3,000L/hour and the key components have a typical life of 10-15 years (as per Naandi estimates). 3 months are required on average per village from preliminary contacts to the launch of the plant.

## SOURCE OF REVENUES:

- User fees: monthly household cards (20 or 12L/day/household)
- Enrollment fees: symbolic, to create sense of joining
- Containers: sold at cost (typically around INR140 or US$2.8)

## WATER SOURCING:

Access granted by local community/ government, over 5-year period in general.

## BUILDING/ LAND SOURCING:

Land granted by local community/ government, over 5-year period in general.

## GOVERNANCE/ RELATIONSHIPS WITH LOCAL AUTHORITIES:

Strong relationship-building component (i.e., not only water provider but development partner). Regular communication to local governments on the purpose of the project and quality of water provided.

## REGULATORY FRAMEWORK:

Standards on water quality (Bureau of Indian Standards and WHO standards).

## LEVEL AND DEPTH OF AWARENESS OF POPULATIONS IN NEED (REGARDING SAFE WATER, HYGIENE, SANITATION):

Depends mostly on local pollution issues and levels.

## MARKETING:

- Activities:
  - Pre-launch: Door-to-door in-depths interviews, and focus group discussions by Naandi staff
  - Launch: Celebration event with local authorities and communities
  - Post-launch: Continuing village education through a water promoter (usually a lady from the village) paid by Naandi, who re-lists drop-outs and lapsers, or enlists newcomers; recurring promotion and education activities to demonstrate the link between safe water, hygiene and health; school sensitization events. Most intense in the first 6 months.
- Value proposition to end user: health-cost benefits and savings; convenience with possibility of home delivery for those willing to pay the extra cost
- Value proposition to community: affordable quality in service provision, and safety of water provided. The only treatment option in areas affected with chemical contamination (e.g. fluoride, arsenic)
- Approach to developing consumer insights: Feedback from the field from all Naandi staff.

- Consumer life cycle management: strong awareness effort at the start; follow-up by field coordinators that monitor utilization levels, drop outs
- Loyalty reinforcement mechanisms: 30-days pre-paid cards for 12L or 20L. No other benefits offered.

## PRICING:

Affordability focus with a price that hovers around INR0.1-0.2/L (US$ cents 0.2-0,4/L), i.e., INR2 to 4 for 20L.

## STORAGE:

12L or 20L containers with tap (and still large enough opening to allow cleaning) sold to users. An estimated 90% of Naandi customers use containers provided by Naandi.

## DISTRIBUTION AND DELIVERY:

Direct provision at plant for 50-60% of beneficiaries, who come daily. Plant is usually open 8 hours a day (early mornings and end afternoons). Others rely on daily distribution by local entrepreneurs, identified by Naandi but paid directly by users willing to pay an extra cost for the service – the distributor typically charges INR2-3 for the service. Request for home delivery is mostly convenience-driven. Poorer households will rather come on foot or bicycle.

## ENTREPRENEUR/ FRANCHISEE/ RETAILER SELECTION, IF ANY:

Plant operator and safe water promoter selected by Naandi sales team after public advertisement (interviews and tests; basic qualifications required)

## END-USER PAYMENT:

Upfront cash payment of 30 days card

## END-USER FINANCING: None

## MAINTENANCE:

Done by Naandi maintenance teams, assigned to a number of plants, which conduct weekly preventive maintenance visits, plus curative maintenance. Each maintenance squad covers clusters of 10 plants. Stocks of spare parts maintained by same team.

## WATER QUALITY CONTROL:

Water sample sent to certified laboratories every month. Results displayed at the water plant. Daily tests of salt levels in the water

## MONITORING:

Operational and commercial indicators tracked through daily reports, maintained by plant operator. Weekly checks (and cash collection) ensured by field coordinators that have an inspection and promotion support function. These coordinators are in charge of supervising 10 villages (within sometimes large perimeters). Audit teams to detect potential fraud.

## IMPACT MEASUREMENT:

Case studies conducted in a selection of new villages (before launch, and every year after that). This approach offers mostly anecdotic evidence. Statistical surveys too costly to organize.

## FUTURE PLANS AND NEXT STEPS:

Target to cover 2,500 villages by 2015 (i.e., over 6m beneficiaries, assuming a target of 500 households and 5 people per household). Main operational focus on improving promotion and educational impact to increase penetration rates. No evolution of the business model foreseen in the short-term.

# IS THE PROJECT:

## SOLVING THE PROBLEM?

**Problem and magnitude:**

- As of 2004, there were 454k diarrheal related deaths (4.4% of total deaths), and 15.4m diarrheal related DALYs (5.0% of total DALYs) recorded for the country
- 2008 improved water access coverage: 88%.

**Scale and reach:**

- Strong growth of operations: 2007-08:10 plants; 2008-09: 120; 2009-10: 350; 2010-11: 500. Present: 405 plants. 2008 – present CAGR: 51%
- Average number of beneficiaries per kiosk: 300 households
- Over 600k actual users; over 2.1m potential beneficiaries in all villages served
- Rather high average rate of penetration among beneficiary communities, with older sites converging towards over 50% penetration over time.

**Quality of water provided:**

- Standards: BIS – 10,500-1991 and WHO
- Typical Reverse Osmosis treatment: bacteriological, chemicals and metals

**Safe water needs addressed:**

- Production capacity: 500-3,000L/hour; Storage: 3,000 - 12,000L. Plant open 8 hours/day
- 12L to 20L/day/household for drinking only

**Link with hygiene, sanitation and wastewater management:** Strong emphasis on hygiene. No focus on sanitation or wastewater

**Acceptance and usage:**

- Important usage variations depending on weather and seasons, with a lower use in the winter season
- Compliance reinforced by the use of 30-day prepaid cards (payable in cash at the beginning of the month; days not used are lost)
- Taste is well accepted. Convenience (home delivery) is the principal barrier to increased penetration

**Impact on health of beneficiaries:** Anecdotal evidence of impact on fluorosis, and lowering of diarrhea cases but no statistical survey conducted yet

**Other impact:** Not documented

## ECONOMICALLY SUSTAINABLE?

**Fully loaded cost of 1L, incl. subsidies:** N/A

**Price of 1L (US$ cents):** 0.2-0.4

**At user level:**

- Average household income per month of beneficiary household in Andhra Pradesh: US$60 (INR3,000), equals to Purchasing Power Parity $156 (2009 data)
- This means that this targets populations of the BoP 500.
- Assuming 5 people per household with 20L/day/household and a price of US$0.4/L, water expenses therefore represent 2-3% of a BoP 500 household income.

**Cost of alternatives to customer:** Free, untreated water

**What it would take to reach the poorest:** Increased promotion and penetration

**At kiosk level:**

- Average current revenues per kiosk: US$540
- 2 Naandi staff by plant on average (1 operator, promoter in selected cases, and sales/ audit/ maintenance teams support)
- Operators' salaries ranging from INR2,500 (basis salary) to INR4,000 (US$50-80), depending on sales and seniority. Slightly below for promoters. Break-even depends on the number of users, as well as the maintenance and electricity costs
- About 200 transporters. No data available on revenue model

**At project level:**

- Assuming 500 kiosks and an average price/L of INR3, project realizes US$3.7m in revenues. While 100% of operational expenditures are recovered, overhead is still not fully recovered (would be breakeven in terms of overhead with 800 kiosks).
- Full cost recovery (including capital expenditures within 5 years), with current volumes, would require to pass from an average current price of INR3 to INR4.8

*NB: Numbers projected at end 2010*

# CASE STUDIES

## ENVIRONMENTALLY FRIENDLY?

**Water efficiency:**

- Use of Reverse Osmosis technology, which results in 30-70% water rejection. Where high fluoride levels, water is treated before rejection. No structured effort to systematically recycle reject water
- No maintenance of water source, as usually underground

**Energy consumption:** Depends on water quality.

**Chemicals used:** Anti-scale agent, lime (standard with Reverse Osmosis)

**Hardware recycling:** Not required so far given that all machines are far from reaching the end of their lifecycle

**Waste in production materials:** N/A

**Packaging:** N/A

## SCALABLE AND REPLICABLE?

**Requirements/ prerequisites for the project to scale:**

- Stringent processes to ensure constant water and service quality (including premises cleanliness, communication by Naandi staff), despite changes in pollution levels and large numbers of plants
- Stringent audit mechanism to match volume data and sales recorded
- Strong delivery on promotion activities and capacity to quickly adapt social marketing from geography to geography
- Large-scale grant financing from donors and/ or governments to finance equipment.

**Additional requirements/ prerequisites for the project to replicate:**

- Favorable political and regulatory environment (e.g., paying water can be otherwise questioned by politicians)
- Presence of low cost HR for most operations; maintenance managers need to be educated
- Larger villages, with electricity and water access, with no more than 100km distance between villages (to allow for a enough coverage of sales and maintenance teams)
- Presence of national technology provider to limit cost of equipment Otherwise, could be imported.

# THE PEOPLE

Manoj was born and brought up in Kerala, India. After a successful banking career in Mumbai, he knew that his true calling was in serving the poor. In 1997, he joined BASIX, a microfinance institution, where he designed and rolled out new products and approaches in Raichur – one of the poorest districts in India. For him, this experience was fundamental. He discovered who poor people are, how they make choices, and more importantly, the only reason why they would ever work with you: trust.

He then joined PLAN international, a large US NGO, before being approached in 2,000 by a group of prominent politicians and industrialists to start the Naandi Foundation on the following terms: 'we, as government, will outsource some of our most challenging tasks to you – the ones we do not know how to crack, but we have no money to start with. You will get money when you get results'.

After 10 years, the foundation had channeled US$60m of grants, to reach 6m poor, through an extended team of 4,500 regularly employed staff all over India. Naandi Water was founded as a for-profit enterprise in 2010, after over 2 years of successful pilots.

Manoj ambition is now to scale up 10 times in 3 years. He believes that the only way forward is Naandi 2.0, i.e., breaking Naandi into social businesses, which will become the implementation arms of the foundation. The foundation itself should evolve into a holding, focusing on policy and advocacy issues. In Manoj words: 'Social businesses can tap much more money and better people. We need to build a true enterprise to solve true problems.'

*Hypotheses: Exchange rate: US$1 = INR50; INR19.2 = Purchasing Power Parity $1. BoP 500-3000 classification scale of 2002 was adjusted on U.S. Consumer Purchasing Index with latest 2010 available data (ftp://ftp.bls.gov/pub/special.requests/cpi/cpiai.txt). Prices of water and family incomes were converted following Purchasing Power Parity conversion factor for private consumption (LCU per international $) 2009 (http://search.worldbank.org/data?qterm=PPP%20conversion&language=EN).*

*Sources: Interviews of Manoj Kumar (CEO Naandi Foundation), Adrien Couton (CEO Naandi Water), Nageswara Rao S. (Area Sales Officer) on 23- 24.11.2010; Visit of Gagilapur water treatment station on 24.11.2010; http://www.naandi.org/*

*Contact for the project: Adrien Couton, CEO Naandi Water (adrien.couton@naandiwater.in); Manoj Kumar, CEO Naandi Foundation (manoj@naandi.org)*

**Manoj Kumar**
Naandi Foundation CEO

Why are you doing all this?

*I needed to be true to myself. My inner voice kept repeating 'Manoj, you ought to do something else with your life'.*

What was your 'aha' moment?

*I went to study the Grameen model in Bangladesh. There, I discovered a 20-storey building, with 20k staff. That was the 'social sector' in Bangladesh! In comparison, India was terribly backward. The main reason for that? All our best people are after money and we had no revenue model to attract them.*

How are you inspiring others?

*First, I need convince young bright minds to leave what they are doing and work with me. I show them that their life can be way more meaningful, and that the price to pay is actually little. I do that through real-life stories.*

*Second, I need to convince investors, governments that we got a model that works. Once we have demonstrated that, everything else will follow. Hence the importance of seeing big since the start: if we fail, we will be forgiven. If we succeed, we will have won.*

*Third, I need to convince poor communities to work with us. To win their trust takes no less than true commitment. All the poor people out there are smarter than you and me. They exactly know what you are about.*

What are the key lessons learned?

*Charity is dead, with the exception of serving the ultra-poor and disaster response. We need more innovative investments, more human capital.*

# SARVAJAL REVERSE OSMOSIS FRANCHISE

**Sarvajal,** India
www.sarvajal.com

# EXECUTIVE SUMMARY

## ORGANIZATION:

Sarvajal ("Water for all") is a for-profit social enterprise that operates community water-filtration plants through local franchisees in mid-sized Indian villages (approximately 5,000 inhabitants).

## PROJECT:

Sarvajal was launched in 2008 and had (as of end of 2010) 120 franchises that serve over 66k people. Franchisees buy the license (US$950) and pay a monthly fee to Sarvajal, operate the kiosk and sell water to villagers in 20L containers for INR6 (US$ cents 0.6/L), while Sarvajal takes care of installation, maintenance and quality monitoring. Franchisees typically reach breakeven in 6-12 months and each serves about 110 households daily.

## INNOVATION:

- Sarvajal lowered technology costs to US$3k per machine including set up and installation allowing for full cost breakeven for Sarvajal in 4 years.
- All machines are equipped with a patent-pending two-way monitoring device "Soochak" that gives real-time information on water production and enables to anticipate service issues before they create downtime for franchisees.
- Its technology of 'plant on wheel' allows Sarvajal to protect itself against franchisees that do not repay their fees (by easily transferring the equipment). As removing the plants from the villages proved difficult however, the machines are also now moving to a new program called "Suvidha" which provides a pre-payment mechanism for franchisees - as machines only operate for the volume the franchisees have purchased upfront.

## RATING 9/16:

- Social impact: Safe water (WHO standards), tested regularly, for 66k beneficiaries, via a rapidly growing network of 120 franchises (5-11k new beneficiaries per month). Initial evidence shows positive impact, but penetration remains relatively low (30% in mature kiosks), as there is limited investment into awareness campaigns and hygiene education. Focus is mostly in larger villages so far (1,000+ households). There is no systematic usage of prepaid cards to improve compliance.
- Economic sustainability: Average client income ranges from US$30-300/month. Water expenses represent up to 1-10% of monthly budget. Pricing allows full cost recovery including capital expenditures in the long-term (25% gross margin). Looking for equity investment to accelerate expansion. Breakeven planned in 2012 at 450 franchisees.
- Scalability and replicability: Sarvajal is still working on operational issues that have constrained its scale (marketing, franchisor recruitment, payment collection), yet the rapid spread of the model is very encouraging for future scale up, given availability of capital. Replication requires locally available and affordable technology, availability of electricity and free water, a pool of literate, local entrepreneurs, a favorable regulatory framework for franchising, and sufficient population density to support plant operations.
- Environmental impact: Reverse Osmosis plants only, resulting in 30-70% reject water. Not yet found other uses for that water. Electricity needed for pumps and purifier. End-of-life machines are refurbished.

# PROJECT CURRENT STATUS

**DATE OF CREATION:** 2008

**PRODUCT/ SERVICE DELIVERED:**

Water treated at village level by Reverse Osmosis, under a franchise model creating local employment. Distribution sometimes put in place by franchisees for an additional cost.

**GEOGRAPHICAL FOCUS:**

Rural villages in Rajasthan, Uttar Pradesh, Madhya Pradesh, and Gujarat, India (1,000+ households per village).

**PARTNERS, SUPPLIERS AND FINANCING INVOLVED:**

- Partners: Acumen Fund (through Ripple Effect Program); Institute for Financial Management and Research (IFMR): conducted a survey on user perception, needs and aspirations, to help adjust marketing approach
- Suppliers: Large range of local technology providers
- Funding: All capital expenditures and overhead is equity from Piramal Enterprises, an Indian large conglomerate group.

**TECHNOLOGY USED AND INSTALLATION REQUIRED:**

Reverse osmosis machine with a controller/ monitoring device, manufactured locally, delivered on a truck as a monolithic bloc on wheels, and immediately ready to use. Sarvajal has managed to source extremely low-cost equipment, and assembles it itself to keep costs down. The machine body, for instance, is done locally, rather than purchased (typically US$500-1,500). Similarly, the tanks are extremely low cost. Max production: 84kL/week if working 24/7, constrained by electricity use and operator work time. Machine lifetime guaranteed for 6 years.

**FINANCING MECHANISMS:**

- Capital expenditures: Sarvajal purchases equipment and assembles it itself. It includes, for a machine with a capacity of 500L/ hour, 2 high energy membranes (e.g., ESPA2) (US$250 each), the machine body (US$150), tanks (US$150), pipes/ pumps with high pressure/ input/ dosing (US$1,500), and control systems such as the 'Soochak' (US$700)
- Operational expenditures: Sarvajal purchases the equipment and franchises it to the operator for a one-time fee of US$950. Sarvajal bears upfront cost of installation (US$110) and recurring costs (US$90/month/franchisee) including expenses for parts, maintenance, marketing, and business development support. Franchisee bears cost of electricity (average US$40/month), distribution, operators, and additional marketing/ awareness activities
- Revenues: Franchisees operates the machine and sells water in 20L batch for INR6 (US$0.12), keeps 100% revenues for first month, then gives back 40% of water sales to Sarvajal (he keeps 100% of delivery fees). He has a "reserved zone" of 3km radius, to ensure a minimum of clients to support the plant.

**WATER SOURCING:**

Locally available source of water, whose access is given for free by local communities.

**BUILDING/ LAND SOURCING:**

Unoccupied public building or private building from franchisee.

**GOVERNANCE/ RELATIONSHIPS WITH LOCAL AUTHORITIES:**

Little interaction.

**REGULATORY FRAMEWORK:**

Un-regulated sector for unpackaged drinking water so far. Seen as a possible risk in the future if competitors lobby for regulations that would be unfavorable to Sarvajal.

**STARTING LEVEL OF AWARENESS OF POPULATIONS IN NEED (REGARDING SAFE WATER, HYGIENE, SANITATION):**

Recognition of link health/ water, but additional awareness needed to convince people of purchasing systematically safe water.

**MARKETING:**

- Activities conducted and media used: Typically, Sarvajal works in villages where available is visibly dirty or brackish – where value-add of the treatment is most easily demonstrable. Awareness/ advertisement campaigns done by Sarvajal in new villages (within their first three months, included in upfront franchise fee) and low performing franchises, through full day event with role plays, games for kids, etc. Marketing training for franchisees every 2 months
- Value proposition: (1) Clean water is accessible right in the beneficiaries' village and (2) clean water is vital to health
- Approach to developing consumer insights: Toll free landline set up in Nov. 2010 to have direct feedback from clients
- Consumer life cycle: No specific action

- Loyalty reinforcement: For the end-user, monthly prepaid card with free container cleaning at the end of the month. For the franchisees, incentives are given on volume sold, as well as rewards on referral schemes.

## PRICING:

US$ cents 0.6/L. Computed to allow full cost recovery by Sarvajal, including capital expenditures and all other platform costs.

## STORAGE:

500L storage capacity in overhead tank (some franchisees purchase an additional 500L tank themselves). Additional storage possible in suitable 20L recipients provided by Sarvajal. Sarvajal also provides its containers for INR110 (US$2.2) to franchisees (at cost), who lend them to customers against a security deposit.

## DISTRIBUTION & DELIVERY:

120 franchisees to date, some with own last mile distribution system (truck, bike, etc.) at an additional cost to users (up to INR4, or US$0.08, per container) to cater to neighboring villages. Nearly 80% of franchisees provide home delivery to their villages.

## FRANCHISEE SELECTION:

Advertising in districts where extension is planned, due diligences in villages asking elders, existing shop owners, etc. Now trying to link up with other networks to find entrepreneurs more rapidly (large NGOs willing to enter the water sector, MFIs already doing due diligence on clients for loans and with a network of collection agents sometimes idle part of the day and thus possible interested in becoming franchisees themselves, etc.). Sarvajal has also set up a dedicated sales team whose focus is to identify franchisees. Each franchisee is given a 3km radius exclusivity.

## END-USER PAYMENT:

Daily for each 20L unit, or with prepaid 30-day cards (with a monthly free cleaning of recipients). Left to franchisee's choice.

## END-USER FINANCING: N/A

## FRANCHISEE/ ENTREPRENEUR FINANCING:

Family savings or microfinance. Not organized by Sarvajal.

## WATER QUALITY CONTROL:

Done by controlling device that reports automatically to Sarvajal Headquartersevery day, and more thoroughly every quarter at the plant with TDS meters. Cleaning solution for containers and machine provided by Sarvajal free of charge to franchisee.

# CASE STUDIES

## MAINTENANCE:

E-monitoring device on each machine counting liters, detecting technical issues, checking repairers' work through individual pin code, and communicating information directly to Sarvajal HQ. Sarvajal can also block the machine at distance, if it faces maintenance issues. The interventions of the maintenance teams will also be monitored at distance in future. Franchisee can send SMS to ask for an operator in next 48 hours. Technology is local so spare parts are easily available.

## MONITORING AND IMPACT ASSESSMENT:

Not done yet but planned for.

## AWARDS:

- Grant recipient in April 2009 of Ripple Effect, a project jointly administered by the Acumen Fund, IDEO, and the Gates Foundation to invest in innovations related to water, and to develop dispensing units (think: ATM for water) using RFID technology
- Sankalp 2010 winner (Social Enterprise Awards and Investment Forum) in Health, Water and Sanitation, Emerging Enterprise Category.

## FUTURE PLANS AND NEXT STEPS:

- Growth planned in clusters of 20-25 franchisees in contiguous areas, accompanied by one regional territory office
- Entering urban slums with RFID-based dispensing units in FY 2012
- Discussing with MFIs for potential partnerships to take advantage of synergies
- Planning a shift from service-based collection to prepaid mechanism for both consumers and franchisees, through a proprietary technology (hardware and software), still in development
- Exploring alternative options for financing its water purification machines
- Launching a US$300 water dispensing machine, for smaller villages (25 households), that works on solar

# IS THE PROJECT:

## SOLVING THE PROBLEM?

**Problem and magnitude:**

- As of 2004, there were 454k diarrheal related deaths (4.4 % of total deaths), and 15.4m diarrheal related DALYs (5.0% of total DALYs) recorded for the country
- 2008 improved water access coverage: 88%
- Up to 40% people without access to safe drinking water in operation areas

**Scale and reach:**

- 120 water plants in 2 years, 10-20 additional franchisees per month
- 66k beneficiaries
- Relatively low penetration (30% penetration on average in mature kiosks), with an average of 110 households per plant
- Average villages of 1,000+ households

**Quality of water provided:**

- 50 to 150 TDS (WHO standard)
- Water tested every quarter

**Water needs addressed:**

- Total weekly plant production: max 84kL, actual ~50kL
- Drinking and cooking needs: 10-40L/day/household, sold in 20L containers

**Link with hygiene practices, sanitation:** Hygiene not addressed beyond Sarvajal initial marketing campaigns. Sanitation not addressed. Limited education and awareness campaigns and activities

**Acceptance and usage:**

- High acceptance, on taste notably
- More education required on safe storage practices – for franchisees and users
- More education required on need for systematic safe water purchase/ use
- No systematic usage of prepaid cards to improve compliance

**Impact on health of beneficiaries:**

- Anecdotic evidence of fewer knee, dental, back and stomach problems after a month of Sarvajal water use; decrease in health expenses.
- Impact study (6 months in 2010): fewer school and work days skipped in population drinking Sarvajal water versus non-users

## ECONOMICALLY SUSTAINABLE?

**Fully loaded cost of 1L:** N/A

**Price of 1L:** US$ cent 0.6/L.

**At user level:**

- Average household income per month of beneficiary household: US$150-250 (INR7,500-12,500), equals to Purchasing Power Parity $390-651 (2009 data)
- This means that this project targets populations of the BoP 1000-1500
- Assuming 20L/day/household, water expenses therefore represent less than 4% of a BoP 500 household income
- Cost of alternative: Water bottle costs US$0.1/L
- What it would take to serve the poorest? More awareness and education.

**At franchisee level:**

- Employment: 1-4 employees/ water point (depending on delivery system), not necessarily the poorest people
- Revenues: 120 franchises with about US$400 revenues/ month (and 30% to 45% profit margin). Breakeven in 6-12 months
- Capital expenditures: Initial investment of US$950 to buy the franchise
- Minimum number of customers to breakeven before end of equipment lifetime: 625 customers for a single kiosk

**At project level:**

- Employment: 60 employees at Headquarters and regional offices, split over 4 different teams: IT and R&D, maintenance and billing, sales to franchisees, and business support to franchisees
- FY 2010 revenues: ~US$102k, with gross margin of 56%
- Cost recovery level 2010: Operational expenditures covered at 85%
- Capital expenditures: Financed up to 33% by the franchisee upfront fee. Payback period for Sarvajal typically ranging around 3-4 years, depending on franchisee's revenue sales (4 years assuming franchisee can serve 125 households daily)
- Time to breakeven: Break-even planned for mid-FY 2012 (assuming 450 franchises)

- Minimum number of kiosks for total project to breakeven before end of equipment lifetime: 450

*NB: Looking for new equity to scale up. Difficulty in accessing cheaper loans, without a recoverable and liquid asset, or a guarantee from a credit worthy or listed entity*

*NB: Numbers projected at end 2010*

## ENVIRONMENTALLY FRIENDLY?

**Water efficiency:**

- 30-70% water is rejected in the process, depending on water quality (not contaminated, but not good to drink)
- Working with University of Michigan to find ways to use reject water for public toilets or others

**Energy consumption:**

- Purification: 200W needed to power pump and purifier for 500L/h
- Transport: Monthly maintenance visit by public transport; container delivery transportation depends on franchisee.

**Chemicals used:** Anti-scalant for the membrane, chlorine to clean recipient (not toxic or environmentally dangerous).

**Hardware recycling:** Refurbishment and repair of end-of-life machines, re-tested before going back to the field. All old parts recuperated by Sarvajal.

**Waste in production materials:** N/A

**Packaging:** N/A

## SCALABLE AND REPLICABLE?

**Requirements/ prerequisites for the project to scale:**

- Upfront capital needed to buy machines and create patented controlling devices
- Fine tuning of operational details:
  1) Mechanisms to avoid bad payers/ identify faster the right entrepreneurs among local operators (so far ~60 entrepreneurs dropped out/ were withdrawn the machines because they did not want to pay)
  2) Mechanisms for maintenance and payment collection at acceptable costs (density issue)
- Higher willingness to pay for water to increase penetration
- Favorable political and regulatory environment vis-à-vis private water operators, and possibility to access water for free.

**Additional requirements/ prerequisites for the project to replicate:**

- Technology provider available locally at reasonable costs
- Free water source, easy to access; Cheap electricity
- Sufficient population density to support plant operations
- Good level of awareness on importance of safe water
- Presence of at least one literate person per village (franchisee)
- Regulatory environment allowing for a minimal protection framework for franchisors.

# THE PEOPLE

Founder and CEO Anand Shah is an American-born Indian from Houston. After graduating from Harvard College as a biologist in 1999, Anand served as the Technology Director and Teacher at the MATCH Charter school in Boston. In 2001, Anand helped found Indicorps, an NGO that he run for 6 years, encouraging young Indians around the world to participate in the development of India through grassroots initiatives and NGO capacity building.

He then started looking for models that would have dual business and social goals, as he thought those would attract and retain young talents in India. Piramal healthcare incubator hosted a first project of his on access to energy, offering village level solar stations providing electricity for fees of around US$2/months, run though a franchise model. As this endeavor was not taking off, Anand turned to the second most important topic for Rajasthan, access to water, and started Sarvajal in August 2008.

Learning from Byrraju and Naandi Foundations, his goal was to improve their model in terms of financial sustainability, enabling larger scale and impact. As of now, the model is gaining 10-20 new franchisees per month, i.e., serving an additional 60k to 180k people every year. Anand is looking for partners in regions where Sarvajal already operates as well as in new regions, to expand faster.

*Hypotheses: Exchange rate: US$1 = INR50; INR19.2 = Purchasing Power Parity $1. BoP 500-3000 classification scale of 2002 was adjusted on U.S. Consumer Purchasing Index with latest 2010 available data (ftp://ftp.bls.gov/pub/special.requests/cpi/cpiai.txt). Prices of water and family incomes were converted following Purchasing Power Parity conversion factor for private consumption (LCU per international $) 2009 (http://search.worldbank.org/data?qterm=PPP%20conversion&language=EN).*

*Sources: Visit to Sarvajal Headquarters in Ahmadabad, India, on May 17, 2010; Interview with Anand Shah, CEO, November 10, 2010, and multiple mail exchange with Anand and his team: 1) Anuj Sharma, (COO) Field Operations, MBA from Institute of Rural Management, (2) Priyanka Chopra (COO), MBA Wharton School, UPenn, 3) Jay Subramaniam, (CFO), CPA, University of Maryland, (4) Sameer Kalwani, (CTO), University of Illinois Urbana-Champaign, Field visits to 2 franchises and interviews with franchisees and clients in Kawa and Kamalbur (about 100km from Ahmadabad) on May 18, 2010; Planète d'entrepreneurs Impact assessment in October 2010; Sarvajal website visited in November 2010 (www.sarvajal.com); www.wateraid.org/international/what_we_do/where_we_work/india/ (for general data on water in India)*

*Contact people for the project: Anand Shah (CEO): anandl@sarvajal.com and Jay Subramaniam (CFO): +91 81286 60407*

**Anand Shah**
*Founder and CEO of Sarvajal*

What was your aha moment?

*I was coming back from a wedding in India with an elder Indian expatriate man who was complaining about getting sick because of the water. He said he knew how to recognize clean water but because he was leaving, he was not going to do anything about it. To me if you know the solution to a problem, you cannot complain without acting on it. So I decided to act.*

What is your vision for this project?

*I want to prove that infrastructure can work through a decentralized model. In the case of clean water, anyone should be able to access it within 25-50m from their home.*

What are the key challenges you have faced?

*1) Find entrepreneurs.*

*2) Recover money from people to whom you gave an asset, and having to take back the machine when they keep not paying*

*3) Maintain machines so dispersed geographically*

*4) Raise awareness on water to a point where people understand the need for clean water, drink it consistently and pay for it.*

What are the key lessons learnt from your model?

*Contrary to what one could think about the BoP, the poor do buy water; they want solutions not made for the poor, but quality solutions that would suit anyone; and they are not only looking to make money but also to be recognized in the community.*

*Finally, technology is not the issue to service the BoP. It is the logistic part that requires creativity... but it is doable!*

# MANILA WATER COMPANY TUBIG PARA SA BARANGAY (TPSB)

**Manila Water Company Inc.,** Philippines
www.manilawater.com

## EXECUTIVE SUMMARY

### ORGANIZATION:

The Manila Water Company Inc. is a private concessionaire regulated by the public water utility - Metropolitan Waterworks and Sewerage Systems (MWSS). It provides water and sewerage services to 6.1 million people from 23 cities and municipalities in eastern Metro Manila and Rizal Province. Manila Water is a publicly traded company whose shareholders include the public (43.0%), the Ayala Corporation (43.3%), Mitsubishi Corporation (7.0%), and the International Finance Corporation (6.7%).

# MANILA WATER

## PROJECT:

In response to the water crisis in Metro Manila in the mid-1990s, the government opened the state-owned MWSS' operations for private bidding, recognizing that the private sector may effectively improve Manila's waterworks and sewerage system. It entered into Concession Agreements in August 1997 with two concessionaires, Manila Water Company for the East Zone (1,400km$^2$ zone), and Maynilad Water Services for the west Zone (540km$^2$). Although the concession agreements did not specifically require efforts to connect poor customers, they obligated the concessionaires to aggressively expand water coverage in their zones and move towards near-universal water coverage by the end of the first decade of the concession period. In order to expand its customer base and meet its concession obligations, Manila Water launched the *"Tubig Para sa Barangay"* (TPSB) - "Water for the Community" program in 1998, with the objective of connecting communities of urban poor and slum dwellers to its service area. By adopting innovative models of service installation and payment collection, it has connected over 1.7m poor individuals (340k households) and extended 24-hour water availability to 99% of its customers in the distribution area. Manila Water also offers wastewater treatment services, with nearly 70k mainstream and TPSB households connected to a sewer line as of 2010.

## INNOVATION:

- Pro-poor strategy: When Manila Water took over its concession area, it adopted the goal of connecting and providing high-quality service to informal settlements as a central component of business plan. This strategy emerged from its obligations under the service concession agreement.
- Land titles, connection fee payments, and billing & collection: Primary barriers to providing poor communities access to water were: marginalized residents' lack of legal titles over the land they occupied, their inability to pay connection fees upfront, and the sheer difficulty of installing connections and collecting payments in informal settlements. The TPSB program has addressed these obstacles in an integrated manner, by working with the local government to ease land title requirements, implementing staggered connection fee payments and cost-sharing strategies such as collective metering, and adopting clustered or street-metering approaches in informal areas.
- Community outreach and involvement: Community members are consulted and involved at key stages of the process so that they take ownership of their connections, contribute to the financing, and become interested in maintaining them over time. Customer interaction records are maintained and inquiries or service requests are received through a 24-hour hotline. To ensure the durability of TPSB customer base, Manila Water has also formed business partnerships with community-based cooperatives that manufacture board-ups and meter protectors for the water supply chain. Manila Water also launched livelihood programs, so that communities were not only able to pay their bills, but also felt like they needed to protect their connections from illegal tampering, etc.

## RATING

- Social impact: As part of the overall concession contract, dramatic increase of coverage of population with access to 24/7 piped, safe water in large quantities. From 1997, coverage improved from 26% to 99%. Water availability increased from 16h to 24h/day. Water losses decreased from 63% to 11%. Water quality improved also significantly: water samples collected have been 100% compliant with the Philippine National Standards for Drinking Water. As of end 2010, Manila Water covered 1.7m marginalized customers under the TPSB program.
- Economic sustainability: Overall concession is economically sustainable. Sales of water cover for necessary investments into the network. In 2010, increase in connection allowed for an increase in billed volume of 3.5% over 2009. In turn, revenues grew by 16% and net income by 23%.
- Scalability and replicability: Potential for further scale of the TPSB in areas with lower coverage within East Manila, and beyond through Manila Water subsidiaries (e.g., Boracay, Laguna). Replication would require equally conducive governance and contractual arrangements, availability of financial and physical resources for expansion of water supply and wastewater treatment facilities, and availability of subsidies and other funding mechanisms to support connections for the poorest individuals.
- Environmental impact: Positive developments, with investments into wastewater facilities, significant reduction in system losses and various energy and operational efficiency initiatives underway. Manila Water has been awarded by FinanceAsia as among Asia's Greenest Companies, and the Philippines' Greenest Company.

# PROJECT CURRENT STATUS

**DATE OF CREATION:** 1998

**PRODUCT/ SERVICE DELIVERED:**

Clean water piped directly to households (drinking and more). Water is provided through 3 different schemes, which poor households can choose from:

- Individual metered connection, specific to a household
- Collective metered connection, which serves 2-5 households, which are responsible as a group for paying the connection charge and monthly bills. The families sharing the mother meter may opt to install individual sub-meters, with one household acting as the leader, collecting payment and remitting of payment to the concessionaire
- A community-managed water connection, with nominated individuals paid by Manila Water to administer collection. This creates local employment, keeps costs low, and ensures high collection rates).

**POSITIONING OF PRODUCT:**

24/7 availability, affordability.

**GEOGRAPHICAL FOCUS:**

Urban poor areas and informal settlements within the East Zone of the service area in Metro Manila.

**COMPETITIVE LANDSCAPE:**

Bottled water retails for PHP15 per L (US$0.34 per L) and filling stations sell treated water in 5-gallon containers at PHP2.11 per L (US$0.05 per L) versus PHP0.025 per L (US$ cents 0.06) with Manila Water.

**PARTNERS, SUPPLIERS AND FINANCING INVOLVED:**

- MWSS (Metropolitan Water Works and Sewerage System): Cooperates with Manila Water in monitoring water levels at supply source, planning and developing future sources of water supply
- Barangay (sub-municipal government) officials: support in easing land title requirements; approval in water connections; approval in fee reductions or waivers; provision of free construction labor
- Beneficiary community: consulted in the selection of connection schemes and bill collection arrangements; assistance in monitoring and maintaining systems and preventing pilfering, especially in low-income neighborhoods
- World Bank Global Partnership for Output-Based Aid (GPOBA): The World Bank provided a US$2.8m grant in 2007 to support individual connections for up to 20k low-income households. Over 11k households have benefited from this scheme as of 2010, selected among the poorest customers of the TPSB. This subsidy is remitted directly to Manila Water as a single payment conditional on the independent verification of three months of satisfactory service delivery
- Asian Development Bank (ADB): In the period May-August 2006, ADB granted US$100k to cover connection fees for 4 communities, with a 3-year pay-back period for the beneficiaries.

**TECHNOLOGY AND INSTALLATION:**

Technology used in piping water to customers includes: High-Density Polyethylene and steel pipes, small-diameter and large-diameter valves, brass and galvanized iron fittings, bolts and nuts, bollards, board-ups, pumps, motors, water meters, and generator sets. To connect a poor neighborhood, an underground line is laid to carry water to the perimeter of the neighborhood, and is then extended above ground partially covered, attached to a wall or lying on the surface and connecting to a battery of meters from where homeowners make their own connections. The concentration of meters in one publicly visible spot deters illegal connections.

**FINANCING MECHANISMS:**

The major sources of revenue for Manila Water are water services (82%), sewer/ environmental services (16%), and other income (2%). The TPSB program costs are typically shared between Manila Water, municipalities and communities, although the communities typically remit payments post-completion, leaving Manila Water to bear the bulk of initial capital expenditures. For the 2004-2009 period, the company allocated US$352m for TPSB capital expenditures, funded directly from operations and borrowing. The community component of the financing typically represents the cost of bringing water from central metering points to individual households, although both Manila Water and local governments offer financing mechanisms to reach as many homes as possible.

# MANILA WATER

## WATER SOURCING AND TREATMENT:

Water supply for Manila is sourced from the Angat-Ipo-La Mesa Dam Raw Water System north of the city and treated in the Balara Treatment Plant. Water treatment consists of four processes: coagulation/ flocculation, sedimentation, filtration and disinfection.

## BUILDING/ LAND SOURCING AND INSTITUTIONAL ARRANGEMENTS:

As a concessionaire, Manila Water is granted the right to the use and usufruct of MWSS assets, including buildings and land, provided that the service targets in the Concession Agreement continue to be met. The company is expected to use these assets, commit to maintaining them in reasonably good condition, and return them to MWSS at the end of the concession period.

## GOVERNANCE/ RELATIONSHIPS WITH LOCAL AUTHORITIES:

Manila Water forms partnerships with local authorities of local neighborhoods/ municipalities wherein it provides infrastructure installation while the municipal government provides permit fee reductions or waivers, small subsidies, or construction labor (together with the communities) in order to reduce costs. Specific obligations under these partnerships are negotiated for each community or municipality and are defined and formalized in Memoranda of Agreement. Breakdowns of how system installation costs are to be shared between Manila Water, local governments and the community are also decided through these agreements, as are local arrangements to land title issues and requirements, as well as specific waivers for document requirements for water connection (such as proof of land ownership).

# CASE STUDIES

## REGULATORY FRAMEWORK:

Manila Water operates a concession since 1997, which was extended until 2037. The concession agreement sets 23 operational targets, including but not limited to: increased water and sewer coverage, 24-hour supply, reduction of non-revenue water and compliance with water quality and environmental standards. As part of the enforcement of these targets, Manila Water was required to post a US$60 million performance bond, which may be withdrawn by the government for non-compliance. The government agencies that monitor Manila Water's performance are:

- The MWSS Regulatory Office that monitors Manila Water's compliance with its service obligations and approves tariff decisions (rate reviews are performed every 5 years)
- The Philippine Department of Health monitors compliance with the requirements of the Philippine National Standards for Drinking Water
- The Philippine Department of Environment and Natural Resources regulates wastewater effluent based on national pollution control standards
- The Philippine Laguna Lake Development Authority, which monitors and regulates wastewater effluents discharging directly and indirectly into Laguna Lake, grants water abstraction rights for surface water sources around the lake, issues clearances for all relevant locators located within the Laguna Lake basin.

## LEVEL AND DEPTH OF AWARENESS OF POPULATIONS IN NEED (REGARDING SAFE WATER, HYGIENE, AND SANITATION):

There is awareness of the benefits of clean water across the population, but awareness among low-income and low-education populations of sewerage and sanitation issues is relatively low.

## MARKETING:

- Activities: Manila Water implements a comprehensive program of community relations, which involves deploying staff to the city's poor neighborhoods to explain the investment that the company is making in improving service levels and water quality and to educate community members on the dangers of illegal tampering with the network
- Value proposition to the customer: affordable and reliable, round-the-clock access to piped water from an operator
- Approach to developing consumer insights: Manila Water regularly engages communities in public consultations (about 80 per year) to discuss user issues and concerns. It also carries out an annual Community Water Partners Day during which up to 80% of employees are deployed to various communities to conduct on-site verification of water-related concerns
- How does it realize a loyal consumer relationship: Manila Water maintains consumer interaction records. It also makes itself accessible through a 24-hour hotline and operates eight Business Areas to cater to issues from walk-in customers. In addition, customers are also invited to undergo the "Lakbayan" or a Water Trail Tour, a free, half day tour of Manila Water's facilities to gain a better appreciation of the company's services and advocacies.

## PRICING:

Under the concession agreement, Manila Water is entitled to recoup all of its capital and operating expenditures as well as its cost of capital and cost of debt through a market-based rate of return. Total charges consist of the:

- Water Charge, which is composed of the basic charge and the Foreign Currency Differential Adjustment (FCDA). The Basic Charge covers the cost of operating, maintaining, improving and expanding the distribution network and facilities. The FCDA is a revenue neutral mechanism to allow the company to recover/ (refund) the losses/ (gains) due to the fluctuations of the Philippine Peso against other countries' currencies for the foreign currency denominated loans
- Environmental Charge, consisting of 18% of the Water Charge, and which is added for the mitigation of environmental impacts in the course of water conveyance, treatment and distribution
- Sewer Charge of 10% for customers classified as small business and 30% for as commercial/ industrial ones, which tap into the main sewer line
- Maintenance Service Charge ranging from US$0.02-0.07 covers the maintenance of the water meter
- 12% VAT on the total of the charges.

Manila Water charges its customers in accordance with a tariff schedule. There is a sliding tariff scale (9 bands for residential customers), starting with a flat rate per connection:

  - 1st band (0-10$m^3$) is PHP72.45 (US$1.67)/connection (inclusive of 40% discount), if monthly consumption <10$m^3$; and PHP89.25 (US$2.06)/connection if monthly consumption >10$m^3$
  - 2nd band (10-20$m^3$) is PHP10.89 (US$0.25)/$m^3$
  - 3rd band (20-40$m^3$) is PHP20.65 (US$0.48)/$m^3$.

# MANILA WATER

## PARTNERS' SELECTION:

Partnerships with community-based cooperatives that manufacture materials such as board-ups and meter protectors for the water supply chain.

## HOME DELIVERY:

24/7 delivery to 99% of connections (within the distribution area).

## END-USER PAYMENT:

Each connection is billed monthly, with payments accepted through various channels (banks, payment centers, retail shops) for convenience. Overall bill recovery rate is reportedly at 99%. Payment is either done by the connected household, by the leader of the group of few households sharing a collective meter, or a Manila Water administrator for community master meters.

## END-USER FINANCING:

Flexible financing options offered include collective metering and staggered payments for connection fees. Manila Water offers subsidies of up to two thirds of the connection fee. Since 2007, TPSB-GPOBA subsidies have also been available to qualified customers. Beneficiaries are selected through a two-step process: Manila Water works with local government officials and community leaders to identify groups in need, and the local government unit head must certify that the majority of households in that community fall under the poverty line for the National Capital Region. The subsidy aims to bring down the cost of water connection by covering the connection fee of PHP2,372 (US$55). The remainder of the connection charge, consisting of the meter deposit and guarantee deposit (amounting to PHP600 or US$14), is paid by the beneficiary (in installments, if preferred).

## MAINTENANCE:

Manila Water staff oversees the day-to-day operations and maintenance of the storage and conveyance facilities and of the main distribution network. In informal areas where land ownership is a problem, bulk metering and cost-sharing programs help enforce self-monitoring through collective responsibility. The community also assigns individuals to administer monitoring and maintenance (as well as collection).

## WATER QUALITY CONTROL:

An average of 917 samples are collected monthly at private and public taps and tested in Manila Water's ISO 17025: 2005-accredited Laboratory Services Department against more than 50 physical, chemical and bacteriological parameters for safety and potability.

## MONITORING AND IMPACT MEASUREMENT:

Manila Water's performance is reviewed by the MWSS Regulatory Office in accordance with the concession agreement. The key performance categories are network quality, water quality, and risk of communicable diseases, service quality and coverage.

## FUTURE PLANS AND NEXT STEPS:

- In 2009, Manila Water's application for a 15-year renewal of its concession agreement with the MWSS was approved, extending the concession term to 2037
- PHP200 billion (US$4.6 billion) has been allotted for capital investment until 2037
- Efforts will be focused on expanding sewerage services and coverage (through combined sewerage-drainage systems) in the coming years with the goal of achieving 100% coverage within Manila Water service area by 2037
- Expanding operations outside Metro Manila will drive future growth. Manila Water has acquired two subsidiary companies, the Laguna AAA Water Company in Sta. Rosa near the capital and the Boracay Island Water Company in one of the country's premier tourist destinations, which have begun operations in September 2009 and January 2010 respectively. Manila Water has also signed partnership agreements with the REE Corporation and the Mitsubishi Corporation for prospective projects in Vietnam and with the OP Jindal Group for projects in India.

# IS THE PROJECT:

## SOLVING THE PROBLEM?

**Problem and magnitude:**

- As of 2008, there were 10k diarrhea-related deaths (2% of total deaths) and 393k diarrhea-related DALYs (3% of total DALYs) recorded for the country
- 2008 total improved water access coverage: 91%
- Before intervention:
  - Less than two-thirds of the population had a water connection. Sewerage services were available to just 8%
  - Water availability averaged 16h/day
  - Deteriorated lines and the proliferation of illegal connections resulted in 63% water system losses
  - Water quality between 1994 and 1996 was below national standards due to operational inefficiency and under-investment in network rehabilitation
- After intervention:
  - 1% of customers still without 24h/day water availability
  - Water system losses reduced to approximately 11%
  - Average pressure: 17 psi

**Scale and reach:**

- Over 1.1m connections as of end 2010, with about 340k social connections by the TPSB program (1.7 million low-income individuals)
- Wastewater treatment services to nearly 70k mainstream and TPSB households connected to a sewer line as of 2010
- Billed volume grew from 440m L/day in 1997 to 1.14 b L/day in 2010

**Quality of water provided:** Water samples, collected monthly at private and public taps, are tested in Manila Water's ISO/IEC17025: 2005-certified laboratory, and have exceeded the Philippine Department of Health bacteriological compliance standard of 100% for several years. This had a direct, positive impact on people's health

**Safe water needs addressed:**

- 1,200L/day consumed on average per regular residential household
- Poor households consume an estimated 300L/day/household, on average

**Link with hygiene practices, sanitation and wastewater management:**

- From 1997 to 2010, Manila Water increased its wastewater treatment capacity from 40m L/day to 135m and expanded the East Zone's sewerage area from 3% to 16%. Today, Manila Water operates 36 sewage and septage treatment plants. These initiatives are essential towards contributing to the revival of the Pasig, Marikina and San Juan rivers. Manila Water has been awarded by Finance Asia as among Asia's Greenest Companies, and the Philippines' Greenest Company
- However, implementation of wastewater management targets from the concession agreement has been difficult because of lack of available land for proposed treatment facilities, limited experience on the part of the concessionaire in sewerage provision, and resistance from the public and local governments to the disruption expected when retrofitting sewerage
- Most households not connected to a sewer network are dependent on septic tanks which are designed to require emptying and cleaning every five years. To such households Manila Water offers assistance through the *"Sanitasyon Para sa Barangay"* (i.e. "Sanitation for the Community") program, providing free septic tank de-sludging and cleaning services. Manila Water coordinates with local governments to deliver services on a scheduled basis per community. Any Manila Water customer may avail of the services on the condition that water bills have been paid. In 2010, the company cleaned 58,221 septic tanks and treated and disposed of 203,595$m^3$ of septage
- Manila Water's *"Lingap"* program has installed drinking fountains and washing facilities in 174 public schools, 22 government hospitals and orphanages, 19 city jails and 658 market stalls in order to promote good hygiene and proper hand washing practices

**Acceptance and usage:** For the 3rd year in a row, high satisfaction ratings from the Public Assessment of Water Services survey

**Impact on health of beneficiaries:** Reports from the Philippine Department of Health show that diarrhea cases per 1,000 people in TPSB communities have gone down by nearly 80%

**Other impact:** Time saved from not queuing anymore at public standpipes

# MANILA WATER

## ECONOMICALLY SUSTAINABLE?

**Fully loaded cost of 1L, incl. subsidies:** N/A

**Price of 1L:** US$ cents 0.017/L if consumption is lower than 10m$^3$/month/household (i.e., less than 67L/day/person). US$ cents 0.03 if consumption of 38m$^3$/month/household (current residential average)

**At user level:**

- Average household income per month for target beneficiaries: US$191 (PHP8,250), equals to Purchasing Power Parity $304 (2009 data)
- This means that this project targets population of the BoP 500-1000
- Assuming a monthly water bill of about US$1.5 (i.e., 9m$^3$/month/household), water expenses therefore represent about 1% of the income of a BoP 500 household
- Cost of alternative to customer: vendors sell at PHP2.11 per L (US$0.05 per L)
- What it would take to reach the poorest: cost-adjustment strategies such as subsidized tariffs

**At partners' level:** Manila Water livelihood program has generated over US$500k in new jobs, benefiting 850 families over the last several years

**At Manila Water level:**

- PHP9.6b (US$221m) invested in laying and rehabilitation of mains, increased water treatment capacity (+45% growth over 2009), and increased water supply capacity (+13% increase over 2009)
- Revenues: PHP11b (US$253m), 16% growth over previous year
- Net income: PHP4b (US$92 m), 23% growth over 2009
- Total costs and expenses (ex. depreciation and amortization) at 32% of revenues (PHP3.5b, US$81m)

*NB: End 2010 figures unless indicated otherwise*

## ENVIRONMENTALLY FRIENDLY?

**Water efficiency:** System losses have been reduced from all-time high of 63% in 1997 to an all-time low of 11% in 2010, helping minimize extraction of raw water supply

**Energy consumption:**

- Annual power consumption of system facilities is approximately 175 kilowatt-hours per million liters
- Energy efficiency projects include: pump refurbishments, equipment improvements, power factor adjustments and Time-of-Use programs

**Chemicals used:** Chlorine applied at three points: pre-chlorination for taste and odor removal, intermediate-chlorination for filter aid and post-chlorination for disinfection.

## SCALABLE AND REPLICABLE?

**Requirements/ prerequisites for the project to scale:** Maintenance of efficient operations and financial sustainability to ensure the continuity and consistency of service

**Additional requirements/ prerequisites for the project to replicate:**

- Conducive governance and contractual arrangements
- Availability of financial and physical resources for expansion of water supply and wastewater treatment facilities
- Prospective beneficiary communities are well-organized and willing to cooperate with the connection and billing process
- Subsidies and other funding mechanisms to support connections for the poorest individuals.

# THE PEOPLE

**Gerardo C. Ablaza Jr.**
*CEO, Manila Water Company*

Why is inclusive business so important to Manila Water?

*We cannot fulfill our mission of providing universal access to water without including people at the base of the pyramid. In the Philippines, the base of the pyramid makes up 90% of the population. Serving this population is essential to our current level of 99% uninterrupted water service coverage in Manila's East Zone.*

What types of support do you need from other organizations for your BoP activities?

*Research and development is always helpful to create insightful, consumer-focused programs and products in these dynamic times and markets. Financing is critical to developing inclusive businesses, as there are still many untapped opportunities at the BoP.*

What were key lessons learned?

*Before planning your business model, closely study your customers from the way they think to the way they live. This will help you understand their needs and create products and services that are truly relevant to them. Also, remember that innovation isn't purely technical. You have to consider social and political complexities.*

What are your future plans?

*Looking ahead beyond water connections, the need for water sanitation and wastewater treatment has become increasingly important. All of Metro Manila's major river systems are now biologically dead, and are major sources of water-borne diseases. We are working on connecting all households to a sewer line or to our combined sewer-drainage system.*

*Another opportunity is to expand the base of the pyramid initiative beyond Manila's East Zone. Very often, marginalized communities outside Manila spend more money for poorer quality water because they are beyond our distribution system's reach.*

*Source: Interview based on report of International Finance Corporation, Inclusive Business Solutions: Expanding opportunity and access at the Base Of the Pyramid, 2010*

*Hypothesis: PHP43.2 = US$1; PHP27.1 = Purchasing Power Parity$1. BoP 500-3000 classification scale of 2002 was adjusted on U.S. Consumer Purchasing Index with latest 2010 available data (ftp://ftp.bls.gov/pub/special.requests/cpi/cpiai.txt). Prices of water and family incomes were converted following Purchasing Power Parity conversion factor for private consumption (LCU per international $) 2009 (http://search.worldbank.org/data?qterm=PPP%20conversion&language=EN).*

*Source: Meeting with Mr. Gerry Ablaza, CEO of Manila Water Company on 14 January 2011; Exchanges with Lia Marie Guerrero; Manila Water Company 2009 Annual Report; Manila Water Company 2009 Sustainability Report; International Finance Corporation, Inclusive Business Solutions: Expanding opportunity and access at the Base Of the Pyramid, 2010; Asian Development Bank Water for All, Bringing Water to the Poor , 2004; Asian Development Bank, Country Water Action: Philippines Manila Water Successfully Reduces Water Losses Using Multipronged Strategy, 2006; Asian Development Bank, Country Water Action: Philippines Water and Small Pipes: What a Slum Wants, What a Slum Needs, 2007; www.manilawater.com*

*Contact for the project: Lia Marie A. Guerrero, Stakeholder Relations and Brand Manager (lia.guerrero@manilawater.com)*

# SDE SUSTAINABILITY OF A PRO-POOR APPROACH VIA EFFICIENCY GAINS

**Sénégalaise des Eaux/ Finagestion,** Senegal
www.sde.sn

## EXECUTIVE SUMMARY:

### ORGANIZATION:

Sénégalaise des Eaux (SDE) is a privately-owned company (57% Finagestion, 33% Senegalese investors, 5% Government, 5% employees) that manages, since 1996, water production, treatment and distribution for Dakar and 56 main cities of Senegal. Sanitation is not part of SDE contract, as it is provided for by ONAS (Office National d'Assainissement du Sénégal). The contract is structured as a leasing contract ("affermage") between SDE and the public asset-holding company, SONES (Société Nationale des Eaux du Sénégal). The initial contract was extended in 2006 for 5 years. It features strong financial incentives to reduce leakage and improve coverage, as well as billing and collection efficiency.

**SDE contract**

The SDE leasing contract differs from a concession, under which the operator invests in and runs the system in exchange for 100 % of water revenues.

The SDE fee is based on volumes sold at an average cost-plus tariff (weighed by volumes in different tariff categories) multiplied by the volume produced.

The amount to be paid by SDE to SONES is the total billed amount, minus SDE's fee adjusted for technical and commercial efficiency targets.

# CASE STUDIES

## PROJECT:

SDE increased access to urban poor through 2 main schemes:

1. "Social Connection" program, which consists in subsidized connections. From 1995 until 2010, 154k new social connections were effected under this program. For the financing, SONES negotiates and earmarks soft loans from aid agencies (AFD, World Bank, KFW, BEI, BOAD, etc.) and private banks under favorable conditions (2% to 7% p.a. over 10 to 15 years). Each time funding is made available SDE advertises and executes a campaign, and invoices SONES back at the price of an ordinary connection. Demand has regularly been exceeding offer. 15k social connections per year are planned for the period 2010-2012.
2. Standpipes program: SDE partners with NGOs to mobilize the community around new standpipe installations and establish water councils. SDE is also responsible for billing the bulk sold at the standpipe. The standpipe is managed by a local entrepreneur chosen by the community. These operators buy in bulk from SDE and in turn charge their customers at a subsidized tariff. Standpipes programs are financed by the Government -via SONES- with donor soft loans. Alternatively, in few cases, financing can come from NGOs or the communities themselves (up to 25% in cash and/ or labor). SDE is in charge of 4000 standpipes through that scheme.

## INNOVATION:

- Incentives: as SDE is remunerated for water sold, it has a positive incentive to add more customers, including those who are poor. In addition, as SDE is paid on the basis of water supplied at a rate that is not directly a function of the type of customer serviced, it remains somewhat "blind" to the tariff each customer actually pays. Hence, there is no 'disincentive' to serve the poor.
- Even service conditions for the poor: Poor neighborhoods used to be hit by shortages more severely than the more affluent ones. Although SDE had no contractual obligation to do so, it opted to distribute evenly the supply deficit among wealthy and poor neighborhoods. By doing so, it established a strong reputation of customer service at no major expense from the wealthy dwellers, as many of them had reservoirs and pumps.
- Strong efficiency focus: SDE volume growth comes at the expense of a diminished profitability by $m^3$ sold (as new social customers tend to benefit from social tariffs). As a result, SDE financial sustainability can only be maintained via significant and continuous efficiency gains. SDE response is their Total Quality Management commitment (ISO 14,000, QSR certifications), which translated into important operational excellence projects (e.g., state-of-the-art electronic leak detection and computerized billing systems).

## RATING:

- Social impact: SDE provides safe water to about 5 of a total of 12 million Senegalese. It provides water (connection or standpipes) to 98% of the population within its perimeter (leaving about 100k people without improved water access to date). Out of these 5 million, 1.5 million are poor urban dwellers who did not have water connections before 1996, and about 600k only have stand pipe access. Quality of water and service levels also improved dramatically over the contract period.
- Economic sustainability: Both SDE and SONES have financially sustainable operations, and sales of water cover for necessary investments into the network. However, this balance seems fragile, namely with regard to: a) investment needed to address water shortages in Dakar; b) need to revisit tariff scale to continue cross-subsidizing the social tariff.
- Scalability and replicability: Although the SDE model has proven its scalability, SDE has limited potential for scale left, given current coverage of 98%. The plans to cover the remaining households without water access are mostly dependent on the availability of funding for new social connections. Replication in other geographies would mostly require a similar governance and contractual framework, which could possibly lead to the same alignment of incentives. Such contractual arrangements have the advantage of being implementable in countries where the utility regulatory framework is not yet fully in place (as it is not necessary to establish any independent regulator before the model can be implemented). Professional management, ready and able to introduce a Total Quality Management approach is a key element as well.
- Environmental impact: SDE water yields are over 80%. Energy efficiency needs to be significantly improved, in order to reduce dependency on electric power, or gasoil in case of shortages. An energy savings plan is in the works (with estimated US$2m savings since 2007).

# PROJECT CURRENT STATUS

**DATE OF CREATION:** 1996

**PRODUCT/ SERVICE DELIVERED:**

Delivery of safe water through affordable home connections (social connection program). Private connections represent 95% of the total billed volume, standpipes distributing the remaining 5%.

**GEOGRAPHICAL FOCUS:**

Dakar and 56 main cities of Senegal.

**COMPETITIVE LANDSCAPE:**

In areas still not covered by SDE, the population continues to rely on private water vendors.

**PARTNERS, SUPPLIERS AND FINANCING INVOLVED:**

- Partners for social connections: 3rd parties (generally SMEs) conduct the works required for social connections (digging and leveling work)
- Partners for standpipes: SDE collaborates with NGOs to facilitate the installation and management of standpipes. For instance, ENDA-Tiers Monde provided for 500 of the 4,000 standpipes within the SDE perimeter. This set up allows for faster expansion of the network, while reducing the risk of non-collection of bills thanks to NGOs intermediation
- Infrastructure owner and developer: SONES had a mandate to manage strategic development, long-term planning, and oversight of the sector. SONES revenue is dependent on SDE performance, which it monitors
- Other key players include ONAS (Office National de l'Assainissement) in charge of sanitation, and the Ministry of Hydraulic Infrastructure in charge of the rural water sector
- Financing: Capital expenditures investments (US$308m in total) are financed by soft loans from donor agencies (World Bank, AFD, KFW, BEI, BOAD, etc.) and private loans (Citibank, Bank of West Africa).

**TECHNOLOGY USED AND INSTALLATION REQUIRED:**

The water provided by SDE is treated by coagulation, precipitation, filtration, chlorination and pH balancing. The pipes used in lower-income districts tend to be smaller (15 mm) hence cheaper.

**SOURCE OF REVENUES:**

Sales of water. In 2010, households consumed 70% of the total SDE volume and were responsible for little more than 50% of SDE sales. Among households, the social tariff band represented 54% in volume and less than 25% in value.

**GOVERNANCE/ RELATIONSHIPS WITH LOCAL AUTHORITIES:**

Regulated in the contract.

# CASE STUDIES

## ADMINISTRATIVE REQUIREMENTS:

Paperwork and criteria to obtain a social connection have been reduced to a minimum. Geography, i.e., living in a poor neighborhood, is the sole eligibility criteria. There is no need to provide land/home ownership certificate. Rather, local urbanism services can easily deliver an "occupation permit" to proof residency in the area. SDE provides for a free economic and technical appraisal when connecting new areas.

## LEVEL AND DEPTH OF AWARENESS OF POPULATIONS IN NEED (REGARDING SAFE WATER, HYGIENE, SANITATION):

Difficult to evaluate. However, years of combined social marketing efforts by Government and NGOs did certainly play a role in the fact that a vast majority of urban dwellers, including recent rural migrants, view connection to piped water as an "aspirational" service.

## MARKETING:

- Social marketing activities are mainly supported by SONES and NGOs
- Approaches to developing consumer insights and loyalty:
  - Pre-launch of operations: Ability-to-pay surveys prior to installation of standpipes or connection of a social neighborhood
  - Launch of operations: Launch events for newly managed standpipes as well as for social connection campaigns
  - After-sales: Free hotline
- Value proposition: Quality of water, high service standards, accessibility and affordability
- Approach to develop consumer insights: Regular interaction with community leaders, and customer satisfaction surveys.

## PRICING:

- Water tariffs are set by the Government. These fuel 4 revenue streams: the "Utility" share (SDE), the "Patrimony" share (SONES), the "Sanitation" share (ONAS) and the "Government" share (VAT and Hydraulic tax). Tariffs were gradually increased until 2003, when SONES and SDE reached economic balance. No increase since, but for the exception of public administration tariffs, which seem over-stressed given the increase in delayed payments
- Tariff scale depending on user category and volumes consumed. Household tariffs consist of 3 bands: social (CFA190/$m^3$ or US$ cents 40/$m^3$ for the first 10$m^3$), regular (CFA630/$m^3$ or US$1.3/$m^3$ for volumes 10-20$m^3$) and dissuasive (CFA790/$m^3$ or US$1.6/$m^3$ for volumes >20$m^3$)
- SDE bulk price at standpipe of CFA322/$m^3$ (US$ cents 67/$m^3$). Licensed operators are supposed to re-sell the water at a recommended price of CFA375 (US$ cents 75/$m^3$) (about twice higher than the social tariff for private connections). In practice, price at standpipes hovers around CFA625/$m^3$ (US$1.3)
- Connection costs are covered by SONES. The price of the connection hovers around US$170-325, depending on distance from the grid. However, a deposit of US$29 is required from the household, which is used in case of non-payment of the bills.

## STORAGE:

SDE helps clients to make proper use of "roof tanks", a common practice, by encouraging regular cleaning. Cleaning of containers used at standpipes is the users' responsibility.

## END-USER PAYMENT:

Bills can be paid at the district SDE counters or via bank transfer every other month. Mobile counters for fee collection and customer service are also available. In case of non-payment SDE can block the connection and access the deposit after 2-3 months of outstanding payment. There is a penalty of US$14.6 for reopening a connection. Bills recovery rate is 97.5% (above contract target).

## END-USER FINANCING:

SDE offers their 'regular' customers to pay their connection in 2-3 installments. 'Social' connections are fully subsidized, with the exception of the deposit.

## MAINTENANCE:

Managed by SDE teams that cover urban and peri-urban areas alike. SDE has introduced state-of-the-art electronic leak detection to facilitate early intervention.

## WATER QUALITY CONTROL:

The contract sets quality targets: 96% microbiological conformity and 95% physical-chemical conformity. In the frame of the SDE TQM approach, a Water Quality Committee reviews performance weekly.

## FUTURE PLANS AND NEXT STEPS:

SDE plan is to install over 30k social connections and 400 new public standpipes over the period 2010-2012. With 10 people serviced per social connection and 150 per standpipe, this amounts to 400k urban dwellers. Current contract ending in 2012, SDE will decide on preparing next public tender where sanitation could be included. In addition, SDE is preparing together with SONES an investment plan to address capacity shortages and infiltration risks in Dakar peri-urban flooded areas.

# IS THE PROJECT:

## SOLVING THE PROBLEM?

**Problem and magnitude:**

- As of 2008, there were 6,500 diarrheal related deaths (6% of total deaths), and 217k diarrheal related DALYs (5.7% of total DALYs) recorded for the country
- Total drinking water coverage was 69% in 2008
- Prior 1996: There were up to 32% water losses in Dakar's water network. Intermittent supply (16 hours per day on average), and pressure variations resulted in poor water quality

**Scale and reach:**

- To date, 5 million SDE clients
- Between 1996 and 2010, there were 272k new connections, out of which 154k social connections
- 2010 coverage: 98%, out of which 11% through standpipes (vs. 64% prior to 1996)
- Growth of operations: 10k to 15k new social connections per year
- Performance indicators: Yield of network of 80.5% and collection rate of 98.3%. 92,5% of customer complaints answered within the contractual time frame

**Quality of water provided:** Water quality objectives are 96.9% microbiological conformity. 2010 results: 99,2% bacteriological conformity

**Safe water needs addressed:** Connected households consume about 55L/day/person (drinking, cooking, washing)

**Link with hygiene, sanitation and wastewater management:** SDE does not take a proactive role on hygiene education issues. SONAS provides for sanitation services

**Acceptance and usage:** Taste and flow well accepted. Last customer satisfaction studies revealed high scores and continuous improvement on almost all counts. Discontinuity in services, due to the current power shortage, is the main area for improvement

**Impact on health or other aspects of the life of beneficiaries:** Not monitored

# CASE STUDIES

## ECONOMICALLY SUSTAINABLE?

**Cost of connection:** Average cost is approximately CFA71K (US$148) for a 5m long ordinary connection, plus about US$22 margin for SDE, bringing the total bill to US$170. In the case of a social connection, this cost is borne by SONES

**Price of connection:** Up to 5m from the house, free of charge for social connections (US$170 for ordinary connections). Between 5 and 10m, social customers pay US$2.6 per meter. Most social connections require 5m or less. Beyond 10m, SDE will ask neighbors to regroup and share the grid extension cost

**Cost of 1L to SDE:** US$ cents 0.12

**Price of 1L (average for households including tax):** US$ cents 0.08

- Social tariff: US$ cents 0.04/L for first 10m$^3$/month (no VAT, no municipal tax apply)
- Normal tariff: US$ cents 0.13/L for consumption between 10-20m$^3$ (no VAT applies)
- Dissuasive tariff: US$ cents 0.16/L for consumption over 20m$^3$
- Standpipes: US$ cents 0.075-0.13/L

**At user level:**

- Average household income per month of beneficiary household: US$130 (CFA62,400), equals to Purchasing Power Parity $203 (2009 data)
- This means that this project targets populations of the BoP 500 (assuming 10 people per household)
- Assuming a consumption of 550L/day/household (for a household of 10 people), average bill would amount US$12.45 (or about 4% of a BoP 500 household's income)
- However, standpipe users pay more than the social tariff even though they are probably poorer. Increasing block tariffs may also be problematic in cases of large families or families that share a single connection
- What would it take to reach the poorest: Expansion of the Social Connection program (with SONES funding). Revisiting of standpipes tariffs

**At standpipe operator level:**

- 1 person employed per standpipe
- SDE water cost: US$ cents 0.067/L
- Standpipe retail price: US$ cents 0.13/L
- Actual margin/m$^3$: US$ cents 63
- Average volume sold/month: 85m$^3$
- Gross monthly profit: US$54

**At SDE level:**

- 2010 revenues: US$137m
- 2010 royalties to SONES and ONAS: 53m
- 2010 profits: US$5.5m
- In addition, SDE is setting up a number of cost cutting measures, including: E-reading of meters; E-payment (SMS) being tested in partnership with Société Générale; Pre-payment system being studied in 5 SDE branches

*NB: End 2010 figures unless indicated otherwise.*

## ENVIRONMENTALLY FRIENDLY?

**Water efficiency:**

- 19.5% water losses (improved from 32% in 1996)
- Proprietary state-of-the-art electronic water leakage detection system, allowing for early detection and intervention
- SDE has developed communication programs to encourage water savings. Programs, which are run with the support of UN Habitat, managed to save as much as 6,000m$^3$ daily, i.e., 2% of the total SDE volume. New project being discussed with donors

**Wastewater management:** Not part of the contract

**Energy consumption:** Energy efficiency needs to be significantly improved, in order to reduce dependency on electric power or gasoil (in case of electricity shortages). Initial energy savings plan is in the works (with estimated US$2m savings since 2007)

**Chemicals used:** Chlorine, lime, aluminum sulfate and calcium hypochlorite used at treatment plant

## SCALABLE AND REPLICABLE?

**Requirements for the project to scale sustainably:**

- Further availability of soft loans to finance social connections
- Extension of perimeter within contract
- Revision of tariffs or cross-subsidies regime: current tariffs will not support significant investments needed to address the water shortage issue in 2014

**Requirements for the project to replicate:**

- Highly committed management, ready to implement Total Quality Management system
- Appropriate contractual incentives and governance arrangements
- Replicability is being tried through the World Bank in other countries (Niger, Nepal and Sri Lanka)

# THE PEOPLE

Mamadou Dia was born in Northern Senegal from a farmers' family.

Early on, he decided for a career in water. He served in the public water sector for 34 years in almost every region of the country. He eventually became the "Operations Director" of the former SONEES.

In 1996, he was made Deputy General Manager of SDE, and became General Manager in 2006.

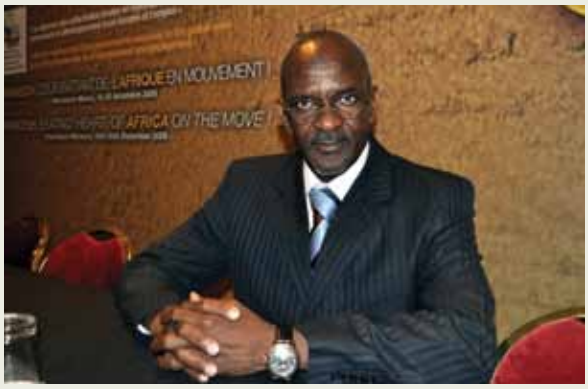
Today, Mr. Dia is a world-renowned expert on water access in developing countries. For instance, he is the President of the African Water Association of Utilities, and the President of the Senegalese Association of Standards.

Mr. Dia graduated from HEC School of Management, Paris.

*Hypothesis: CFA480 = US$1; CFA307.1 = Purchasing Power Parity$1. BoP 500-3000 classification scale of 2002 was adjusted on U.S. Consumer Purchasing Index with latest 2010 available data (ftp://ftp.bls.gov/pub/special.requests/cpi/cpiai.txt). Prices of water and family incomes were converted following Purchasing Power Parity conversion factor for private consumption (LCU per international $) 2009 (http://search.worldbank.org/data?qterm=PPP%20conversion&language=EN).*

*Sources: Project visits in 28-29 October 2010 and 2-4 February 2011. Various interviews over the period with SDE Director: Mamadou Dia, Managing Director; Aladji Dieng, Technology ; Abdul Ball, Operations; Cheikh Fall, Communication; Waly Ndour, Sales and Marketing; M. Gnigne, Maintenance. Interview with M. Ngningue, (Ministry for Hydraulic Infrastructure; World Bank Water Supply and Sanitation Sector Board Discussion Paper Series, Jan 2004*

*Contact for the SDE Project: Mamadou Dia, Managing Director, SDE (mdaa@sde.sn), Aladji Dieng, Technical Director, SDE (aladji@sde.sn), Cheikh Fall, Communication Director (cfall@sde.sn), Abdoul Ball, Operations Director, (aball@sde.sn)*




**Mamadou Dia**
*General Manager, SDE*

Why are you doing all this?

*We should treat people equally. Access to water is a human right. We have carried on what SONEES had started with free connections. We have eliminated other barriers such as the cost of technical studies for new connections.*

What was your aha moment?

*This goes back to the time I was working for the national public utility. As it was tolerated that the poor did not pay their bills, they were also the ones that got most of the water shortages. When SDE took over, we implemented a "Democratic Water Shortage Management Approach": no neighborhood should remain 24 hours without water and no neighborhood should be guaranteed 24 hours supply. If the poor were to pay their bills as the wealthy, they also became entitled to equal treatment in terms of service quality.*

How are you inspiring others?

*Since 1996, we adopted a wholly different approach with our team: everyone was trained in Participative Change Management. We institutionalized rewards for performance, started a regular and participatory dialogue with employees on performance and objectives. Employees are also encouraged to participate in a company-wide brainstorming, called "Ecoute Collaborateur".*

What were key challenges on the way?

*The main challenge is the renewal of the contract on December 2012. The tender conditions are not yet known. But the Senegalese Water sector will face important challenges in terms of water supply. Further technological innovations will have to be put in place to keep costs low.*

What were key lessons learned?

*Total Quality Management was essential in improving significantly our operations. We are now invited to help replicate this approach in countries such DRC, Burkina Faso, Guinea or Madagascar.*

# SUEZ ENVIRONNEMENT WATER FOR ALL

**Suez Environnement – PALYJA,** Indonesia
www.suez-environnement.com

## EXECUTIVE SUMMARY

### ORGANIZATION:

PT PAM Lyonnaise Jaya (PALYJA) is the Indonesian subsidiary of Suez Environnement (owned 51% by Suez Environnement and 49% by Astratel Nusantara). It has a concession contract with the DKI Jakarta, the local government-owned water utility, to supply water to west Jakarta, from 1998 till 2023. PALYJA is remunerated on the basis of volumes sold, independently from tariffs, incentivizing the company to increase sales across geographies and segments.

### PROJECT:

The Water for All Program is improving access to treated water in low-income areas through alternative funding and collaborations for network expansion. It actually consists of 3 different schemes:

1. Since 2008 - World Bank Output-Based-Aid program (GPOBA): Subsidies to connecting a target of 6,500 poor households to the city water network. Targeting small pockets of poor households or communities located within larger areas that were already serviced by PALYJA (i.e., only tertiary network required, while overall supply was sufficient). Initially DKI Jakarta's spatial planning policy criterion excluded all slums communities. Hence only 1 pilot is being run in a slum, and will be potentially replicated if successful.

# SUEZ ENVIRONNEMENT (PALYJA)

2. Since 2008 - Water Kiosks: A water Kiosk consists of a clean water reservoir (capacity of 5m$^3$) and collective taps designed to serve up to 150 households in areas without access to piped water. It is located on private land; facilities are owned by PALYJA but managed by the owner of the private land on which the Kiosk is built. These local partners are selected following an assessment based on multiple criteria such as land availability, land accessibility, distance to the network, quality of underground water, etc. Clean water is delivered to the Kiosks by trucks 3x/week and the population buys water directly at the Kiosk from the local community operator. Transparency in terms of prices and earnings is a major improvement from the practices of water vendors. PALYJA built 11 water Kiosks, out of the 49 official Kiosks under its management. There are in Jakarta, however, many more similar Kiosks, informal and privately managed.
3. Since 2009 - Master Meters: In areas with access to piped water but the informal settlements not yet allowed by local regulation to get access to individual house connections, water connections are provided to communities with the financial and operational assistance of NGOs. These communities build their own tertiary networks, connected to a PALYJA master water meter located outside the settlement. Hence, PALYJA is in charge of upstream provision, while the downstream network is the responsibility of the community, organized by partner NGOs into Community Based Organizations (CBO). The tariffs are set by the CBO and include the operations & maintenance cost of the provider. In addition, CBOs are in charge of mobilizing the communities, managing the billing and coordinating network maintenance.

## INNOVATION:

- Multiple social connection and financing schemes, available depending on the proximity of piped network, income level of beneficiaries, and legality of land tenure/ neighborhoods (e.g., informal settlements are also covered through special authorizations, or modular schemes whereby the community owns the last mile of pipes).
- Approach to professionalize and include the informal sector usually present in the downstream business (both through water Kiosks and master meters). Potential solutions include: provision of related business opportunities for those affected, such as management of public lavatories or new hydrants in a nearby area. For instance, while connecting a slum area in northern Jakarta as part of the GPOBA, PALYJA proposed to collaborate with a local leader and "hydrants" owner, as they were put partially out of business.
- Close relationship with authorities to steer project: joint identification of project areas; re-negotiation of investment schedule, etc.
- Strong community outreach component: This includes partnerships with NGOs to promote the project; awareness campaigns with new customers on their rights and obligations; establishment of community focus groups to encourage female participation in the project. For instance, on the GPOBA, Mercy Corps assisted PALYJA to develop community profiles, through focus group discussions.

## RATING:

- Social impact: Project reached important scale in terms of low-income and social households coverage (over 60k beneficiaries), including 413 households in informal slums (GPOBA pilot), as well as an additional 96 households in semi-informal areas (through Master Meters). Diversified and modular offer to these populations, ranging from new/ better managed Kiosks, master meters and individual subsidized connections, allowing penetrating these neighborhoods with more tailored solutions. While quantity of water has increased significantly (for master meters and home connections), the quality of water remained as high as before. However, while hygiene topics are covered through partnership campaigns with NGOs, sanitation is not part of the contract.
- Economic sustainability: The capital expenditures for social connections are 100% subsidized by donors and Palyja. Price tariffs only allow recovering between 15 to 50% of the cost of water (for all projects), leading to heavy cross-subsidization across geographies and income-levels of populations. The water Kiosks are not sustainable financially, but were required by the Governor of Jakarta as a small-scale, temporary solutions in un-connected areas.
- Scalability and replicability: The 'modular' approach to proposing services to communities has allowed this project to address more diversified needs of the population. It is however limited by the fact that public authorities have only allowed home water connections in informal settlements on an exceptional and small scale basis. The needs in grant funding to cover capital expenditures may also hinder future scale-up plans.
- Environmental impact: Water efficiency has improved from over 59% of water losses in 1998 to 43% in 2010, across the concession area. However, wastewater management is not part of the contract.

# PROJECT CURRENT STATUS

## DATE OF CREATION:

2008 (actual start of Water for All projects)

## PRODUCT/ SERVICE DELIVERED:

Subsidized connections (individual and collective) to the water network. No provision of sanitation services.

## GEOGRAPHICAL FOCUS:

Slums and poor legalized areas of western Jakarta.

## COMPETITIVE LANDSCAPE:

As the underground water is contaminated with sea infiltration, there are not many alternatives. Therefore people buy their clean water from ambulatory vendors or at Kiosks not managed by PALYJA at a price of US$3.7-7.5/$m^3$ (25-70 times more than PALYJA's current tariffs). The eastern part of Jakarta is managed through an agreement between DKI Jakarta and Aetra (previously Thames).

## PARTNERS, SUPPLIERS, RETAILERS AND FUNDERS INVOLVED:

- Funding: World Bank for GPOBA. Total program cost: US$2.6 m; USAID finances ESP and Mercy Corps
- Partners: NGOs ESP and Mercy Corps (Master Meter program, GPOBA).

## WATER PRODUCTION, TREATMENT AND DELIVERY:

62% of the total volumes are produced by PALYJA. 30% is purchased as non-treated bulk water, and the remaining comes from local resources.

## EQUIPMENT:

- For GPOBA, same equipment as regular customers, i.e., individual connections with meters.
- For Water Kiosks, water distributed via a tank supplied by trucks, no individual meters.
- For Master Meter, individual connection to a local distribution network (property of the community, managed by the community) with individual meters. The distribution of water in the network is ensured by gravitation (usage of a roof tank). There is no data available on the lifetime of these connections.

## SOURCE OF REVENUES:

- Sales of water: Tariff scale whereby low income households pay between US$0.12-0.18/$m^3$ of water. For the Master Meter and the Water Kiosk, these tariffs are considerably higher to include network maintenance costs or transportation costs, which come at the charge of the communities/CBO that own the installation (in contrast with GPOBA connections, where the maintenance cost is borne by Palyja)
- Individual connection: Connection prices differ by tariff class: very low-income customers (<28$m^2$ habitation) pay US$70, and low-income customers (<70$m^2$ habitation) pay US$105. For the GPOBA, these connection fees are subsidized up to 96%, resulting in about US$13 remaining contribution per household. This contrasts with a cost of US$340 to PALYJA (including cost of pipes, connection and meter)
- Master Meter connection: Price of US$28 on average.

## GOVERNANCE/ RELATIONSHIPS WITH LOCAL AUTHORITIES:

Concession contract with DKI Jakarta. Contract includes financial penalties for non-respect of operational performance indicators (technical targets in terms of losses, new connections and coverage), as well as service standard targets (quality of water/ pressure provided, customer care, etc.).

## REGULATORY FRAMEWORK:

Only land tax payers ('PBB' status) are entitled to get a connection to PALYJA's network and regularization of illegal squatters never took place in Jakarta. However, in order to connect the informal settlement of Muara Baru as part of GPOBA (413 households), PALYJA got an exemption from Jakarta's government on the requirement of legal ownership for them to be able to access a public water connection. However, none of these habitations were regularized.

## LEVEL AND DEPTH OF AWARENESS OF POPULATIONS IN NEED (REGARDING SAFE WATER, HYGIENE, SANITATION):

Very low, especially on topics such as hygiene and sanitation. The cooperation with Mercy Corps on the GPOBA was aimed at increasing the awareness of targeted populations on these issues.

# SUEZ ENVIRONNEMENT (PALYJA)

## MARKETING:

- Activities conducted and media used: Socialization and sensitization activities before starting any neighborhood connections (meetings, events, door-to-door). For GPOBA social connections, PALYJA has to ensure upfront that at least 50% of potential beneficiaries are willing and able to pay
- Value proposition: Affordability, reliability and convenience
- Approach to developing consumer insights on ability and willingness to pay: Surveys in partnerships with Mercy Corps
- Consumer lifecycle: The population targeted with these projects is intended to become part of PALYJA's regular customers. For Master Meters, PALYJA deals with a single customer which represents the CBO. For the Water Kiosk, users are not registered with PALYJA as they directly purchase the water for the Kiosk
- Loyalty reinforcement mechanisms: None

## PRICING:

Tariff scale for household connections based on home surface, regulated by DKI Jakarta, which remained constant for the past 4 years. However, the tariff paid by beneficiaries sometimes differ from the regulation as it needs to include additional charges, such as network maintenance (Master Meters) or transportation costs for delivery (Water Kiosks).

| GPOBA (social and low income customers) | Master Meter | Water Kiosk |
|---|---|---|
| 0.12 US$/$m^3$ (up to 20$m^3$) to 0.18 US$/$m^3$ (>20$m^3$) | 0.43 US$/$m^3$ (includes maintenance of network, bill collection, etc.) | From 2 to 2.5 US$/$m^3$ (depending on usage of water delivery services) |

## END-USER PAYMENT:

Monthly billing for connected households. Upon use, at the Kiosks. In order to ensure appropriate pricing at the Kiosk, visible panels at the entrance of the Kiosk are mandatory. These panels clearly show the price of water sold by PALYJA to the Kiosk and the price of the water available at the Kiosk for consumers. Thus, the latter are well aware of the financial mechanism. Moreover, a Memorandum of Understanding, clarifying the water price, is signed with the Kiosk manager.

# CASE STUDIES

## END-USER FINANCING:

- GPOBA: PALYJA is responsible for the uptake and pre-financing of the project (over period of up to 3 years) until output delivery (reimbursement of World Bank – 75% upon connection, 25% upon payment of 3 consecutive bills with water consumption of >10m$^3$/month; penalties in case of low uptake of the scheme). Connections are subsidized up to 87% of the connection fee for low-income households and 98% for very low-income ones. End users pay their share (US$13 for low-income households, and US$1.1 for very low income households), in 12 monthly installments
- Master Meters: Cost-sharing program, whereby PALYJA invests US$17k for infrastructure development (for 3 master meters), and communities contribute with the purchase of individual meters, electricity connection and provision of cleaning equipment for a total US$28 per household. Project costs are recovered in installments
- Water Kiosks: PALYJA invested approximately US$4k per new water Kiosks. Bulk water is sold to the Kiosk at US$0.35/m$^3$, and end users pay for use.

## LOCAL COMMUNITIES FINANCING:

For the Master Meter, PALYJA finances all installations up to the meter. Downstream investments are mainly funded by NGOs and small contributions from the communities.

## MAINTENANCE:

- GPOBA: The maintenance is part of a regular maintenance scheme
- Master Meter: The maintenance is done by PALYJA up to the meter, and done by the community after the meter
- Water Kiosk: As facilities are owned by PALYJA, maintenance is handled by PALYJA's Kiosks management team.

## WATER QUALITY CONTROL:

There are no dedicated water quality controls on these projects. However, proper quality control is ensured at the level of the concession, on a regular basis, with many samples analyzed in PALYJA and external labs.

## MONITORING AND IMPACT MEASUREMENT:

No dedicated monitoring and impact measurement survey. However, GPOBA customers are included in a annual customer's satisfaction survey, done by TNS Sofres.

## FUTURE PLANS AND NEXT STEPS:

Possible replication of these projects at a larger scale, with alternative funding such as the GPOBA

# SUEZ ENVIRONNEMENT (PALYJA)

## IS THE PROJECT:

### SOLVING THE PROBLEM?

**Problem and magnitude:**

- As of 2004, there were 32k diarrheal related deaths (1.6% of total deaths), and 1m diarrheal related DALYs (1.9% of total DALYs) recorded for the country
- 2008 improved water access coverage: 80%
- From 1998 up to today, the total service coverage ratio increased from 34 to 64% (3m people out of the 4.5m in west Jakarta). Continuity of service has also improved significantly
- Only 10k poor households and 1k very poor households were connected before the project

**Scale and reach:**

- Total number beneficiaries: From Feb 98 till end 2009, approximately 62k beneficiaries, out of which 5042 households through GPOBA, 7'200 households through 49 water Kiosks, with an additional 59 planned by 2012, and 96 households in total (through 3 master meters)
- In the target project areas, increase of coverage from 0% to 50-70%
- Profile of beneficiaries:
  - GPOBA: poor = house of <70m$^2$ who can display some proof of tax payment to local authorities; very poor = house of <28m$^2$
  - Water Kiosks: Communities located far away from the distribution network with low quality of underground water
  - Master Meter: Semi-informal settlements located in areas with low quality of groundwater. As PALYJA only provides water up to the master meter and downstream networks are not property/ responsibility of PALYJA, DKI regulations are respected

**Quality of water provided:** Clean water in line with Indonesian regulation. Prior to the water Kiosks, the source of water was unknown and not subject to any quality control. For the GPOBA and Master Meter, prior to the project, people could only rely on contaminated groundwater

**Safe water needs addressed:** Quantity of water used passed from an estimated 20 to 40L a day to 300L/day or even 430L for master meter's beneficiary households. No data available on consumption at water Kiosks

**Link with hygiene practices, sanitation and wastewater management:** The link with hygiene is done through socialization events but deeper behavior change is undertaken with the support of NGOs such as Mercy Corps or ESP

**Compliance, acceptance and usage:**

- Success of the GPOBA project is measured at 2 levels: physical connection itself and average water consumption
- Impact on health of beneficiaries: Health impact is not yet measured

**Other impact:** Other impact (time freed, economic benefits) not yet measured

### ECONOMICALLY SUSTAINABLE?

**Operational expenditures/m$^3$** (based on billed volumes and not produced volumes; accounts for cost of bulk treated water, maintenance and billing costs):

- Water Kiosk: US$1/m$^3$, or US$0.47/m$^3$. It is more expensive than standard water tariffs due to cost of transport of water to the Kiosk
- Master meter: US$0.53/m$^3$ (identical to standard tariff, as operations and maintenance post-meter is ensured by the community)
- GPOBA: US$0.53/m$^3$ (identical to standard tariff)

**Price of 1L:**

- GPOBA: US$ cents 0.012-0.018/L
- Master meter: US$ cents 0.043/L
- Water Kiosk: US$ cents 0.2/L at the Kiosk, US$ cents 0.25/L if home delivery by pushcart (compared to US$ cents 0.37-0.75/L previously)

**At user level:**

- Average household income per month of beneficiary household: US$50-150 (IDR450k-1350k), equals to Purchasing Power Parity $84-251 (2009 data)
- This means that this project targets populations of the BoP 500-1000
- Assuming 300L/day/household and US$ cents 0.012/L, water expenses therefore represent less than 1% of income of a BoP 500 GPOBA household; assuming 430L/day and US$ cents 0.043/L, water expenses represent less than 4% of the income of a BoP household in the case of master meters. No data available for households relying on a Kiosk for their daily water
- What it would take to reach the poorest: Additional subsidies, alternative financing schemes and higher involvement of local governments

**At Water Kiosk level:**

- Number of people employed by water Kiosk: 1 or 2, depending on the water Kiosk manager
- Level of revenues: Purchase of water from PALYJA at US$ cents 0.035/L
- Monthly profit: 150 US$/month, 50% above Indonesian minimum revenue

**At utility level:**

- Overall: Full cost recovery concession, with the exception of selected subsidies
- GPOBA:
  - Revenues: US$0.12-0.39/$m^3$ (IDR 1,050-3,550)
  - Capital expenditures: Pre-financing of US$2.6 m over period up to 3 years
  - Set up costs of program estimated at US$250k in total
- Water Kiosks:
  - Revenues: 0.39/$m^3$
  - Capital expenditures: US$4k for each of the 11 water Kiosks
- Master Meter:
  - Revenues: US$0.39/$m^3$
  - Capital expenditures: US$17K for 3 master meters

*NB: Numbers projected at end 2010 unless specified otherwise*


## ENVIRONMENTALLY FRIENDLY?

**Water efficiency:**

Connecting these settlements contribute to the reduction of water losses. For the case of the Master Meter, a 4% reduction in water losses was achieved due to close monitoring of the network by the CBO. Across the concession territory, water losses were reduced from over 59% in 1998 to 43% today

**Wastewater management**: No

**Water resource management:** Indirectly, as heavy taxation on deep wells introduced since the start of the project is enticing deep well owners (depleting the water tables) to connect to the grid instead. But that does not concern the operation areas of the social connections project

**Energy consumption:** Not determined for these projects

**Chemicals used:** No particular chemical used on these projects

## SCALABLE AND REPLICABLE?

**Requirements/ prerequisites for the project to scale:**

- Continued positive relationships with local water authority and government
- Regularization schemes to allow connections in informal settlements, or from households not able to produce the required paperwork
- Increase in production capacity
- Availability of subsidies for connection fees

**Additional requirements/ prerequisites for the project to replicate:**

- Governance framework allowing for close relationship with local (water) authority
- Strong municipal support to run pilots and extend them to the informal slum areas
- Availability of subsidies/financing schemes to cover cost of connection
- Sufficient and reliable water volumes produced
- Ability to productively engage with local water vendors active in the slums

# SUEZ ENVIRONNEMENT (PALYJA)

## THE PEOPLE

Philippe graduated in Hydraulic & Environmental Engineering and in Business Administration in France. He started his career in French Guyana dealing with shrimp farming and in Reunion Island as environmental engineer. He then went back to Europe to work for HR Wallingford (consultancy specializing in civil engineering hydraulics and water environment) and ADS Environmental Services (company specialized in flow monitoring technology, equipment and turnkey environmental services).

In 1996, he joined the water business division of the Suez Group, where he worked successively for Lyonnaise des Eaux and Ondeo, and for the Contract team in Puerto Rico and the Caribbean region. In 2004 he joined PALYJA in Jakarta, as Contract & Planning Manager and was appointed in 2008 as President Director. Philippe is now 47 years old, married and father of three daughters.

The GPOBA was the trigger for the establishment of a 'Water for All' team in Jakarta.

Future plans include: completion of phase II of GPOBA, and replication of the Water for All project elsewhere in town. But for this, as Philippe says: "We need to convince the city authorities and find more donors to subsidize capital expenditures and connection costs".

*Hypothesis: IDR9,000 = US$1; IDR5,375.9 = Purchasing Power Parity $1. BoP 500-3000 classification scale of 2002 was adjusted on U.S. Consumer Purchasing Index with latest 2010 available data (ftp://ftp.bls.gov/pub/special.requests/cpi/cpiai.txt). Prices of water and family incomes were converted following Purchasing Power Parity conversion factor for private consumption (LCU per international $) 2009 (http://search.worldbank.org/data?qterm=PPP%20conversion&language=EN).*

*Source: Interviews with Philippe Folliasson on 3.12.2010, 20.12.2010 and 10.02.2011. Additional exchanges with Vincent Fournier through January, February and March 2011; WB OBA approaches November 2010, Note Number 38, Output-Based Aid in Indonesia (www.GPOBA.org); PALYJA Water for ALL Programs abstract note and poster; www.PALYJA.co.id*

*Contact for the Project: Philippe FOLLIASSON, President Directeur (Philippe.Folliasson@PALYJA.co.id); Vincent Fournier, Technical Support Department Head, previously GPOBA manager (Vincent.Fournier@PALYJA.co.id)*

**Philippe Folliasson**, *Managing Director of PALYJA*, with Water for All team: **Nirmala Hailinawati, Irma Damayanti and Vincent Fournier** (from left to right)

Why are you doing all this?

*Bringing to the population of Jakarta the "essentials of life" is what motivates me. Today, there is still one inhabitant in three with no access to water, or access to expensive, unsafe water provided by local vendors. In addition, our services will help ensure that large businesses stop relying on their own deep wells, which put the long term water sustainability of Jakarta at stake.*

What was your aha moment?

*For me, it is whenever I manage to go to those low-income areas, and discuss with the beneficiaries on how access to water improved their living conditions, notably for women.*

How are you inspiring others?

*There were a lot of frustrating moments indeed. But the stakes were so high that we never dropped it. The project is also so various and challenging that motivating the team was never an issue.*

What are key challenges on the way?

*To successfully continue its work PAYJA needs:*

- *additional water resources as soon as possible*
- *more investment at a stable pace*
- *develop awareness of the city administration on access to piped water, including low-income families*

What were key lessons learned?

*Patience, "sabar" in Bahasa Indonesian, is the key to success. Ability to listen and understand needs from the various stakeholders is also very important.*

# VEOLIA ENVIRONNEMENT SOCIAL CONNECTIONS PROGRAM

**Veolia Environnement (Redal and Amendis),** Morocco

www.veolia.com/en/

## EXECUTIVE SUMMARY

### ORGANIZATION:

Veolia Environnement is a world leader in environmental services. It operates in four complementary segments: water, waste management, energy services and passenger transportation. In Morocco, Veolia Environnement operates through 2 subsidiaries for water: Amendis (in Tetouan and Tangiers) and Redal (in Rabat), since 2002. The estimated perimeter for water distribution is constituted of 605k inhabitants in Tetouan, 929k in Tangier, and 2.024m in Rabat in 2011. In all three cities, water infrastructure needs to be expanded, given the major influx of rural migrants into town. These contracts cover provision of water, sanitation and electricity while water production mostly remains with the national water company (ONEP).

### PROJECT:

As part of each delegated management contract, Veolia started the following program dedicated to improving access to water and sanitation:

1. The 'Social Connections Program" was initiated in 2002 and aims at connecting both informal suburbs and poorer households that remained unconnected within regular areas, to the water and sanitation networks. The perimeter and resources dedicated to this initiative were further formalized in 3 distinct agreements in 2005 and 2006, following King Mohammed VI's decision to launch the "National Initiative for Human Development (INDH)". The target is to connect 85k poorer households to the

water and sanitation networks in the areas around Rabat, Tangier and Tetouan within 5 years. This represents about 12% of the total target perimeter coverage for water distribution set in the delegated management contracts. In addition, the program introduced facilitated payment terms (up to approximately half/two thirds of the costs) for the poorest households within the perimeter. Subsidies and cross-subsidies for this program are channeled through a revolving fund (e.g., in Tangiers), set to collect the $260m still necessary to achieve the program's target across all 3 geographies.

2. This program is completed by the service offering 'Saqayti' stand posts pilot ("my fountain" in Arabic) initiated in 2006, in those areas where inhabitants cannot be immediately connected (for technical reasons). Saqayti stand posts were developed to propose alternatives to existing stand posts, which are freely accessible. They consist in automated stand posts delivering safe water continuously to nearby inhabitants through a system of prepaid chip cards (hence avoiding that outside enterprises and individuals pick up water, leading to wastage and longer queues). Access to and utilization of these stand posts is individual and restricted to target households owning this card. The municipalities decided to pay and credit, each month, the equivalent of 40L/day/person (e.g., in Rabat-Sale), on the cards of these users, to ensure access for basic water needs. The cards are credited each month by the municipalities with the equivalent of 40L/day. Beyond this volume, users need to re-credit their cards. The role of Veolia is to propose to replace existing stand posts with Saqayti ones, wherever requested by Veolia counterparts (who are water and sanitation authorities and the owners of free-access stand posts). Today, out of the 845 stand posts in use on its perimeter, 18 are Saqayti.

## INNOVATION:

- Customer-centric approach: Creation of dedicated social marketing teams, trained to interact with populations in need and working in partnership with local associations to do territory mapping, surveys on ability and willingness to pay, program marketing, and stakeholder relationships, using sociological surveys and approaches. These also support clients in submitting their application, as well as solve issues post-connection. Veolia also introduced mobile agencies visiting suburbs at set times to offer subscription, billing and other services. In contrast with what Veolia may do in its mainstream contracts, it sought to develop a strong expertise to go and identify clients, understand them, develop and propose appropriate solutions. Starting from this understanding, Veolia developed tailored administrative, juridical, marketing, financial approaches.
- Financial engineering to bridge the gap between total costs and ability/willingness to pay of beneficiaries. This includes: pre-financing of works by a fund managed by Veolia Environment on behalf of delegating authorities; establishment of a revolving fund (mostly financed by municipalities, Veolia Environnement, and the delegating authority), allowing for cross-subsidization of taxes and tariffs; financing of exemptions of connection taxes for selected households; output-based aid grant financing from the World Bank and Veolia subsidiaries. This fund also finances a 0% interest loan scheme for applicants to repay the connection cost over 3 to 10 years. The whole scheme was engineered backwards, starting from willingness and ability to pay from customers.
- Active stakeholder management: Bi-weekly Monitoring Committee meetings and field visits with public/ local authorities and program partners to coordinate activities, address bottlenecks and evolve/ adapt solutions. Stakeholder management is also very extensive at the level of the communities, as the Veolia teams reach out to neighborhood committees, developers, urban development offices, social services, etc. in order to ensure that the whole 'eco-system' is moving forward.
- Facilitated administrative requirements for new connections: Together with the local authorities, Veolia helped streamline the procedure to submit administrative paperwork and request a connection. For instance, it set up mobile 'single counters', whose role is to providing information about the process, find administrative solutions, and constitute the files on-situ by taking pictures of the documents and buildings.
- Organizational set up: The social connection teams are fully integrated into the mainstream organization, rather than operating at the periphery of it. The teams include a significant amount of women, who tend to be more successful at promoting water connections, not only to other women, but also at bringing issues such as hygiene, children care, etc.
- For the Saqayti Stand posts' pilot, the use of chip cards brings a number of virtuous effects: a) improved safety and convenience for the households that have authorized access to the stand post (vs. open access previously); b) less water wastage for beneficiary households who now are better aware of their consumption levels; c) savings and facilitated allocation of subsidies for public authorities which credit an initial few cubic meters every month.

# CASE STUDIES

## RATING:

- Social impact: The social connection program has provided 70k households with water and sanitation connections in 3 cities of Morocco, out of a total target of 85k. 85k households represent about 12% of the total target perimeter set in the concession contracts for water. Sanitation is an integral part of any household connection. In addition, 752 households were provided privileged access to automated stand posts (Saqayti). In terms of health, there is demonstrated positive impact in newly connected informal areas of Tangiers (in terms of mycoses, child diarrhea and conjunctivitis). However, there is no demonstrated health impact for households who gained a home connection, while they previously had already access to a stand post and in many cases to home sanitation. However, for these households, many other positive effects were recorded otherwise, such as time savings, social integration, and overall wellbeing. The latter is also true for Saqayti users.
- Economic sustainability: Overall, the revolving fund covers the investments necessary to the social connection program. Cross-subsidies have been established to finance the social and low-volume tariff tranches.
- Scalability and replicability: The social connection program was accelerated thanks to the National Initiative for Human Development, and Veolia's financial contributions. Further scale and replication will be limited by the availability of subsidies. Administrative and legal hurdles were lifted, thanks to the political decision (framed in the National Initiative for Human Development) to regularize all informal areas. Henceforth, only neighborhoods located in dangerous areas (e.g., easily flooded), which are to be relocated, could not apply to the social connection program. For the latter, Veolia developed the Saqayti stand posts, whose uptake will depend on actual demand from the local water and sanitation authorities, as well as the owners of existing stand posts.
- Environmental impact: Within the framework of the GPOBA, a World Bank environment audit scored the program operations as very good. At their request, a procedure was set up for inhabitants to make grievances related to environmental issues. No one has so far made use of the latter. In terms of water and energy efficiency, no specific improvement measures reported.

# PROJECT CURRENT STATUS

## DATE OF CREATION:

2002 for social connections (and 2006 for Saqayti stand posts)

## PRODUCT/ SERVICE DELIVERED:

Individual water and sanitation connections, and automated stand posts

## GEOGRAPHICAL FOCUS:

Urban centers of Rabat-Salé, Tangiers and Tetouan (Morocco) consisting of about 30 municipalities. Program targets informal settlements in suburbs, and pockets of poorer households in areas already connected to the network.

## COMPETITIVE LANDSCAPE:

Public water fountains free of access, wells

## PARTNERS, SUPPLIERS, RETAILERS AND FUNDERS INVOLVED:

- Partners: Moroccan government and local municipalities with regards to: objectives and launch of social connection programs, connection application requirements, and more broadly supervision of the delegated management contract and decision on taxes and tariffs (connection price, water tariff through stand posts, prepaid credits through stand posts)
- Funders: Since 2002, funds for the social connection program were provided for by Veolia Environnement and public authorities. Since 2006, Veolia also contributed indirectly to the program financing by foregoing its monitoring and control fees. Since 2007, World Bank GPOBA (Global Partnership for Output Based Aid) granted US$2m to subsidize about 20% of the total investment costs related to connections of 3k of the poorest households in informal suburbs. In addition, municipalities finance basic water supply at Saqayti stand posts, as well as free supply at other public fountains
- Supplier: ONEP is the national water company (less than 2% of the water distributed on the perimeter is produced by Veolia Environment).

## TECHNOLOGY USED AND INSTALLATION REQUIRED:

Public authorities requested that standards for social connections were the same as for other connections in the city. New networks are generally over-dimensioned to actually accommodate future new inflows of inhabitants in this newly connected area. Yet cost reductions were made possible through digging only one trench for both water and sanitation networks.

## SOURCE OF REVENUES:

As defined in the delegated management contract - balancing water sales and operational expenses.

## WATER SOURCING AND INSTITUTIONAL ARRANGEMENTS:

The water is produced and treated by ONEP, which sources it from various dams. Veolia purchases treated water in bulk from ONEP at a price of 4.34/ $m^3$ (incl. taxes) (US$0.52) in Rabat and MAD2.85 (US$0.34) in Tangiers and Tetouan.

## BUILDING/ LAND SOURCING AND INSTITUTIONAL ARRANGEMENTS:

Following the authorizations to connect informal neighborhoods (formalized in the National Initiative for Human Development), Veolia collaborates with the public authorities to connect new neighborhoods: Veolia first proposes a connection plan, to be approved by the municipality. Households within the area can then get a residency certificate from the neighborhood official representative and obtain all necessary papers from the city offices. Filing the application is then also facilitated by Veolia, through its mobile agency teams and local partner associations. Once connected to water, these households are de facto considered as official residents.

## GOVERNANCE/ RELATIONSHIPS WITH LOCAL AUTHORITIES:

Close collaboration through bi-weekly Monitoring Committee meetings with public/ local authorities and program partners to coordinate activities and address bottlenecks, combined with regular field visits to ascertain land, eligibility or technical issues.

## REGULATORY FRAMEWORK:

Veolia operates under 3 delegated management contracts of 25 years each for Tangier and Tetouan, and 27 years for Rabat. The contract states that 100% coverage should be achieved by the end of the contract.

## LEVEL AND DEPTH OF AWARENESS OF POPULATIONS IN NEED (REGARDING SAFE WATER, HYGIENE, SANITATION): Low

# CASE STUDIES

## MARKETING:

- Activities conducted: Target households are informed about the social connection program through Veolia teams and local authorities. For Saqayti stand posts, Veolia and the municipal authorities, in collaboration with local associations, identify priority beneficiaries. Some partnerships were conducted with local NGOs to promote the importance of individual water and sanitation connections (emphasizing impact on health, time gained and overall happiness), as well as the importance of appropriate use of water. Of note, Veolia teams provide special support to illiterate people, when they fill in their application for a new connection
- Value proposition: For individual connections, emphasis on time saved and convenience as well as availability of payment facilities. Little promotion actually needs to be done, given than households want to be connected at home.

## PRICING:

- Tariffs are set in the delegated management contracts and can be revised periodically by the public authorities.
- Current tariff scale for individual connections in Rabat is as follows (as of end 2010):
  - 1st tranche from 0 to 6$m^3$: US$0.29/$m^3$. This price is inferior to ONEP's bulk water price of US$0.52-0.34/$m^3$ and is therefore called the "social bracket"
  - 2nd tranche from 6 to 20$m^3$: US$0.88/$m^3$
  - 3rd tranche over 20$m^3$: US$1.37/$m^3$
  - In addition, there is a fixed monthly fee of US$1.026

For social connections, pricing was established following extensive, specific surveys made by socio-economists on ability and willingness to pay on a monthly basis (on top of water bills). The result of these surveys showed that the average acceptance level was around MAD100/month (US$12) for water and sanitation. This price only represents a fraction of the total cost of the connection. Upon proposal from Veolia Environnement, local authorities accepted this price level, and a maximum repayment period of 10 years.

For individual connections :

- Total average cost to Veolia *including all network extension works, water connection costs, and sanitation connection costs:* US$1,500-3,000 per household (out of which sanitation bears the largest part and is a mandatory element of each connection, as per the requirements set by Moroccan authorities)
- Households are charged interest-free monthly payments for their contribution to the total cost of the connection to water and sanitation (MAD100/month). This price level seems appropriate given the 94% average repayment rate (of bills plus connection payment) observed in the program
- The differential between costs and household payments is financed through cross-subsidies and subsidies, contributed for by Veolia, public authorities, as well as the World Bank (GPOBA program).

## STORAGE:

N/A for home connections. Saqayti users stock water in own containers, leading to potential re-contamination.

## ENTREPRENEUR SELECTION, IF ANY: N/A

## END-USER PAYMENT:

Users pay on a monthly basis for their water and electricity bills. Households with a social connection can pay their connection fee in installments, which are included in their main bill. Veolia has developed a payment facility service – JIWAR that allows its clients to pay their bills with partner neighborhood retailers, 7/7, from 8 till 22.00, commission free. Bills can also be settled with Veolia mobile agencies.

## END-USER FINANCING:

Applicants to a social connection are offered a loan scheme to repay their contribution to the connection cost (monthly installments over 3 to 10 years, at 0% interest rate). 94% of all households asking for a social connection subscribed to this scheme (with 94% repayment rate overall).

## MAINTENANCE:

Similar to those of non-social connection areas

## WATER QUALITY CONTROL:

Regular sampling and testing of water quality

## MONITORING AND IMPACT MEASUREMENT:

A number of impact monitoring surveys on social connections and Saqayti stand posts have been conducted or will be in the coming months. These measure health impact, as well as other improvements in the life of users. An important survey has been the one on the social connection program in Tangier (new connections in existing parts of the network), conducted by the Abdul Latif Jameel Poverty Action Lab (PAL) of MIT.

## FUTURE PLANS AND NEXT STEPS:

- Continuing implementation of the social connection program, as outlined in Veolia's contracts
- Veolia also plans to develop a campaign for Saqayti users on improved water usage and sanitation practices.

# IS THE PROJECT

## SOLVING THE PROBLEM?

**Problem and magnitude:**

- As of 2004, in Morocco, there were 6k diarrheal related deaths (0.4% of total deaths), and 211k diarrheal related DALYs (4% of total DALYs) recorded in the country
- Total drinking water coverage was 81% in 2008
- Before contract (1999): yield was at 77%, and coverage at 78%. Continuity of service was already at the level of 24h/7days
- As of 2010, these indicators improved: yield is at 81%, coverage at 92%.

*NB: Rabat data only*

**Scale and reach:**

- Total estimated target perimeter of the 3 concessions: 3.6m inhabitants (as of 2011)
- According to recent estimates, 412k inhabitants (i.e., over 82k connections) should be effected by end of 2010 to reach 100% penetration
- Social connection program progression: 9100 new connections in 2008, 8700 in 2009, and 9900 in 2010
- As of end 2010: 70k social water connections realized (350k users) (42k in Rabat, 11k in Tetouan, 17k in Tangier)
- As of end 2010: 33k social sanitation connections (150k users) realized (12k in Rabat, 9k in Tetouan, and 12k in Tangier) in parallel with new water connections. Differences between the water and sanitation figures are due to the fact that many households already had access to an existing sanitation connection of good standard (individual or semi-collective installation), which could be maintained as such or rehabilitated through other programs.
- It is estimated that slightly less than half of the 70k water connections were 'mass' connections of new neighborhoods, while the rest is individual connections. Mass connections are possible mostly since 2006, with the framework of National Initiative for Human Development.
- Eligibility criteria for social connection include: surface of habitation, number of floors, and written declaration to have less than US$420 monthly income.
- 752 households (about 40 households per stand post) benefit from 18 Saqayti stand posts in communes of Rabat, Tetouan and Tangier. Saqayti stand posts were installed in neighborhoods upon demand from the authorities
- WB GPOBA: connection of 100% of the 3,000 target households in Tangier by June 2010. Beneficiary neighborhoods were identified and selected based on the number of inhabitants and the priorities of the authorities

**Quality of water provided:** Clean water in line with Moroccan and international regulation for home connections and Saqayti stand posts. Water quality is the same level for social connections and the rest of the city, and has noticeably improved since the start of the contract, as documented by regular water tests

**Safe water needs addressed:**

- Over 64L/day/person average consumption for social connections. This contrasts with an average consumption of 85 to 90 L/day/person in 'mainstream' households
- 20-26L/day/person average consumption in the 18 pilot Saqayti stand posts. This equates to 3-4$m^3$/month

**Link with hygiene practices, sanitation and wastewater management:**

- The project provides mandatorily both water and sanitation to home users. Synergies between both activities have not been estimated. However, synergies do exist in terms of capital expenditures (e.g., digging only one trench, sharing planning and works teams), billing and collection costs, as well as overhead
- A number of programs have been undertaken to promote hygiene and sanitation, including a program of children education, conducted in Tangier in cooperation with the Ministry of National Education and UNICEF

**Compliance, acceptance and usage:**

- Individual connections: 90% satisfaction, following the J-PAL MIT survey (in Tangiers). High acceptance can be seen through high application rates (70%) in areas specifically and actively targeted with mobile units providing support to application process. Penetration in areas financed by WB GPOBA reached up to 90%. Also, despite increases in 150% of water spend on average, bill recovery amounts to 95% and 0% of connection cancellation (as of mid-2010). Users also stopped going to the stand post (where water is for free), despite an increase in water bills due to their increased consumption, and equivalent quality of water
- Saqayti stand posts: Overall good satisfaction

**Impact on health of beneficiaries:**

- In newly connected informal areas of Tangiers, a joint study by Veolia Amendis and the Water and Sanitation Ministry measured positive impact on instances of mycoses, child diarrhea and conjunctivitis
- There is no extensive study yet on the health impact of the social connection programs that benefited households living in the center of the city, who had previously access to a stand post and home sanitation. A study conducted by the PAL MIT on a limited number of such households did not find any statistical evidence of improved health conditions for this group of the population

**Other impact:**

- Following J-PAL MIT research study, significant time savings, and indications of better social insertion of beneficiaries. This study was conducted on a limited number of beneficiaries, who got a home connection (and who only had stand post access previously)
- Following 2008 research, significant time savings and closer walking distances were recorded for Saqayti users

## ECONOMICALLY SUSTAINABLE?

**Fully loaded cost of 1L for Veolia**: N/A

**Price of 1L:**

- US$0 for first 6m$^3$ at Saqayti stand posts
- For all other users: US$cents 0.029/L for first 6m$^3$, plus a fixed monthly fee of US$1.026
- 2nd tranche from 6 to 20m$^3$: US$0.88/m$^3$

**At user level:**

- Average monthly household income for target beneficiaries: US$230 (MAD1916), equals to Purchasing Power Parity $348 (2009 data)
- This means that this project targets population of the BoP 500-1000
- Assuming 5 people per household with 64L/day/person, water expenses therefore represent less than 4% of a BoP 500 household's income (US$5.9 on average monthly). Cost for Saqayti users is 100% subsidized for the majority of them
- Cost of alternatives to customer: Almost no alternative except for free public fountains that are time consuming
- To reach the poorest a more extensive subsidy and financing mechanism should be developed. It would also require very strong political support

**At project level:**

- As of end 2010 the overall remaining budget has been estimated at US$260m
- Overall balance of the fund: N/A

**At country level for all 3 water concessions:**

- Revenues from sales of water: US$127.5m
- Revenues minus system losses and cost of bulk: US$55m

*NB: End of 2010 data unless specified otherwise*

## ENVIRONMENTALLY FRIENDLY?

**Audit:** Within the framework of the GPOBA, a World Bank environment audit scored the program operations as very good. At their request, a procedure was set up for inhabitants to make grievances related to environmental issues. No one has so far made use of the latter

**Water efficiency:** No specific measures reported

**Energy consumption:** No specific measures reported

**Chemicals used:** Treatment ensured by ONEP

## SCALABLE AND REPLICABLE?

**Requirements/ prerequisites for the project to scale:** Accelerate procedures to buy back land, in order to build roads, and install water and sanitation pipes

**Additional requirements/ prerequisites for the project to replicate:** Political will and support, to underpin identification of necessary financing, design of appropriate social connection program, and framing of appropriate regulations for home connections

# THE PEOPLE

The Social Connections and Saqayti stand posts' initiatives have grown out of the energy and commitment of a team that has changed over time:

Olivier Gilbert, now Managing Director for Social Innovations of Veolia Environnement, started designing and piloting the programs back in 2002, while Veolia was working on the overall planning works for the following 20 years of network development. For the team back then, it was crucial to take into account the social and economic potential of the new neighborhoods at the periphery of Tangiers, Tetouan and Rabat. He built up a team of enthusiastic professionals from within Veolia, including Mohamed Ayatem, Imane El Hatimi and Naoufal Salama.

Mohamed, Imane and Naoufal took over the management and development of the program after 2005-2006, when it got considerably accelerated by the National Initiative for Human Development.

The programs took an important turn in 2010 with the presence of Xavier Joseph, who was then Regional Director for Tangiers, who raised Euros 100 million for the programs. Xavier is now Deputy Director for Morocco.

Today, the team consists of Souad Ellouali, Narjiss Rayssouni, Youssef Hachimi, and Thomas Hascoet, and is fully integrated into the work of the mainstream operations.

*Hypothesis: MAD8.33 = US$1; MAD5.5 = Purchasing Power Parity $1. BoP 500-3000 classification scale of 2002 was adjusted on U.S. Consumer Purchasing Index with latest 2010 available data (ftp://ftp.bls.gov/pub/special.requests/cpi/cpiai.txt). Prices of water and family incomes were converted following Purchasing Power Parity conversion factor for private consumption (LCU per international $) 2009 (http://search.worldbank.org/data?qterm=PPP%20conversion&language=EN).*

*Source: Interview with Olivier Gilbert on 19.11.2010; Interview with Thomas Hascoet on 29.03.2011; Interview with Olivier Gilbert and Xavier Joseph on 22.06.2011. Public presentation of MIT research study findings on 19.01.2011 in Paris; Internal Veolia Environnement documents*

*Contact for the project: Olivier Gilbert, Délégué aux Innovations Sociales, Veolia Environnement (Olivier.Gilbert@veolia.com)*

Why are you doing all this?

*Olivier Gilbert: The decision to expand water access to informal, poor urban areas rests with public authorities – in this case Moroccan municipal officials, who are very engaged since the National Initiative for Human Development. Veolia's mandate is solely to implement policies that these same authorities have decided, with the means that they have mobilized, and with their support (in order to overcome obstacles such as administrative ones, etc.). Public authorities expect from us concrete proposals, based on thorough studies (including socio-economic, technical and financial), and efficient implementation. If we work on these issues, it is first and foremost in the framework of the public-private partnership, to implement public policies with expertise and innovation.*

*Xavier Joseph: The program in Morocco is the logical continuation of what I have done in the South of France in 2006, when we introduced social, progressive tariffs. For a company like Veolia, these programs are the next frontier, where everything still needs to be done ...And it must be done! Everyone should have access to water in the 21st century.*

What was your aha moment?

*Xavier Joseph: Seeing children in clean uniforms singing and cheering at the opening of my first water network in Morocco, in a neighborhood where we did about 2,000 connections.*

What were key lessons learned?

*Xavier Joseph: It is the people who matter, not the theoretical model!*

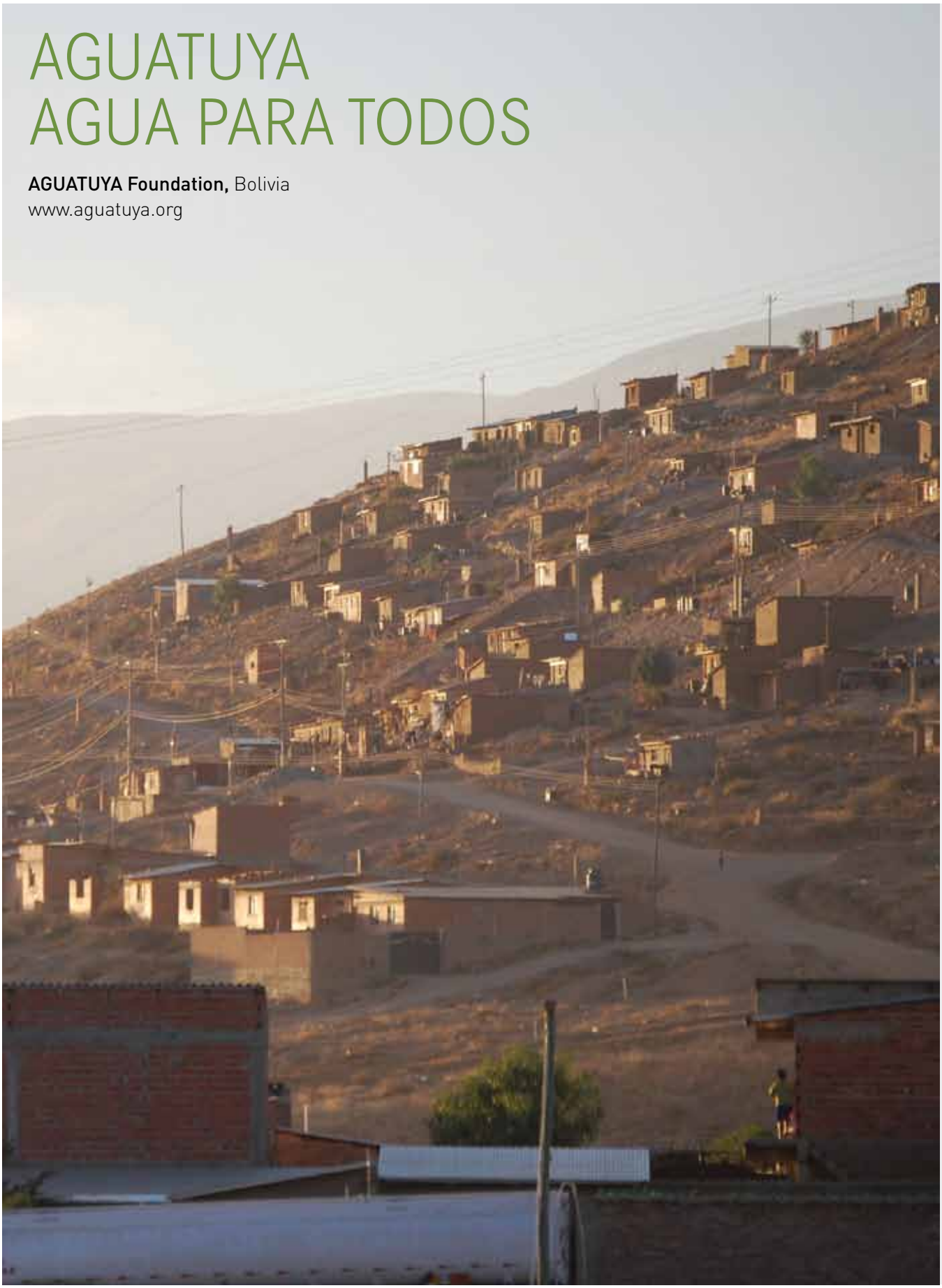
*Olivier Gilbert: To expand water services in poorer or peripheral areas requires innovating at many levels: technical, marketing, relationships with the population, legal and financial...that was very interesting for all the teams that participate to these operations. We now have local specialized teams that work in these areas with specific tools, notably regarding the monitoring and evaluation aspects. What we need to deliver, after all, is innovation and expertise to develop new solutions for public services...we fall exactly within the mandate of an operator contracted by public authorities.*

What are the way forward and plans for expansion?

*Xavier Joseph: We need to have the expertise and mindset that we developed on these programs spread more across the organization. What these teams learned is to reconnect with the customers. And we need to do more of the same elsewhere, not in a philanthropic way, but with a financially sustainable approach. We can fulfill a real need with a business approach!*

# AGUATUYA
# AGUA PARA TODOS

**AGUATUYA Foundation,** Bolivia
www.aguatuya.org



# EXECUTIVE SUMMARY

## ORGANIZATION:

AGUATUYA is a foundation focusing on providing innovative solutions for people without access to water and sanitation. It is an offspring of the water systems' producer Plastiforte, which was legally split from its mother company in 2008, in order to attract grants from the public and the non-profit sectors. AGUATUYA is the driving force behind Agua para Todos, a partnership consisting of the municipality of Cochabamba, the public water utility SEMAPA, the private sector and local communities. It also coordinates support from Plastiforte.

## PROJECT:

In 2005, Agua para Todos launched an initiative to construct low-cost, decentralized water mini networks in the suburbs of Cochabamba's south. The communities (in clusters of about 140 households – the largest network covering 424 households) finance the US$35k investment into infrastructure with the support of the government fund "Fondo de participación popular" and/ or own resources. To do so, local water committees are formalized within the target communities, whose responsibility is to build, own and manage these mini networks. Each water committee appoints one or two community members to operate the system on a salary or free-of-costs basis. In a first phase, the communities buy water from private tank vehicles or nearby sources. The purchase of water in large quantities reduces the costs of water for users by 50%. In a second phase, the decentralized networks can be connected through a master meter to SEMAPA's network, which reduces the costs of provision by another 50%. By end 2010, 33 mini networks for 4500 households or 22.5k users were established. This corresponds to about 7% of Cochabamba's population without water. 90% of the people where AGUATUYA has project operations subscribe to the proposed scheme.

## INNOVATION:

- Multi-stakeholder participation: AGUATUYA has succeeded, after the water wars at the beginning of the last decade, in bringing together various stakeholders (municipality, public utility, and private sector, communities) to improve water access in Cochabamba's low-income areas. This translated into a non legally-binding agreement establishing the responsibilities and duties of each partner.
- Flexibility: The systems provide the communities with a temporary solution that reduces the costs of water for user households by 50%. At the same time, the product is flexible enough to be permanently connected to urban water network once SEMAPA reaches the area.
- Technology and cost-reduction: The costs per mini network have successfully been reduced through technological innovations (e.g. hydro-pneumatic tower instead of water towers), bringing it closer to the financing means of local authorities and communities.
- Community ownership: Communities bear the cost of financing, and find ways to get additional subsidies from the public authorities. Similarly, the communities manage the installations, including pricing and billing. For instance, AGUATUYA has developed a cost calculation tool that helps the communities to determine a sustainable price by themselves.

## RATING 10/16:

- Social impact: AGUATUYA has provided access to 7% of Cochabamba's population that does not have access to piped water. However, the sourced water quality is not controlled and not systematically treated. Users can therefore be exposed to water contamination, and as a result, a number boil their water prior to use.
- Economic sustainability: Given low-cost technology, 100% of the capital expenditures can be borne locally (45% by the communities, 55% by the municipality on average). Yet, operational costs could hike up significantly for those systems that source water from tank vehicles, would fuel be no more subsidized. The overhead costs (coordination and negotiation support) of US$24k for the setup of 5-10 new mini networks are borne since 2009 by subsidies from a number of international donors, private sector contributions.
- Scalability/replicability: The project builds upon existing community structures and relies on the willingness of the multiple players to support the project (politically, organizationally). The financing depends on funds from the public sector and/ or from the capacity of the communities to raise the amount necessary for the investment.
- Environmental impact: The project reduces the amount of fuel needed to distribute water from tank vehicles to a community because the vendors have to address only one customer instead of multiple dispersed household tanks. The use of hydro-pneumatic towers reduces the amount of electricity needed for pumping. However, the project lacks anything related to water management for when it sources water locally. It also does not provide any sewage infrastructure.

# PROJECT CURRENT STATUS

## DATE OF CREATION:

2005

## PRODUCT/ SERVICE DELIVERED:

Non-treated water delivered with tank vehicles to decentralized, low-cost mini networks, which can be connected in a second phase via master or individual meters to the main urban water network.

## GEOGRAPHICAL FOCUS:

Rapidly urbanizing, poor suburbs in the south of Cochabamba (Bolivia), representing 300k people out of a total city population of 600k.

## COMPETITIVE LANDSCAPE:

- Private water vendors charge US$2.86-3.50/m$^3$ (BOB20-25). This is 2-3 times higher than the price charged by the project
- The city utility conducts its own expansion plans, but typically does not cover AGUATUYA's areas.

## PARTNERS, SUPPLIERS, RETAILERS AND FUNDERS INVOLVED:

- Funders: AGUATUYA's team work for Agua para Todos is financed by grant money (US$25k/year) since 2009 by international donors. Up to 55% of the capital expenditures is financed through a national government fund "Fondo de Participación Popular", which attributes to each community about US$21/person/year for the development of local infrastructure projects (water, sanitation, electricity), depending on the priorities from each community
- Suppliers: Plastiforte, AGUATUYA's parent company, is the main provider (33% in value and 80%-90% in number of pieces) of construction materials for the mini networks (pipes, hydro-pneumatic tower, etc.) and the main contact partner of the communities in case of technical problems. Sales from the project Agua para Todos correspond approximately to 5% of Plastiforte total annual turnover. The other providers supply the individual meters, the tank and the pump, which are among the most expensive parts. Plastiforte is chosen as a supplier of choice for communities choosing AGUATUYA's solutions.
- Partners:
  - SEMAPA manages Cochabamba's water network with a current coverage of 50% of the population. It supervises the works and optionally connects the mini networks at a later stage. As the city suffers from water shortages, SEMAPA is investing into increasing its water production capacity by 2012-2015
  - The municipality of Cochabamba signed a first cooperation agreement with Agua para Todos and SEMAPA 2005, framing the conditions under which Agua para Todos could act as a complementary water system provider in Cochabamba's new suburbs. Through this period, their interest and commitment rose gradually (25% to 55% of financing of the projects). This agreement ended in 2010. The municipality and Agua para Todos are currently negotiating a second agreement with the goal to align the project with SEMAPA's expansion plans
  - Fundación Infocal: In charge of training local community managers on the administration of the networks, on the basis of a curriculum developed with Agua para Todos. AGUATUYA pays BOB180 (US$25) to Infocal per person per training. This cost is financed by international donors (grant money)
  - NGO CIDRE and Habitat Bolivia offer micro loans to finance communities' investments into infrastructure.

## TECHNOLOGY USED AND INSTALLATION REQUIRED:

Low-cost, highly durable flexible pipe systems, which can be tailored to given environments. A system typically consists of a water tank, a pump, a hydro-pneumatic tower, polyethylene pipes and individual household meters. The hydro-pneumatic tower has the same function/pressure level as a water tower but at lower cost (US$2k vs. US$18k) and faster installation (4 hours). The polyethylene pipes have a smaller diameter than PVC pipes, are longer (up to 100m), flexible, and more robust (due to less connections). They have a life span of 50 years. For most of its products, Plastiforte guarantees a life span of at least 20 years. The meters are usually built into the wall in order to avoid the costs of a robust box in the ground. The individual connections/meters are typically the most expensive part of the installation (US$100 per household on a total of US$250). A mini grid costs on average US$35k (technical assistance: US$1200; trench digging: US$8750; pipelines: US$6550; storage tank/pumping station: US$5k; household connections: US$14k) but the geological differences can lead to large differences in costs between the systems. This does not include AGUATUYA's overhead and Fundación Infocal training cost. This would add about US$2,500-5,000/mini grid/year. The networks are designed to be extended up to the double of the initial user quantity. A major share of the materials (representing 33% of total product value) used are produced by Plastiforte. The local communities usually help with the construction of the network in order to minimize the costs. SEMAPA supervises the works.

## SOURCE OF REVENUES:

- The communities arrange for financing of capital expenditures, and ensure that pricing allows to cover operational costs, maintenance and refurbishing
- AGUATUYA receives funds from international donors to cover its role as project orchestrator
- Plastiforte sells its products to the communities
- The private water vendors cover their costs through sales of bulk water
- SEMAPA: No information available

## WATER SOURCING AND INSTITUTIONAL ARRANGEMENTS:

In a first phase, water is sourced from a nearby water source or from a private tank vehicle. The private tank vehicles typically get the bulk water from vendors with access to private ground water resources outside the city. Water provision is highly competitive and there are more than 300 suppliers for the city. The competition drives prices down and the water providers operate only with a small margin. The water is not treated but usually drinkable. However, there is no quality control and some vendors may sell water from an unsecured water source. In a second phase, the grid can be connected via a master meter or individual meters to the city's water network. The community can then choose to keep the control of the management of the mini grid or to transfer the responsibility to SEMAPA. 5 out of 33 systems have so far been connected to SEMAPA and 10 systems source water from a nearby source (7 deep wells and 3 ground water sources)

## BUILDING/LAND SOURCING AND INSTITUTIONAL ARRANGEMENTS:

The installations are built on municipal ground. Therefore, constructions have to be authorized by the municipality of Cochabamba in accordance with the norms set by SEMAPA.

## GOVERNANCE/ RELATIONSHIPS WITH LOCAL AUTHORITIES:

AGUATUYA worked until now under a 2005-2010 non-legally binding agreement with the municipality and SEMAPA. That agreement stands more as a letter of intention and did not imply enforceable obligations for the partners. A new agreement is currently being negotiated, which should provide a framework for closer coordination between SEMAPA and the project. Till now, there was little alignment between respective organizations, in terms of expansion plans and priority areas.

Before the establishment of a new mini network, AGUATUYA leads the negotiation of the contract between the communities, the municipality, SEMAPA and Plastiforte. A community has to be recognized as a legal entity by the municipality in order to qualify for the project. The contracts made between the partners ensure that the necessary financial resources are collected and attributed to a specific construction plan managed by the community, with the assistance of AGUATUYA and SEMAPA. The financing and negotiation process usually takes 3-18 months and the contract is signed by the community leaders, the mayor of the municipality and his financial director. The community leaders are in charge of collecting all the necessary future users signatures.

# CASE STUDIES

## REGULATORY FRAMEWORK:

Water has been declared a basic human right under Bolivian law. This basic right allows AGUATUYA to legally act in the areas. However, SEMAPA cannot expand into informal suburbs, given requirements around proof of legal domicile. That means that the mini networks can only connect to the city network once their settlement has become legalized.

## LEVEL AND DEPTH OF AWARENESS OF POPULATIONS IN NEED (REGARDING SAFE WATER, HYGIENE, SANITATION):

People are usually aware of the risks of drinking contaminated water. Water boiling is therefore wide-spread among households.

## MARKETING:

- Activities conducted and media used: Agua para Todos attends district assemblies to present the project and the requirements for communities to apply through one of its four service points in the city. Additionally, AGUATUYA has started social marketing activities (e.g. educational workshops on hand washing, community cleaning, etc.) with international donors' funding but with a very limited scope so far
- Value proposition: Affordability, quality of life, convenience
- Approach to developing consumer insights: Feasibility studies and stakeholders' assessments conducted prior to the projects
- Consumer lifecycle: N/A
- Loyalty reinforcement: N/A

## PRICING:

Tariffs are calculated, community by community, on the basis of four cost buckets: a) operations and maintenance (incl. the costs of bulk water); b) administrative costs; c) refurbishment needs; d) contingency for unexpected events. The communities are provided by AGUATUYA with a cost calculation tool to help determine required level of revenues for given costs. Users typically pay a flat rate if they consume less than $1m^3$ per month, in order to cover the administrative costs. Above $1m^3$/month, users are charged according to volume. Depending on whether the water is sourced from a close water source or from a tank vehicle, prices vary between US$0.40/$m^3$-US$2.10/$m^3$.

Cost of connection is typically borne at 45% by the community. It is spread on the total number of user households. This financing structure leads to average household investment of US$112. However, investments can differ heavily depending on the actual infrastructure cost and the contribution of the public sector. Additional, incremental connections to a mini network can be installed by Plastiforte for approximately US$77/household.

## STORAGE:

The size of the water tank depends on the size of the community (total volume estimated on the basis of an estimated 50L/person/day). Typically, the container is cleaned 3 times a year. The cleaning and maintenance is organized by the community operator who contracts a third party.

## DISTRIBUTION AND DELIVERY: N/A

## COMMUNITY SELECTION:

The communities are selected based on their willingness and ability to pay for capital expenditures, and their interest in being supported by AGUATUYA.

## END-USER PAYMENT:

Usually, the users are billed by the local water administrator either at home or at the community assembly. Bills have to be paid within the first week of the month. The users are fined (2 BOB/US$0.30) in case of non- payment and are ultimately blocked from the water supply (each individual meter has a security switch that can be sealed by the operator).

## COMMUNITIES FINANCING:

The communities must organize the financing of the project. That process takes between 3 and 18 months. Usually they finance about 45% of the project out of their own pocket and 55% through the national government program "Fondo de Participación Popular". The communities can also access micro loans from CIDRE or HABITAT Bolivia (at 10 to 14% annual interest rate) but only two of them did. This can be explained by the fact that legal residency is required to access credit. In addition most people do not trust the micro-finance institutions and fear that they would have to abandon their properties/house in case of nonpayment. Typically, communities raise money with their members in 3 installments (at the beginning of the works, midway, and just before the water meters are installed). Those who manage to pay the whole amount upfront have a discount.

## MAINTENANCE:

Maintenance is organized by the communities, which save each month a clearly defined amount of money for the maintenance of the facilities. The operators have been trained to supervise the networks and manage operations and billing. To conduct works, they contract Plastiforte, other suppliers or plumbers.

## WATER QUALITY CONTROL:

No mechanism to control water quality.

## MONITORING AND IMPACT MEASUREMENT:

No systematic monitoring mechanism. No impact study.

## FUTURE PLANS AND NEXT STEPS:

Enter into a new agreement with the municipality and SEMAPA, aiming at a better harmonization of Agua para Todos' activities with SEMAPA's expansion plans. Furthermore, AGUATUYA wants to also start providing sanitation solutions.

# IS THE PROJECT:

## SOLVING THE PROBLEM?

**Problem and magnitude:**

- As of 2004, there were 3k diarrheal related deaths (4.7% of total deaths), and 117k diarrheal related DALYs (5.1% of total DALYs) recorded in the country
- 2008 improved water access coverage: 86%
- 300k people or 50% of Cochabamba's city population (mostly living in the southern areas) do not have access to the water network. They have to buy water from local water vendors at a price 2-3 times higher than AGUATUYA's

**Scale and reach:**

- Growth of operations: 600-1,000 new household connections/year and 5-10 new mini networks/year over the past 3 years
- Total number beneficiaries: ~4,500 household connections (or about 22.5k beneficiaries)
- Rate of penetration in areas where population does not have access to piped water: 7%. But penetration in areas where there are project operations: 90%

**Quality of water provided:**

- Test from NGOs have shown that the water quality from private water vendors is usually good, but with serious exceptions. Water from SEMAPA cannot be drunk. AGUATUYA recommends boiling the water before use
- 10% of the communities buy chlorine to treat the water in the tank prior to distribution

**Safe water needs addressed:** 50L day/person for drinking, cooking, hygiene, etc.

**Link with hygiene practices, sanitation and wastewater management:**

- Pilots with eco-sanitation modules have been conducted and a decentralized treatment plant has been constructed with subsidies
- There is limited synergies at this stage between the water and sanitation programs, with the exception that the project team responsible in a certain community for water and sanitation is the same

**Acceptance and usage:**

- Users are generally satisfied with the quality of the service provided, which tends to degrade after the connection of the mini grid to SEMAPA, as it provides water only a few hours a day
- Tampering and illegal connections are very limited, given that the systems are actually owned by the communities. This is also facilitated by the fact that the meters are located within the external walls of the houses, hence facilitating meter reading. Users that would want to connect a by-pass before the meter would have to do this breaking their wall. Finally, each household connection has an anti-fraud control valve, which can be blocked directly and only by the system operator. Finally, the communities' rules/statutes dictate fines and punishment for those that cheat and get caught. This goes from fines (US$2-20) to temporary suspension, and event permanent removal of the household connection

**Impact on health of beneficiaries:** No study conducted on health impact

**Other impact:** No study conducted on other impact

## ECONOMICALLY SUSTAINABLE?

**Fully loaded cost of 1L:**

- Water from a nearby water source: US$0.02/L (BOB0.0014)
- Water from a tank vehicle: US$0. 21/L (BOB0.0147)
- Water from SEMAPA: US$0.09/L (BOB0.0063)
- The cost of water from the tank vehicle is indirectly subsidized by the Bolivian government through heavy subsidies (>50%) on the fuel price. The removal of the subsidies, as proposed but later-on rejected by the government in December 2010, would put the economic equilibrium of the project for tanker-sourced water at risk

**Price of 1L:**

- Water from a nearby water source: US$0.04/L (BOB0.0028)
- Water from a tank vehicle: US$0.229/L (BOB0.02)
- Water from SEMAPA: US$0.114/L (BOB0.01)

**At user level:**

- Average household income per month of beneficiary household: US$90-150 (BOB630-1050), equals to Purchasing Power Parity $203-339 (2009 data)
- This means that this project targets populations of the BoP 500-1000
- Assuming 5 people per household with 50L/day/person, water expenses therefore accounts for less than 3% of a BoP 500 household income in the case of a nearby water source, 16% with a tank vehicle, and 8% with water from SEMAPA.
- What it would take to reach the poorest: Capex-wise: capital expenditures, increase subsidies, or facilitate access to micro-finance for target communities; For operational costs: subsidize SEMAPA water price for project beneficiaries

**At mini-grid level:**

- Number of people employed by mini network: 1-2 (at the beginning often without salary)
- Capital investment of 1 mini network: on average US$35k for 139 households (US$250/household). The capital investment is borne by the Bolivian government (~55%) and the communities (~45%)
- Operational expenditures/month (excluding savings for asset replacement):
  - US$217 with a nearby water source
  - US$2,154 with water from a tank vehicle
  - US$962 with water from SEMAPA

- Revenues/month:
  - US$547 with a nearby water source
  - US$2,487 with water from a tank vehicle
  - US$1,292 with water from SEMAPA

**At AGUATUYA level:**

- US$150 capital investment for training of water committees (6 people) at the beginning of the operations of each mini network
- US$24k overhead for the Foundations' support to Agua para Todos. This is 100% subsidized by international donors
- The former parent company Plastiforte benefits from sales of its products (~US$8k revenues/system at US$800 profits/system). Sales from the project correspond to approximately 5% of total annual turnover

*NB: Projected end 2010 figures, unless specified otherwise*

# CASE STUDIES

## ENVIRONMENTALLY FRIENDLY?

**Water efficiency:**

- AGUATUYA's polyethylene pipes are less likely to leak than traditional PVC pipes
- Ownership by the community and individual metering by the community encourages more rational use of water
- Wastewater treatment: None
- Water resource management: None. In fact, project may encourage water sourcing from non-sustainable sources

**Energy consumption:**

- The hydro-pneumatic technology reduces the total amount of electricity needed, as water has not to be pumped anymore to the top of a water tower.
- Water provision through trucks is sub-optimal. However, mini networks allow for a more rational delivery of water to less locations in the city

**Chemicals used:** None

**Hardware recycling:** N/A

## SCALABLE AND REPLICABLE?

**Requirements/ prerequisites for the project to scale:**

- More clear and stable regulatory framework: Bolivia has just amended its constitution to state it is the government's role to provide service for all. This now results in communities expecting municipalities and central government to pay for everything (lowering willingness to pay from their own pocket)
- Find financing mechanisms to increase penetration in communities with a lower ability to pay
- Increase awareness of the project among the rest of the population, to create more pull and demand
- Coordination with public water authority to plan for network extension and formalization
- Efficient water resource management, as the city suffers from a lack of water
- Find mechanisms to ensure full sustainability of the project (including overhead), so that expansion is not subject to additional grants

**Additional requirements/ prerequisites for the project to replicate:**

- Existing, organized communities, able to take ownership of the mini networks' financing and installation
- Governance set up and political support to allow for partnership approach in increasing water access

# THE PEOPLE

Gustavo Heredia grew up in a rural area of La Paz (Bolivia) and moved to Cochabamba as a teenager. After school, he moved to Atlanta, where he studied industrial engineering at the Georgia Institute of Technology. In 1996 he came back to Cochabamba and started working in his family business - Plastiforte.

Since the 80s, demand for alternative pipe solutions increased significantly, as new suburbs mushroomed. Plastiforte developed from a simple tube producer to a supplier of integrated water pipes technology. Under the brand AGUATUYA, Plastiforte started to package services such as design, installation, financial and technological assistance.

With his team, Gustavo turned this need into a business opportunity. According to him, it is a segment with limited resources, but willing to pay and needing access to water and sanitation. However, some important activities, such as surveys and training, could not be borne by Plastiforte as they were not profitable. This is why they established the foundation AGUATUYA in 2008.

Gustavo is married and has 3 children.

*Exchange rate: BOB7 = US$1; BOB5.5 = Purchasing Power Parity $1. BoP 500-3000 classification scale of 2002 was adjusted on U.S. Consumer Purchasing Index with latest 2010 available data (ftp://ftp.bls.gov/pub/special.requests/cpi/cpiai.txt). Prices of water and family incomes were converted following Purchasing Power Parity conversion factor for private consumption (LCU per international $) 2009 (http://search.worldbank.org/data?qterm=PPP%20conversion&language=EN).*

*Source: Field visit to Cochabamba, January 10-12, 2011 with interviews of Gustavo Heredia (Executive President AGUATUYA and General Manager of Plastiforte), José Antonio Becerra (Project Coordinator AGUATUYA), Marie Claude Arteaga (Communication Manager AGUATUYA), Carolina Patiño (Municipality of Cochabamba), Renato Montoya (Municipality of Cochabamba), Fredy Rojas (SEMAPA); http://www.aguatuya.org.*

*Contact for the project: Gustavo Heredia, Executive President (gheredia@aguatuya.org); José Antonio Becerra, Project Coordinator (abecerra@aguatuya.org), Marie Claude Arteaga, Communication Manager (mcarteaga@aguatuya.org)*

**Gustavo Heredia**
*Executive President of AGUATUYA and General Manager of Plastiforte*

What was your aha moment?

*It is important to recognize that each actor has his/her own capacities and thus an important role to play. Organized communities can jointly manage a water system that fulfills their needs. The public sector must guarantee equity and justice in water provision and the private sector can operate in innovative and efficient ways. On the other hand, communities lack technical capacity and the public sector lacks resources. By working together, different players/sectors can overcome limitations and reach common goals.*

How are you inspiring others?

*I think the work we are doing is already highly inspiring and motivating for my employees. The impact of our work, which is bringing water to the people and changing their lives, is something very satisfying. You can directly feel the gratitude of the new users.*

What were key challenges on the way?

*Innovation – traditionally we have been working in the provision of water. The issue of sanitation in contrast has been neglected for a long time. It is urgent to develop new innovative sanitation solutions – such as decentralized treatment plants or ECOSAN – because the traditional sewage system is not an option for the emerging, low-income living areas. That is the gap we, as AGUATUYA, are trying to fill in cooperation with international donors and the Ministry of Water.*

What were key lessons learned?

*When working with communities, it is important to listen to their demand in order to guarantee sustainability. Also, it is important to constantly look for innovations.*

# BALIBAGO WATERWORKS SYSTEM

**Balibago,** Philippines

## EXECUTIVE SUMMARY

### ORGANIZATION:

Balibago Waterworks System, Inc. (BWSI) is a privately-owned Philippine water company providing underground water extraction, treatment, pump and motor installation, mainline distribution, system maintenance, meter reading, billing and payment collection services to commercial and residential customers. It operates in 31 branches, all but one of which are located north and east of Metro Manila, providing running water to 74k households in total (over 370k people).

### PROJECT:

BWSI was established in 1958 to develop and operate a water utility network in an area of 900 hectares in and around the sub-municipality of Balibago, 80 kilometers north of Manila. In 1963, it was granted a 50-year franchise by the Philippine Congress to operate exclusively within its service area. The company focused solely on Balibago until 1998, when a change in ownership ushered a period of expansion. BWSI began to acquire new contracts primarily through Build-Operate-Transfer agreements with municipal governments. Under a standard memorandum of agreement, the company is granted the rights to build and operate a waterworks system in a particular municipality for a period of 35 years, after which ownership of the system and the rights to operate

# BALIBAGO WATERWORKS SYSTEM

revert back to the municipality. To date, BWSI has grown from one branch in Balibago to 31 operational branches in rural and semi-urban areas across the country, and has got 2 more in the pipeline. The oldest branch is now 10 years old. Balibago focuses on serving more remote municipalities, without established water authorities. Going forward, Balibago expects more competition, and therefore shorter contracts. 85% of Balibago branches have been established through BOT agreements, while the rest have been established as a result of the company being asked to take over existing waterworks systems. BWSI also supervises a non-profit waterworks project established under the auspices of the 3H Program of Rotary International, serving over 1k low-income families in the rural areas of City of San Fernando and Municipality of Bamban, all located near Balibago.

## INNOVATION:

- BWSI achieves financial sustainability by combining economies of scale with a lean and decentralized management approach. BWSI seeks a minimum density of at least one household per 6m pipe when opening a new branch. It tolerates low or zero profits in new branches, believing that they will eventually achieve a positive bottom line, at least on EBITDA basis. It subsidizes these new branches through income from more profitable branches while minimizing staff and operations to keep costs as low as possible. Internal cost accounting is practiced among the branches. If, however, a branch has experienced five years of net loss, BWSI considers selling out to interested parties. This seldom occurs since most branches do eventually turn out to be profitable or cash positive on EBITDA basis.
- It is common for a new branch with less than 500 connections to be manned by just one pump operator and one plumber, both of whom are also tasked with meter reading, billing and collection. Supervision may be carried out remotely by the manager of a nearby branch, and accounting is done by staff at the BWSI main office. Manpower-intensive activities such as installation and overhauling are carried out by a small, centralized Construction, Repairs and Maintenance Department, which dispatches its members to the various branches on a rotating basis. Overall, BWSI maintains a multi-tasked and fluid body of manpower, wherein staff members in various functions support each other's work across branches as needed.
- BWSI also minimizes costs by utilizing a simple water treatment process. In 90% of the company's service areas, water sourced from underground reservoirs has already been naturally filtered. In these cases, injection of chlorine at the pumping station suffices to treat the water to a standard acceptable by national benchmarks.
- Another key BWSI innovation is the decentralization of decision-making throughout the company. Local branch managers are empowered to take the lead in making key strategic and policy decisions for their service area, with follow-on clearance from the head office. For instance, the decision on whether or not to allow customers for whom the connection fee is too high to pay, to settle the fee in installments is left to the branch manager to decide. Such decentralized decision-making allows BWSI branch managers to be more responsive to their customers in their respective areas. The performance of branch managers is monitored at monthly meetings at which key indicators of branch performance are reviewed. These include indicators for production, billed customers and non-revenue water.

## RATING 11/16:

- Social impact: Balibago provides treated 24/7 water through home connections to over 70k households and businesses (about 400k people) in 31 scattered villages and small towns around Manila, at a price that is roughly the double of that of Manila Water. Average penetration rate is 27% but can reach up to 90%. Acceptance among higher-income segments lags behind acceptance among lower-income segments, as the former tend to prefer to continue using their own private electric pumps and delay connecting to BWSI until such pumps break down and become too costly to fix or replace. Poorest households represent about 20% of total residential customers.
- Economic sustainability: Tariffs are set so that about 4% of average household revenues are spent on water. For poorer households, who spent considerably less water (an estimated 180 liters/household/day), water expenditures represent 1-2% of their income. With over 7m in revenues in 2010, Balibago is a sizable business. Profits are continuously reinvested into growth. Operational costs are maintained very low, despite the challenge of managing scattered branches.
- Scalability and replicability: Large-scale is mostly hindered by capital requirements (long-term, patient capital). Contracts also need to be negotiated, one by one, with municipal government officials, who must be willing to sub-contract to private operators. For being replicated in other regions, the company would require a certain population density (at least 800-1,000 households, with a minimum 50% expected to connect), in order to enable payback on initial investment over 5-7 years. A favorable regulatory environment (including for differentiated tariff setting between municipalities), availability and accessibility of underground reservoir(s) for source water, as well as availability and affordability of electricity are all a must.
- Environmental impact: Balibago records high water yields. In response to rising power costs, it is also installing energy saving devices on all pumping stations. Company does not provide sewage solutions, despite bringing large amounts of piped water to homes.

# PROJECT CURRENT STATUS

## DATE OF CREATION:

1998 expansion of Balibago into water services. Oldest branch now 10 years old.

## PRODUCT/ SERVICE DELIVERED:

Clean water piped directly to residential or commercial customers either through construction of a new waterworks system, or operating, overhauling and extending existing systems.

## POSITIONING OF PRODUCT:

Efficient and dependable water service with 24-hour availability.

## GEOGRAPHICAL FOCUS:

Rural and semi-urban (average village size of 9k households, with a range from 700 to 20k).

## COMPETITIVE LANDSCAPE:

BWSI competes with other operators when bidding for franchises, but does not feel the need to promote its services as it gets enough solicited to add 1-2 new branches a year. Referrals and testimonials from satisfied local government clients are paramount to getting new contracts. The contracts benefit from an exclusivity clause. Many un-connected households extract water from shallow wells using private or shared hand pumps or electric pumps, the latter costing PHP20k-25k (US$452-566) per installation, or buy purified water from commercial water vendors who sell 5-gallon containers at PHP2.11 per L (US$0.05/L).

## PARTNERS, SUPPLIERS AND FINANCING INVOLVED:

- Partners: Municipal governments give assistance in acquiring extraction permits and operating licenses, as per the memorandum of agreement. The National Water Resources Board (NWRB) grants the water permits and Certificate of Public Convenience in order for BWSI to operate
- Technology suppliers: PVC pipes for water lines are sourced locally; water meters are imported from China. Supplier credit is usually granted with 60-90-day payment terms
- Financing: Capital is provided by major shareholders who are well-established businessmen. Already having substantial businesses and holdings, they are able to provide patient capital to the company. Bank lines and internally generated funds are also sources of financing.

## TECHNOLOGY USED AND INSTALLATION REQUIRED:

Groundwater is pumped to the surface through pumping stations and chlorinated before being stored in cisterns or pumped directly into the system. Since the groundwater is generally uncontaminated, further treatment is not required. Pump motors vary in power depending on the size of the area and the number of connections. Each pumping station is designed to serve 800-1,200 connections. PVC pipes are used for mainlines, and sometimes PE tubing is used for service connections. G.I. pipes are used for bridge crossings.

Lifetime of pumps is 2-5 years on average. Storage tanks last 15 years, and PVC pipes are depreciated over 15 years (even if they shall last up to 25 years).

## SOURCE OF REVENUES:

Water sales, service connection fees, sale of plumbing materials.

## WATER SOURCING:

Water sourced from underground reservoirs (77 wells and 1 spring), extracted as per rights outlined in the extraction permit. In about 10% of the cases, Balibago also buys bulk when own water source is not sufficient (from water districts, private companies or utilities that own deep wells).

## BUILDING/LAND SOURCING AND INSTITUTIONAL ARRANGEMENTS:

Generally, 50m$^2$ are required for a pumping station, while 300m$^2$ are required for a branch office with a warehouse and tank. When a new service area is selected, BWSI purchases land to build its pumping stations, though sometimes, property is donated to BWSI or leased for the duration of term of the contract by the local government.

# BALIBAGO WATERWORKS SYSTEM

## GOVERNANCE/ RELATIONSHIPS WITH LOCAL AUTHORITIES:

In 85% of BWSI branches, the company is granted a 35-year BOT (Build-Operate-Transfer) franchise under the jurisdiction of the municipality. The company pays a fee, which starts at PHP0.25 (US$ cents 0.6) per 1,000L produced, which increases over time. The local authorities do not make any investment into the system.

## REGULATORY FRAMEWORK:

A BOT law currently exists in the Philippines to provide a legal framework for private sector participation in public infrastructure. However, BWSI's model was developed before that law, on the basis of the Philippine Local Government Code, which empowered the local government to provide for basic services to the public, including water. BWSI operations and services are monitored by the National Water Resources Board (NRWB), which is authorized to conduct inspections, review utility reports and impose fines for failure to comply with national water standards.

## LEVEL AND DEPTH OF AWARENESS OF POPULATIONS IN NEED (REGARDING SAFE WATER, HYGIENE, SANITATION):

High level of education and awareness in semi-urban and affluent areas on clean water, hygiene and sanitation. Limited awareness in rural and low-income areas.

## MARKETING:

- Activities conducted and media used: None aside from some promotions consisting in giving away a limited numbers of waivers of the service connection fee in newly connected areas
- Value proposition: Dependable, convenient 24-hour water services with good pressure and potability; strong focus on efficiency and reliability of service
- Approach to developing consumer insights: No research done in connected areas; studies and surveys conducted when deciding whether to connect prospective areas that request BWSI services
- Consumer life cycle: Marketing promotions offered to prospective customers in newly connected communities; when a new user requests a connection, valid ID and a copy of land title (or certification of residency from the sub-municipal government) are required; in the absence of proof of residency, BWSI may enter into a side-contract with the user whereby the user gives BWSI the permission to discontinue a connection should that customer be evicted by the property's legal owner; monthly meter reading, billing and payment collection after connection; and customer service made available from branch offices to address water quality or maintenance and billing concerns
- How does it realize a loyal consumer relationship: Rapid and efficient service response to pump breakdowns or power outages, with interruptions aimed to be kept at 4 hours maximum; customers are offered free water at the BWSI branch office during service interruptions.

# CASE STUDIES

## PRICING:

Service connection fee totals PHP2,500-3,000 (US$57-68) while the average price of 1L of water across BWSI branches is PHP0.02 (US$ cents 0.05).

Initial, temporary tariffs for a newly connected BWSI branch are determined through a memorandum of agreement with the local government, and are benchmarked with surrounding water districts. Within one year of connection, BWSI must apply for a 5-year Certificate of Public Convenience (CPC), which results in a tariff reviewed and approved by the National Water Resource Board (NWRB) – the authority that handles private operators. The tariff is established on the basis of the capital invested and operational costs incurred. BWSI branches periodically submit 5-year proposals to the NWRB for each service area, on the basis of which tariffs are revised in renewed CPCs. As a result, each community has its own tariff. However, there are no large differences, including with public water district operators: tariff typically varies from PHP200 to 230 for $10m^3$.

## STORAGE: N/A

## DISTRIBUTION AND DELIVERY:

78 pumping stations (77 wells and 1 spring) across 31 branches deliver water to 74,306 connections as of end of 2010. Pressure: minimum of 16 psi targeted; most pumping stations deliver 20-25 psi on average.

## ENTREPRENEUR/FRANCHISEE SELECTION, IF ANY: N/A

## END-USER PAYMENT:

BWSI collectors visit connected houses to deliver monthly statements of accounts and to collect payments; customers may pay in person at the BWSI head office or branch offices; bill collection rate at 90%.

## END-USER FINANCING:

In a newly connected community, connection fee waivers may be offered to the first 100-200 customers who request a BWSI connection; connection fees may be paid in installments over 3-6 months on an exceptional basis.

## MAINTENANCE:

Each BWSI pumping station is maintained by a full-time pumping operator who is responsible for monitoring extraction, treatment and delivery on a day-to-day basis. BWSI undertakes overhauling maintenance every 6-12 months, during which old or damaged pumping motors or pumps may be upgraded. Maintenance issues are addressed by the BWSI Central Repairs and Maintenance Department, which mobilizes response to water system breakdowns. When conducting repairs, BWSI aims to limit service interruptions to a maximum of 4 hours. During power outages, most branches have access to at least one electricity generator which allows the central system to continue to function.

## WATER QUALITY CONTROL:

In accordance with NWRB requirements, BWSI submits monthly water samples from its pumping stations to a Philippine Department of Health-accredited laboratory for testing on bacteriological parameters. Tests on physical and chemical parameters are conducted every 6 months.

## MONITORING AND IMPACT MEASUREMENT:

The NWRB is responsible for monitoring BWSI's performance in the following areas: extraction levels, production quantity, water pressure, service quality and system investments. Monitoring is conducted through inspections and through the review of BWSI reports. If found to be failing to comply with NWRB standards, BWSI may be required to pay fines.

## FUTURE PLANS AND NEXT STEPS:

Within current service areas, future plans involve increasing numbers of wells to maintain water pressure as populations grow. BWSI, which has previously operated mostly in Central and Northern Luzon, has begun to expand to other regions south of Manila and has also begun to explore surface water extraction and treatment technologies in order to meet demand in places with limited underground water supplies Balibago is also considering entering the waste water management space.

# BALIBAGO WATERWORKS SYSTEM

## IS THE PROJECT:

### SOLVING THE PROBLEM?

**Problem and magnitude:**

- As of 2004, there were 15k diarrheal related deaths (3.1% of total deaths), and 481k diarrheal related DALYs (3.0% of total DALYs) recorded in the country
- 2008 improved water access coverage: 91%
- Prior to BWSI, most rural households extracted water from underground reservoirs some 6-30m deep in the ground through the use of hand pumps, which are labor intensive and are often shared with other households. Some utilize electric pumps to extract water, which adds to household energy costs. Neither method guarantees water quality

**Scale and reach:**

- Total number of connections in 2008: 55,858
- Total number of connections in 2009: 64,481
- Total number of connections in 2010: 74,306. This represents more than 370k people, and an average of about 2'400 connected household per branch
- Penetration rate in target communities varies over time. Penetration in newer branches can be as low as 2%, while penetration in branches where BWSI has been operational for more than 10 years reaches about 92%. The average penetration is 27%. BWSI targets a penetration rate of at least 50% on average. In faster branches, 1,000 households may be connected after the first year, in contrast to about 300 in slower branches

**Quality of water provided:**

- Monthly tests with accredited laboratories show that BWSI is in compliance with NWRB bacteriological standards
- Tests on physical and chemical parameters are conducted every 6 months

**Safe water needs addressed:**

- 472,823,750L/week produced on average in 2010
- 156L/day consumed on average per person (assuming 5 people/household and connection) across all user segments in 2010
- Balibago estimates its poorest users to consume about 180L/day/household, or about 36L/day/person

**Link with hygiene practices, sanitation and wastewater management:** None. Balibago does not propose any sewage solutions. Wastewater usually drains into the drainage system that is constructed and maintained by the municipality

**Acceptance and usage:**

- Acceptance among higher-income segments lags behind acceptance among lower-income segments, as the former tend to prefer to continue using their own private electric pumps and delay connecting to BWSI until such pumps break down and become too costly to fix or replace. This trend can be explained by the fact that in the areas where BWSI is active, those with electric pumps are an affluent minority who can afford the extra costs of a private electric pump for the assurance of having 24/7 supply with good pressure.
- Acceptance is influenced by regional and cultural norms. In the province of Pampanga, where the BWSI head office and most of its branches are located, people tend to view a water connection as a mark of status and actively seek it if it is within their means. But in the nearby provinces of Pangasinan and Nueva Vizcaya, the cultural norm is thrift, and households that rely on hand pumps generally stick to them until they run dry.
- Acceptance is influenced by seasonal factors as well. In areas where farming is the primary source of people's livelihood, the number of households seeking a BWSI connection tends to spike immediately after the harvest season

**Impact on health of beneficiaries:** No research available

**Other impact:** No research available

### ECONOMICALLY SUSTAINABLE?

**Fully loaded cost of 1L:** N/A

**Price of 1L:** US$ cents 0.05 (PHP0.02)

**At user level:**

- Average household income per month for average users: US$276 (PHP12k), equals to Purchasing Power Parity $442 (2009 data)
- Average household income per month for the poorer user segment: less than US$229 (PHP10k), equals to Purchasing Power Parity $369 (2009 data)
- This means that this project targets populations of the BoP 1000-1500, but also serves BoP 500-1000
- Assuming a monthly water bill of about US$11.7 (156L/day/person and 5 people/household) for average users, water expenses therefore represent 7-8% of a BoP 500 household income, or less than 4% of a BoP 1000 household income

- Assuming a monthly water bill of about US$2.7 (36L/day/person and 5 people/household) for the poorer users, water expenses therefore represent less than 2% of a BoP 500 household income
- Cost of alternative to customer: vendors sell at PHP2.11/L (US$0.05/L) of purified water; electric pumps cost PHP20k-25k (US$452-566) per installation
- Reaching the poorest would require subsidized tariffs and financing mechanisms to make the connection cost more affordable

**At project level:**

- Headquarters staff: 45; Branch staff: 310 (1 employee for every 200 customers)
- Capital expenditures: Over US$1m a year (both production and distribution infrastructure)
- 2010 revenues: US$7.08m
- Total costs (including cost of services and operating expenses): 6.3m, out of which bulk water costs of 58k (2009 figure)
- Royalty fees to operate branches: US$170k
- Profit after tax: US$406k
- Cost recovery: At least 500 household connections targeted in order to achieve payback on capital expenditures within 5-7 years. In actuality, fast-growing branches may achieve payback in as little as 5 years while slow-moving ones might take up to 10 years
- The profitability of each contract varies from case to case. Generally, operation of existing networks, with little initial capital investment, is the most attractive, followed by expansion and operation of existing networks
- Growth drivers are expansion of existing networks under contract plus the creation of 1-2 new branches per year, where the former calls for substantial capital investment outlays
- It is becoming more difficult to get new contracts as competition has significantly increased in recent years

*NB: End 2010 data, unless specified otherwise*


## ENVIRONMENTALLY FRIENDLY?

**Water efficiency:**

- Non-revenue water target: 10%
- Actual average non-revenue water: 12.73%
- Unaccounted line loss target: 5%
- Actual average unaccounted line loss 6.41%

**Energy consumption:**

- At Balibago main office, nearly PHP1.5 million (US$33,936) expense per month on electricity: 12-13% of revenues
- 33% increase in power costs in 2010 over previous year due to sharp nationwide increases in electricity rates
- In response to rising power costs, BWSI successfully pilot tested variable frequency drives and is now in the process of installing these devices on all pumping stations where big savings can be potentially gained

**Wastewater management:** none

**Chemicals used:** chlorine and chlorine dioxide

**Hardware recycling:** N/A

## SCALABLE AND REPLICABLE?

**Requirements/ prerequisites for the project to scale:**

- Long-term, patient capital
- Favorable political environment with local and municipal government officials willing to sub-contract to private operators
- To grow at a rate of 20-30 new franchises per year, PHP100-300 million (US$2.3-6.9 million) would be needed to fund capital expenditures. It would also require aggressive recruiting and training of new staff for opening teams and branches.

**Additional requirements/ prerequisites for the project to replicate:**

- Presence of at least 800-1,000 households, with a minimum 50% expected to connect, in order to enable payback on initial investment over 5-7 years
- Availability and accessibility of underground reservoir(s) for source water
- Availability of land or space to build and operate pumping stations
- Availability and affordability of electricity or other sources of energy to power pump motors.

# THE PEOPLE

Alfredo M. Salinda is the Managing Director of Balibago Waterworks Systems Inc. He joined Balibago after a six-year stint in a large urban water company that, at the time, serviced close to half-a-million connections. In the five years that he has spent at Balibago, he has been involved in supervising the daily operations of the company and the performance of its branches nationwide. He has also played a key role in the company's expansion.

Looking ahead, Mr. Salinda sees significant opportunities in geographical areas that continue to be under-serviced. He believes that attending to the needs of these communities will be the main driver of the company's future growth.

*Hypothesis: PHP43.71 = US$1; PHP27.1 = Purchasing Power Parity $1. BoP 500-3000 classification scale of 2002 was adjusted on U.S. Consumer Purchasing Index with latest 2010 available data (ftp://ftp.bls.gov/pub/special.requests/cpi/cpiai.txt). Prices of water and family incomes were converted following Purchasing Power Parity conversion factor for private consumption (LCU per international $) 2009 (http://search.worldbank.org/data?qterm=PPP%20conversion&language=EN).*

*Sources: Interviews with Allam Kahil and Mr. Alfredo Salinda during visit to BWSI offices and pumping stations on 24 January 2011; interview with Mr. Tito Panlilio and Mr. Alfredo Salinda in Board of Investments office on 11 February 2011; interview and emails with Mr. Jayson Anselmo on 10 February and 18 February 2011*

*Contact for the project: Alfredo Salinda (amsalinda@yahoo.com)*

**Alfredo M. Salinda,**
*Managing Director Balibago Waterworks Systems Inc.*

Why are you doing this work?

*When I was working in a large, urban water company, I felt a little lost amidst the scale of the work that we were doing. I was involved in business operations, handling various areas across Manila, but I felt that I was playing a very small role in a very big company. Balibago is much smaller in scale, so when I was asked to join, I felt comfortable that I could handle what happens down to the local branches. I felt that I could do much more in Balibago than in the large, urban water company.*

What was your "aha" moment?

*The company where I previously worked had a program that extended water services to poor areas. Through my involvement in that program, I have seen the effect of a water connection on communities and customers: how their standard of living remarkably rises and their productivity greatly improves. This is what is so satisfying in giving people access to water services.*

What were key challenges on the way?

*In urban areas, especially in Manila, the biggest problem is system loss. At my previous company, system losses were at levels that were unheard of, as far as I understand: we were only selling a bit over a quarter of the water we were producing! Here in Balibago, I do not encounter that challenge so much. We have sufficient water, adequate pressure, and customers are generally satisfied. Working in semi-rural areas brings out a great challenge to serve additional areas that do not have water. This is also a huge opportunity to satisfy a basic human need and move towards giving all communities access to clean, safe, adequate and, most importantly, affordable water.*

# 2AEP
# KAYES MONITORING PROGRAM

**2AEP,** Mali
www.2AEP.com

## EXECUTIVE SUMMARY

### ORGANIZATION:

Created in 2000, 2AEP is a privately-owned engineering consulting firm, providing financial and technical monitoring, advisory services (technical feasibility and socioeconomic studies, development of management tools), as well as training to water operators (users' associations and in one case a small private entrepreneur). The latter operate water systems (boreholes with network of standpipes and private connections) in rural and semi-urban areas of the Kayes region. Since 2007, 2AEP has also started installing new water infrastructure (extraction, storage and delivery).

### PROJECT:

The project is based on a 5-year contract started in January 2005 between the Mali National Department of Hydraulics (DNH) and 2AEP, giving the latter the responsibility and exclusivity for monitoring water operators in the Kayes region.

Before 2005, the monitoring activity was organized by the DNH and done by the CCAEP (Cellule de Conseil aux AEP). In 2005, a national bid for this activity was launched to select two operators: one for the Kayes region because of its specificities (isolated territory, poor road system, large number of water systems; won by 2AEP) and the remaining national territory (won by GCS-AEP). This development is a consequence of the DNH's willingness to:

- transfer to local authorities the responsibility for the supply of drinking water and hydraulic infrastructure, in the context of the implementation of the mid-90's decentralization policies
- professionalize the different players of the water value chain, including sub-contracting to private sector the operations of monitoring of the networks, and in selected cases the operating of the water infrastructure itself.

In 2005, 2AEP got delegated authority from the State to monitor water systems in the Kayes region. Since 2005, the geographical coverage of 2AEP has increased to 91 systems in 2010 (out of a total of 122 water pipes systems in the Kayes region). Of note, the 31 water systems not monitored in the territory are those of the EU-financed Regional Solar Program and World Bank-financed Rural Infrastructures National Program, which have not given formal approval for being monitored by 2AEP.

The work of 2AEP is monitored by the relevant DNH division – the STEFI (Suivi Technique et Financier/ Financial and Technical Monitoring). Following the contract won in 2005, 2AEP's main missions are:

1. Collection, process and analysis of operational efficiency and financial data through weekly written reports/ radio/ mobile communications and biannual field visits; to be communicated to all stakeholders (i.e., local operator, municipality, DNH/STEFI)
2. Recommendations to local operators, municipalities and water users' associations to improve the performance of water service, derived from the audit conclusions
3. Continuous technical training of operators and water users' associations.

In its perimeter, 2AEP's work typically resulted in:

- Increased sustainability and quality of water service (decrease in water cuts frequency, stabilized if not lowered water price, secured financing for repair and renewal of equipment)
- Increased financial sustainability (optimization of operating costs, increased bank and cash savings)
- Increased transparency (enforcement of national and regional regulation, implementation of management tools, and improved communication).

## INNOVATION:

- Cost-efficient automation of the monitoring: Creation of a low-cost, automated database with semester results, including data on unpaid water fees, savings, and infrastructure depreciation.
- Incentives alignment: As 2AEP is remunerated on a percentage fee per $m^3$ of water sold, it has a positive incentive to add more customers and help increase volumes sold, while keeping water prices at acceptable levels.
- Strong transparency focus: Thorough and transparent communication to the different stakeholders (households, users' associations, local leaders, village authorities) on the system's efficiency creates significant pressure to improve performance, following 2AEP's recommendations.
- Combination of monitoring and advisory responsibilities: Having in-depth insights on the performance of centers, 2AEP is also able to provide focused advice to its clients (mostly regarding replacement, maintenance, and management of generators, investment options, and recurring expenses optimization).

## RATING:

- Social impact: 2AEP helped improve water service quality and sustainability for over 400k people, i.e., 27% of the Kayes region rural population (1.5m). For instance, it helped increase efficiency and consequently reduce price of water (up to 20% decrease in some cases), as well as lengthen the life of infrastructure and increase finances available for repairs. 2AEP's upcoming projects seek to better organize systems' maintenance services and create federations of operators (notably to pool funds for infrastructure installation/ rehabilitation/ expansion).
- Economic sustainability: 2AEP has financially sustainable operations, with water fees covering the costs of monitoring the network (transport and experts). While other services offered, beyond monitoring services (such as advisory) add to the top line. However, this economic balance is linked to fee-setting by the DNH.
- Scalability and replicability: 2AEP has potential for scale left, given its current coverage of 75% of water pipe systems in the Kayes region. 100% coverage could be achieved during another, upcoming bidding term, but would also depend on the operators' willingness to improve their operations, as well as users' ability to find alternative sources of water in case of system breakdown. It is furthermore estimated that 40 new systems will be built over the 5 coming years, with a growing number of private connections. Replication would mostly require similar governance and contractual frameworks, as well as strong support from the public authorities (as well as donors financing new infrastructure) to ensure compliance of municipalities and operators. Sufficient density of water systems is also a prerequisite to reach economic viability.
- Environmental impact: Good to very good water efficiency with decrease in water losses from 15% to 7 % of water production. Energy efficiency could be significantly improved, by finding satisfactory combination of solar panels and generators.

# PROJECT CURRENT STATUS

**DATE OF CREATION:** 2005

**SERVICE DELIVERED:**

Technical and financial monitoring, advisory and training of local water operators, municipalities and water users' associations.

**GEOGRAPHICAL FOCUS:**

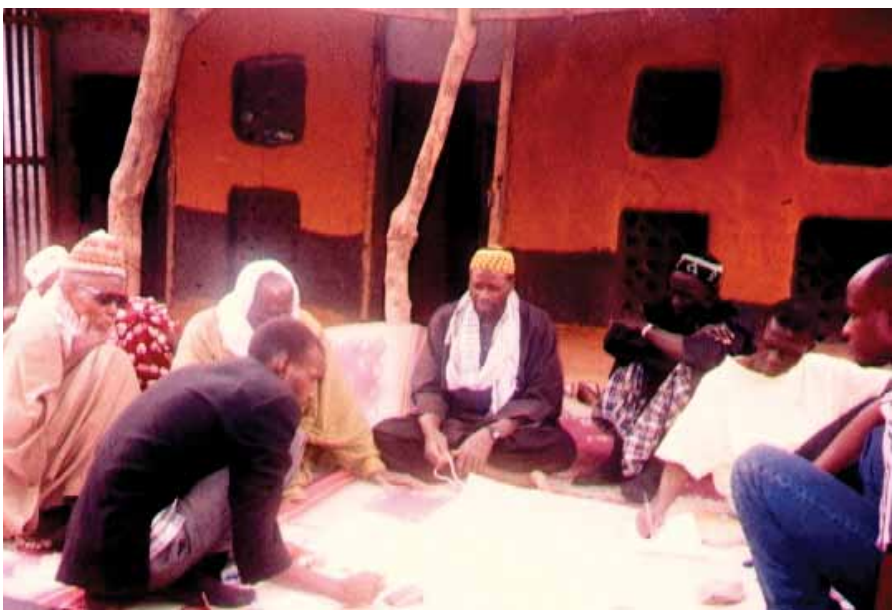
Mali, semi-urban (10k-15k people/ town center) and rural (2k-10k/town) areas of Kayes region. In the region, water is provided by water pipe systems (30%, especially in the north of the region), hand pumps (40%, difficult maintenance, impossible to monitor), and modern pumps (30%). 2AEP only provides services to water pipe systems.

**COMPETITIVE LANDSCAPE:**

During its 5-year contract (now extended to 6), 2AEP had the exclusivity to operate in the Kayes region. A new tender will be issued mid-2011.

**PARTNERS AND FUNDERS INVOLVED:**

- National/ regional authorities: The DNH (national authority) and the DRH (Kayes regional authority) have a regulatory and monitoring role. They review and consolidate the monitoring reports produced by 2AEP, and are present during field visits.
- Municipalities: As a result of the decentralization program initiated in 1995, municipalities have been designated by the State as entities responsible for the quality of water and the continuity of the service. They are responsible for investing and maintaining infrastructure that has a life expectancy superior to 20 years (water towers and hydraulic network). For infrastructure that has a lower life expectancy, municipalities are required to delegate operations to water users' associations or small private operators, that municipalities select and supervise.
- Users' associations: A users' association is an informal body representing water system's users. If the system is managed by a private operator, it acts as an interlocutor on issues of quality and service. In the case of a water system managed by the community, the association appoints a General Assembly, on the basis of 2 delegates representing the families using a same standpipe or a set of 10 to 20 private connections. This Assembly is in charge of all decisions related to issues highlighted in the audits, as well as appointing a team in charge of operating the system. This team typically consists of 4 full-time employees (director, mechanic, plumber, and treasurer), assisted by part-time volunteers and 1 distributor per standpipe paid through a 10% margin on water sales. The distributors operate 6 hours/day at standpipes, and manage the rest of their time small businesses near standpipes
- Local operators: Person or entity, public or private, in charge of the financial and operational aspects of the water system operations (including maintenance, repair and replacement of the water infrastructure with a life expectancy inferior to 20 years, as well as billing and collection of the water sales). Since 2007, the DNH has been promoting the introduction of private operators in areas where users' associations could not run operations at a satisfactory level. In the Kayes region, out of the 91 operators covered by 2AEP, only one is a private operator (in Kéniéba). The rest is users' associations.



## TECHNOLOGY USED AND INSTALLATION REQUIRED:

- Water system operators: Motorized pumps and boreholes systems supplying networks of standpipe/ private connections, with metal or concrete storage tank. The systems are typically powered by generator or solar panels. 68% of households covered in the perimeter of 2AEP have private connections (at an average cost of US$200), vs. the remaining ones that use standpipes (cost of US$940)
- 2AEP has created its own automated database tracking bi-annual performance results, including data on unpaid water fees and users' association savings. It takes into account more qualitative criteria (such as hygiene audits of the areas around standpipes), provides an analysis of local water usage, and allows easy comparison among installations. 2AEP is discussing with STEFI the possibility of using this tool at the national level.

## SOURCE OF REVENUES:

- For operators: Water is sold at standpipes and users pay directly the price of water to the standpipe distributor. Each standpipe is visited weekly by the operator who reads the meter, proceeds to the billing and collection for the association's treasurer. The operator also proceeds with billing and collection of private connections on a monthly basis
- For 2AEP: generates revenues by collecting a fee per $m^3$ produced. This covers typically its STEFI services (audit, recommendations and training of operators and user associations). 2AEP otherwise sells other services, for a fee (e.g., technical feasibility and socio-economic studies, training to municipalities, installing small water infrastructure). These are additional sources of income.

## GOVERNANCE/RELATIONSHIPS WITH LOCAL AUTHORITIES:

- Operators: Operators must sign a contract with the mayors and village chiefs. This document outlines respective responsibilities and sets prices. As the contractor is also a client, this set up may put the operator in a difficult situation, when local administrations delay payment of their bills. However, local administration may also assist operators with recommending the use of safe water to the inhabitants rather than alternative unprotected sources of water
- 2AEP: Besides of the 5-years DNH contract providing exclusivity in the region, 2AEP must sign contracts of technical monitoring delegation with each municipality.

## REGULATORY FRAMEWORK:

Standards on water quality are set by DNH, based on WHO recommendations. STEFI operators activities are regulated by the National Development Strategy of Drinking Water Access (November 2007).

## LEVEL AND DEPTH OF AWARENESS OF POPULATIONS IN NEED (REGARDING SAFE WATER, HYGIENE, SANITATION):

Hygiene and sanitation are an important part of 2AEP's audit and advisory work. Information and awareness campaigns are organized when new infrastructure is installed. In addition, 2AEP encourages municipalities to create hygiene and sanitation commissions to coordinate these efforts. Overall, level of awareness is closely linked to availability of alternative sources of water: The more alternative unprotected ground water sources, the less awareness.

## MARKETING:

- Activities
  - Pre-launch/launch: Local campaigns to increase trust, transparency and ownership around the project
  - Post launch: Training of users, users' association, operators; weekly calls with operators on utilization levels; audits (technical, hygiene, financial criteria) on a bi-annual basis; communication on performance levels; action plan with recommendations
- Value proposition to end users: better transparency; independent monitoring; increased cost savings (price decrease by up to 20%); increased water availability
- Consumer life cycle management: N/A

# CASE STUDIES

## PRICING:

- Operators: The selling price results from an agreement between final users, the operator, and the municipality, on the basis of 2AEP's estimates. It takes into account the technical and operational costs (specific to each installation), in addition to an eventual profit margin in the case of private operators. Average price in rural areas is CFA500 or US$1.04/m$^3$ (vs. US$0.52/m$^3$ price recommended by Water Regulatory Commission in urban areas), but prices vary significantly, even within the same municipality (from US$0.73 to CFA1,250 or US$2.6/m$^3$). Prices at the standpipe are higher than those for private connections, disadvantaging the lower income families (standpipe users pay the fee/m$^3$, plus the 10% margin of the standpipe distributors)
- 2AEP charges a fee of CFA20 or US$ cents 4 per m$^3$ (4% of the average selling price in rural areas), determined by the DNH (following estimates provided by the donors supporting the project—KFW and AFD—on levels required to cover costs).

## STORAGE:

Water is stored in metallic tanks of capacity ranging from 10 to 150m$^3$.

## DISTRIBUTION AND DELIVERY:

Low income households typically fetch water at the standpipe, while higher income households pay for private connections.

## END-USER PAYMENT:

- Operators: Collection rate reaches 97% over the 2005-2010 period in centers monitored by 2AEP. Payment issues are most often local, and related to delays in payments from the administration
- 2AEP: Collection rate reaches 95%. Payments are done on a bi-annual basis, at the presentation of the audit's results to the municipality's General Assembly. In some areas, due to logistic issues, payment is made on an annual basis.

## END-USER FINANCING: None

## OPERATOR FINANCING: None

## MAINTENANCE:

Maintenance and extension of water pipes systems are financed out of a percentage of revenues retained on bank accounts, checked by 2AEP. Maintenance works is actually carried out by local mechanics, at high prices, and significant breakdown time (average breakdown of 24 hours, sometimes up to 72 hours) due to lack of trained mechanics, and spare parts availability.

## WATER QUALITY CONTROL:

According to national regulation, water quality of all water networks should be monitored on an annual basis by the DNH (physical-chemical and bacteriological conformity). However, water quality is not monitored, except in cases of new water system installations, or when ground-water tables are submerged by rain water. According to DNH regulation, water treatment (through chlorine) is compulsory and implemented for water systems with hydraulic networks superior to 10km (all large semi-urban systems are concerned).

## MONITORING AND IMPACT MEASUREMENT:

2AEP tracks indicators such as frequency and duration of outages, production average, level of expenses, water consumption/month. The performance of 2AEP is itself monitored by the relevant DNH division on 3 main criteria: conducting of field audits on a bi-annual basis; limiting breakdown time of water systems to 72 hours; generating and communicating the audit's results. Additionally, the users are encouraged to give their opinion on the operator's service through the users' association and the municipalities.

## FUTURE PLANS AND NEXT STEPS:

- As a consequence of the DNH's willingness to increase competition for the 2011 STEFI national bid, a third region was created, on top of the existing 2 ones. 7 companies are competing for this bid, including 2AEP
- 2AEP is also planning to develop other activities, such as socioeconomic and feasibility studies, maintenance services, while working at the same time on the organization of a water pipe systems federation. Working in collaboration with the municipalities' union, this federation would be the sole and more powerful interlocutor of administrations, and would pool operators' savings to decide collectively on the installation/ rehabilitation/ expansion of water pipe networks in a given area
- The DNH is examining the possibility of extending monitoring contract of STEFI operators to manual hand pumps. 2AEP would participate in that effort
- 2AEP is exploring opportunities to expand in Mauritania (possibly by mid-2011).

# IS THE PROJECT:

## SOLVING THE PROBLEM?

**Problem and magnitude:**

- As of 2004, there were 23k diarrheal related deaths (10.5% of total deaths), and 740k diarrheal related DALYs (10.5% of total DALYs) recorded in the country
- 2008 improved water access coverage: 56%
- 30% of water infrastructure is not in use across the country (2007 data). This varies from 13% for standpipes to 34% for hand pumps
- In Kayes region, average coverage of 1 water point for 96 people but significant disparities in some areas with 1 water point for more than 400 people

**Scale and reach:**

- In Kayes regions, increase of the number of centers monitored from 15 to 91 (between 2005 and 2010), out of a total 122 centers
- 405k indirect beneficiaries in 2010

**Quality of water provided:** No systematic water quality monitoring by 2AEP, nor by public authorities.

**Safe water needs addressed:** Effective water consumption/water system/day/person: about 10L depending on the season

**Link with hygiene practices, sanitation and wastewater management:** Hygiene practices are monitored by 2AEP. Audit includes examination of water points, of septic tanks, and waste management around standpipes.

**Compliance, acceptance and usage:**

- Quality and taste of the water has been challenged in some communities (mostly where brackish water), causing reduced water consumption from water pipes (less than 5% of families concerned)
- In some areas, no sufficient capacity to meet the users' consumption needs (either production capacity, or water resources issues). No organized rationing process exists in those cases
- Important seasonality of piped water sales (with the quantity of water being more than halved in the rainy season compared to the dry season) due to consumer habits and migration (with inhabitants leaving the village for more remote areas during the rainy season)

**Impact on health of beneficiaries:** Consecutively to water systems installation, health surveys have been conducted by local health center, showing positive results. No systematic health monitoring afterwards.

## ECONOMICALLY SUSTAINABLE?

**Fully loaded cost of 1L:** CFA425 or US$ cents 0.088 (average)

**Price of 1L:** CFA500 or US$ cents 0.104 (average)

**At user level:**

- Average household income per month of beneficiary household: US$48 (CFA23,040), equals to PPP$76 (2009 data)
- This means that this project targets populations of the BoP 500
- Assuming average water consumption of 10L/person/day and 5 people/household, water expenses therefore represent about 1% of a BoP 500 household income (or US$1.6)

**At operator level:**

- 4 full time employees per operator, 1 distributor per standpipe
- 91 water systems with CFA774k/month revenues (US$1'614) and CFA94k/month profit (US$196).
- Profit is saved in bank and micro-finance accounts (91%) and in cash (9%) to finance future maintenance, rehabilitation, or extension of systems. The strong increase in deposits underline the need for constant monitoring of these accounts, and the opportunity of defining a maximum threshold to carry investments in infrastructure

**At 2AEP level:**

- Annual revenues: CFA27m (US$56.3k) (NB: HYSTRA estimate of STEFI-related turnover)
- 7 people working full time, computers, and vehicles
- Present amount of fees reportedly ensures only coverage of expenses

*NB: Based on 2009 S2 and 2010 S1 figures*

# CASE STUDIES

## ENVIRONMENTALLY FRIENDLY?

**Water efficiency:**

- Water losses are relatively low (7% of total water production vs. 15% before AEP's action) and concentrated (Bafoulabé, Kita). However, losses slightly increased in 2010 due to malfunctioning floats installed in the water towers (concerns only newly installed water systems), and network leaks following private or illegal connections badly performed
- 15% water losses (out of total amount of water contained in hydraulic network and water towels) remains maximum tolerance rate

**Energy consumption:**

- Efficient energy consumption when solar panels are installed
- For systems using solely generators, energy efficiency could be significantly improved, by combining them with solar panels

## SCALABLE AND REPLICABLE?

**Requirements/ prerequisites for the project to scale:**

- Strong State and investors' support to ensure compliance of municipalities and operators, in terms of performance standards and fee payments to 2AEP
- Making water system management training compulsory for municipalities/ mayors would also increase local capabilities and ultimately revenue levels of operators (such trainings are provided by 2AEP but are at the municipality's cost and initiative)
- Keep increasing the range of services offered to operators (e.g., maintenance, sourcing of technology, water quality control)
- Further investments into new, extended water infrastructure

**Additional requirements/ prerequisites for the project to replicate in other regions:**

- High density of water systems (estimated maximum 50km distance between 2 water systems, depending on the capacity of the system)
- Appropriate institutional and regulatory environment

# THE PEOPLE

Co-Founder of 2AEP, Boubacar Macina is from Bamako, Mali. After studying law and socio-anthropology at the Mali National Administration School (ENA), Boubacar worked at the Canadian International Development Agency (CIDA) as a consultant, before joining a local NGO, Convergence.

He then started to work on the project "9 centers of the Kayes region", financed by the German Development Agency KFW. This project aimed at developing and monitoring water pipe systems. Working in the Kayes region was both a challenge because of the territory's isolation, and an opportunity because of its large water infrastructure network. This project brought him his first experience in the water sector, but most of all, provided him the opportunity of meeting those who would later become the other co-founders of 2AEP: Kassé SACKO, a sociologist, Moussa DAO, a socio-economist, and Kama DIABATE, a legal expert. Once the project was completed, they all decided to pursue water systems monitoring in the region through the creation of 2AEP in 2000.

Learning from other STEFI operations in the region, their goal was to improve their model in terms of financial sustainability, enabling larger scale and impact, and to participate to the institutionalization of water monitoring organized by the state. A key moment was their success at the 2005 STEFI national bid for monitoring of water systems in the region of Kayes. Having achieved a total coverage of more than 90 water systems and 700K people, Boubacar is looking to increase coverage in the Kayes region through its participation to the 2011 national STEFI bid, as well as in new regions, to cover water systems more rapidly.

*Hypothesis: CFA480 = US$1; CFA240.34 = Purchasing Power Parity $1. BoP 500-3000 classification scale of 2002 was adjusted on U.S. Consumer Purchasing Index with latest 2010 available data (ftp://ftp.bls.gov/pub/special.requests/cpi/cpiai.txt). Prices of water and family incomes were converted following Purchasing Power Parity conversion factor for private consumption (LCU per international $) 2009 (http://search.worldbank.org/data?qterm=PPP%20conversion&language=EN).*

*Sources: Interviews of Boubacar Macina (Co-Founder and Manager of 2AEP), Daniel Faggianelli (L'ACQUA), Denis Desille (PS Eau) on 16-18-23-24-.02.2011 and 01-02.03.2011; www.2AEP.com*

*Contact for the project: Boubacar Macina, Co-Founder and Manager (bmacina@2AEP.com)*

**Boubacar Macina**
*Co-founder and Manager of 2AEP*

What was your aha moment?

*I was working on the project "9 centers of the Kayes region". After the negotiations with the water and local authorities, the awareness campaigns, and the water system installation, came the moment of digging to reach the water tables. The people's motivation and their enthusiasm at the sight of water rising from the earth is an experience impossible to describe.*

What are the key challenges you have faced?

*1) Build a team, capable of providing monitoring, advisory, training, repairs*

*2) Monitor operators that are highly dispersed geographically*

*3) Increase confidence of the many different stakeholders in the project*

What are the key lessons learnt?

*1) One really must be passionate and patient about working on the BoP, because it is a difficult job and beneficial to users only if sustainable*

*2) One must remain humble while working with the communities, valuing their knowledge, accepting the local specificities, and taking the time to accompany the beneficiaries through this learning process.*

*3) Working with local communities at the BoP is all except rocket science. Mistakes are usual and normal; we must learn from them.*

# APPENDIX I
## HYSTRA AND PROJECT TEAM

### Olivier Kayser – Hystra Founder and Managing Director

Olivier founded Hystra in January 2009. A former Ashoka Vice-President for Europe, Olivier continues to serve Ashoka as a Senior Advisor. While at Ashoka he created the Ashoka Support Network, a rapidly growing global network of over 300 business people in 20 countries who support Social Entrepreneurs financially and with their expertise. He also contributed to Ashoka's global work on 'Hybrid Value Chains'. Olivier personally advised over 20 social entrepreneurs in developing their strategies and building partnerships with corporations.

Previous to that, Olivier was a Director with McKinsey & Company, where he spent 18 years. Based successively in Paris, Chicago, Hong Kong, Shanghai and Beijing offices, he served a wide variety of clients among which various leading multinational corporations in their entry strategy to China, India and South East Asia markets.

He serves as a Board member of GAIN, CDI Europe, Light Years IP, Ashoka UK, Ashoka France, as well as two international corporations (GeoPost and Belron).

### Alexandre de Carvalho – Hystra Network Partner

Alexandre founded Sankhôfa, a consulting firm helping corporations create value via a human-centered strategy in October 2008.

He worked as the Global Program Director at the Clinton Foundation, in charge of the Pediatric HIV/AIDS Initiative, where he also contributed to the launch of their integrated development program in Rwanda.

Prior to that, Alexander was a Senior Manager with a leading global pharmaceutical group for 23 years, in four continents. Notably, he was the Managing Director of Francophone Africa and India for seven years, when he developed innovative human-centered business approaches focused on bringing health to the local populations.

He serves on the Advisory Board of Pro-Natura International, a development NGO focused on technology-enabled development programs in Africa.

### Jessica Graf – Hystra Project Manager

Jessica joined Hystra, after spending four years with McKinsey, where she worked in Logistics and Transportation, Pharmaceuticals and Financial Services. Her assignments brought her all over Europe, as well as South Africa.

Prior to that, she was the Managing Director of Vietnam Holding Asset Management – a dedicated asset management company investing into Vietnamese companies undergoing privatization.

Jessica also worked seven years for the public and non-profit sector in Eastern Europe, the Balkans, the Caucasus, and South Asia. She notably served the State Secretariat for Economic Affairs of Switzerland, the United Nations Development Program, the Organization for Security and Cooperation in Europe, the International Organization for Migrations, and Action Against Hunger.

She holds an MBA from INSEAD, where she led a project related to hybrid business models for micro-insurance. She also holds a degree from the University of Geneva in Political Science and Public Administration.

### Urs Heierli – Founder msd consulting

Urs founded msd Consulting GmbH (Markets, Sustainability and Development), a consulting company specializing on economically sustainable approaches for development, in 2003.

He was also a co-Founder and Director of SKAT (Swiss Resource Centre and Consultancies for Development).

Urs has worked as Country Director for the Swiss Agency for Development and Cooperation in Bangladesh and India, from 1987 until 1999.

He holds a Ph.D. in Economics from the University of St. Gallen, where he gives lectures on development cooperation.

Currently, Urs is working on several publications and is implementing projects in the area of social enterprises catering to the BoP in the field of nutrition, safe water and micro-irrigation.

### Christian Vousvouras – Project Consultant 300in6

Christian has worked as a Project Consultant at the Water and Sanitation Program of the World Bank in Peru. More specifically, he contributed to the implementation and evaluation of the global initiative "Creating Sanitation Markets".

Prior to that, he worked as an attaché at the Permanent Mission of Greece to the UN in Geneva, at the Foreign Ministry in Athens and at the German Consulate in Barcelona.

He is a Ph.D. candidate in International Business at the University of St. Gallen. Christian is also the author of the booklet 'Safe Water at the BoP', published at the World Water Week 2010, in Stockholm.

# APPENDIX II
## METHODOLOGY

### Introduction

This section details the hypotheses and frameworks used to determine baseline and impact estimates with regards to:

a) Total population without access to safe water

b) Total population in need that could benefit from a given solution cluster

c) Total population in need potentially reached solution cluster

d) Number of lives and DALYs potentially saved by a given cluster solution

e) Economic opportunities generated by a given cluster (notably in terms of total annual revenues generated).

Furthermore, this section explains how cost structures were estimated, in order to evaluate the size of investments required.

In addition, this chapter presents the framework used to rate the different dimensions analyzed in the case studies.

### Baseline and impact estimates

For baseline and impact estimates, the Hystra Project Team only took into account populations living in Africa, Asia (excluding Japan) and Latin America. Wherever possible, data was calculated on a country basis, and then aggregated back at regional level.

Further, the Hystra Project Team assumed that solution clusters could be applied across regions, without significant variations in impact, operational and financial structure. It is however clear that local management capacity, cost of supply and labor, infrastructure, government constraints, user preferences, competitive landscape vary significantly. To compensate for the crudeness of this extrapolation, the Hystra Project Team made, wherever possible, conservative assumptions on potential impact and feasibility.

#### a) Total population without access to safe water

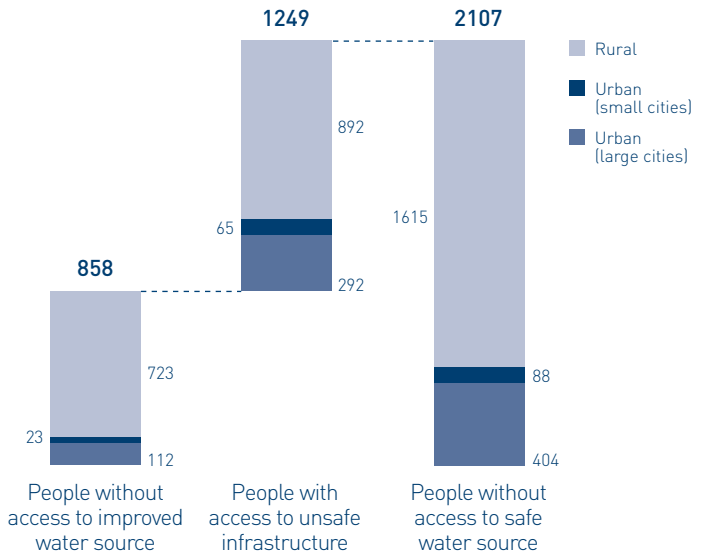
To develop estimates on the total population without access to safe water, the Hystra Project Team based its calculations on the latest available Millennium Development Goals JMP data[79], which measures the number of people without reasonable access to an improved water source.[80]

However, access to an improved source does not necessarily guarantee access to safe water. We therefore took the total population without access to improved water sources, and added up those instances where an improved water source infrastructure would not deliver safe water. The total of the two represents the population without access to safe water. For instance, surveys demonstrate that in 11% of the cases, piped water is not safe. Hence, 11% of all people with piped water access were added back to the total of people with no access to an improved water source, in order to get the total number of people without access to safe water.

With regard to the safety of different types of improved water infrastructure, assumptions are taken from the latest JMP RADWQ[81] survey on the topic.

In addition, the Hystra Project Team distinguished the populations living in large urban centers, from those living in 'small cities', i.e., semi-urban areas with agglomerations between 2,000 and 20,000 inhabitants, and those living in rural areas (i.e., below 2,000 inhabitants per village).[82]

**Figure 23. People with without access to safe water (millions, 2008)**




79 *Source: WHO and UNICEF Joint Monitoring Program (JMP) for Water Supply and Sanitation.*

80 *Millennium Development Goal definitions: Improved drinking water sources: Improved water source is defined by the United Nations as types of water infrastructure that are more likely to provide safe water than un-improved ones. Improved sources include: household connections, public standpipes, boreholes, protected dug wells, protected springs, and rainwater collection systems; Reasonable access: Availability of at least 20 liters per person per day from a source within one kilometer of the user's dwelling.*

81 *Millennium Development Goals Joint Monitoring Program for Water Supply and Sanitation Rapid Assessment of Drinking-Water Quality (WHO and UNICEF), in press.*

82 *Percentages of urban population living in small cities (and towns) between 2k and 20k inhabitants: Africa 15%; Asia: 19%; Latin America: 18%; Developing countries average: 18%. Source: http://www.iied.org/pubs/display.php?o=10537IIED; ww.citypopulation.de.*

**Table 5. Hypotheses with regards to safety of improved water infrastructure[83]**

| Estimated data | Estimated Percentage | Based on following data source |
|---|---|---|
| Proportion of piped water that is safe | 89% | Improved piped infrastructure in urban and rural areas |
| Proportion of borehole water that is safe | 69% | Improved non–piped infrastructure in urban areas |
| Proportion of protected dug wells that is safe | 43% | Improved non-piped infrastructure in rural areas |

### b) Total population in need that could benefit from a given solution cluster

The Hystra Project Team has attempted to estimate how many people in need live in environments where a given solution cluster could be appropriate and cost-effective. This estimate is different from the number of people that a particular solution could possibly reach, as the expected penetration (among people in need) varies by type of solution.

To assess which environment would be relevant for each cluster, two factors were used:

- The level of population density – i.e., whether potential users lived in urban, semi-urban or rural areas
- The level of pollution of the water – i.e., the cleanliness of water poor users have access to.

As a result, the scope of each cluster of solution was limited to the following environments:

→ Pumping & Harvesting solutions are most effective in areas where underground water is in principle clean, and where population density is low.

→ Devices and Flasks & Tabs are solutions for populations in small villages, where water does not require complex treatment.

→ Plants & Kiosks are the most cost-effective solution in areas where water is brackish/ heavily polluted, with a relatively high population density

→ Pipes & Taps are most effective in areas with high population density.

a) 'Mini-Utilities' (i.e., small, independent piped networks) are sustainable and affordable only in areas where water requires limited treatment (e.g., chlorination and filtration)

b) Large utilities are most appropriate in large cities, as they achieve significant economies of scale both in terms of treatment and distribution operations.

There is a certain amount of overlap between these solutions, which the Hystra Project Team took into account whenever working out aggregate figures, in order to avoid double-counting. For instance, the figures for Devices, Flasks & Tabs include populations living in areas where raw water is in principle clean, but where a filter or chlorine would provide an additional assurance of water safety until consumption. The figures for Plants & Kiosks include populations living in semi-rural areas as well as highly polluted urban areas, where mainstream large public utilities fail to deliver safe water. Finally, there is a certain overlap between 'Mini-Utilities' and large utilities. 'Mini-Utilities' could flourish in large cities, where the main utility is unable to expand to under-serviced areas, as long as the water is not heavily polluted.

*83 Percentages based on data from WHO and UNICEF Joint Monitoring Program for Water Supply and Sanitation Rapid Assessment of Drinking-Water Quality (in press). Applicability of data source based on Hystra assumptions.*

**Table 6. Overview of criteria used to determine how many people each cluster of solution could be appropriate for**

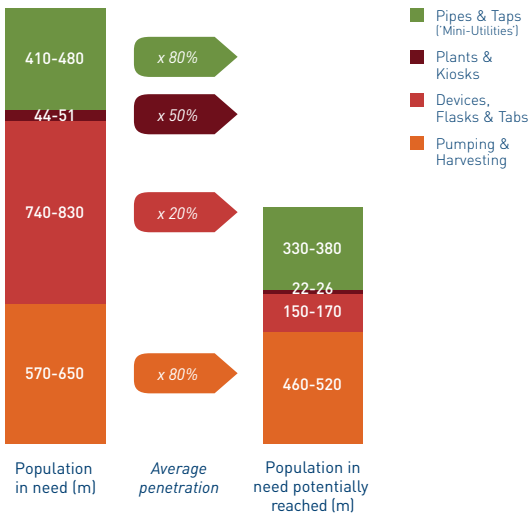
| Cluster | Criteria density of population | Criteria water pollution[84] | Remarks |
|---|---|---|---|
| Pumping & Harvesting | Villages with <2,000 people | Electrical conductivity <2500; dissolved oxygen concentration >5; and suspended solids <100 | Given the lack of reliable estimates on the number of installed manual pumps to date, the Hystra Project Team took the percentage of the population that had access to a non-piped improved water source in rural areas, and discounted that by 50%, as not all non-piped improved water sources would require a pump. For reference, assuming that pumps come with boreholes only: pumps represent 66% of the total improved water infrastructure in rural India, 70% in Pakistan, 21% in Nigeria, 50% in Mali, and 18% in Kenya and Angola. |
| Devices, Flasks & Tabs | Villages with <2,000 people | Electrical conductivity <2500 (that includes overlap with Pumping & Harvesting) | Devices, Flasks & Tabs can serve in areas where the source of raw water is in principle clean but where water itself could be re-contaminated. As such, there is an overlap with Pumps. A more restrictive definition would only count for areas where water is bacteriologically polluted. |
| Plants & Kiosks | Towns with 2-20k people for semi-urban areas, and cities of >20,000 people for urban areas | Electrical conductivity >2500 | Kiosks are appropriate solutions for semi-urban, highly polluted areas, as well as temporary solutions for highly polluted urban areas where public utilities fail to deliver safe water. As such, there is a partial overlap with large utilities in urban areas. |
| Pipes & Taps | Cities with >20,000 people | Electrical conductivity <2500 for 'Mini-Utilities'. No restrictive pollution level for large utilities | Within Pipes & Taps, 'Mini-Utilities' are applicable to small and large cities where water is not very polluted, while mainstream large utilities are applicable in large cities. There is therefore a certain overlap between large and mini utilities. |

## c) Total population in need potentially reached by a cluster of solutions

'People reached' encompasses all people in need, who may actually adopt the safe water service/product offered, given the penetration a given cluster can achieve.

Assumptions relative to penetration levels by cluster are based on conservative averages, observed across the case studies.

**Figure 24. Average penetration levels observed by cluster, used to calculate population in need potentially reached[85]**




*84 The Project Team used three proxy indicators to assess the level of pollution in a given country: a) Dissolved oxygen concentration: Threshold: 5mg/L. Proxy indicator for stagnant water and the level of bacteriological contamination; b) Electrical conductivity: Threshold: 2500 µS cm-1. Proxy indicator for brackishness and what is referred to in the text as heavy pollution; c) Suspended solids: Threshold: 100mg/l. Proxy indicator for turbidity*

*In the case of electrical conductivity, there are very few (yet large) countries that register a level over 2500 µS cm-1. In order to avoid taking the entirety of a country (or not) based on a single country average, the Project Team derived a worldwide repartition of pollution levels for electrical conductivity, and applied this repartition to each country. Source of pollution data: http://sedac.ciesin.columbia.edu/es/esi/archive.html (University of Columbia, Socio-economic data and applications center, Environmental Sustainability Index).*

*85 Only incremental impact of each solution has been considered, to avoid double-counting. For instance, to ensure better health outcomes, the rehabilitation of Pumps should be accompanied by the distribution of Devices and Flasks & Tabs. However, in order to avoid any overlap with Pumping & Harvesting, Devices, Flasks & Tabs were only considered for populations living in areas where water is bacteriologically polluted.*

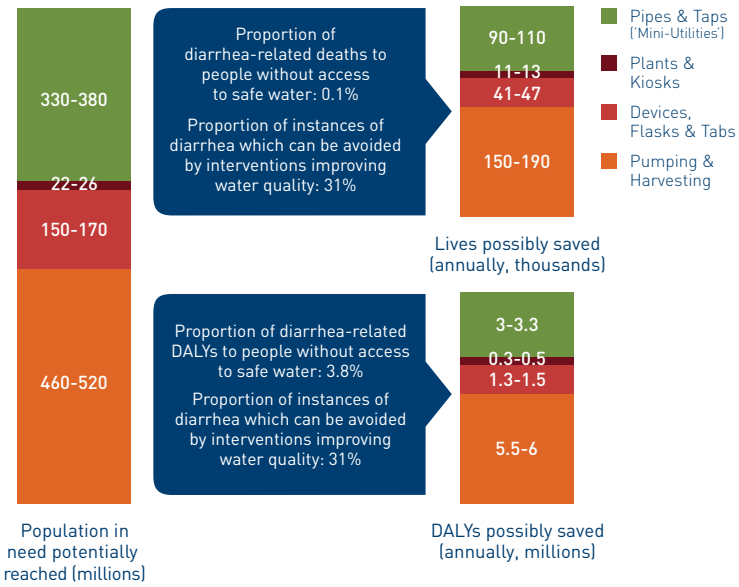
### d) Number of lives and DALYs potentially saved by a given cluster of solutions

Impact on lives and DALYs has been calculated on the basis of the ratio of people dying from diarrhea out of the total population without access to safe water. Hence, for every person given consistent access to safe water, it is assumed that a relative proportion[86] of the diarrhea-related deaths can be averted. This proportion has been further discounted for the fact that safe water interventions typically only solve for about 31% of diarrhea cases.[87] A similar approach was adopted to calculate DALYs.

As scale-up strategies proposed in this Report are designed to be self-sustainable, one could count that these deaths (and DALYs) would be averted for a number of years to come (typically at least 5 years).

All data and assumptions are based on WHO data.[88]

**Figure 25. Average impact ratios used to calculate lives and DALYs saved, in light of population reached**




### e) Economic opportunities generated in a given cluster

The Hystra Project Team attempted to assess the economic opportunities that the development of solution clusters would represent for local entrepreneurs as well as international companies. To do so, it multiplied the price that low-income households were able and willing to pay for each solution, with the quantity of water they would typically buy.

**Table 6. Average prices and liters consumed, as observed among low-income users in case studies, by cluster**

| Cluster | Price/liter (US$ cents) | Liters/ person/day |
|---|---|---|
| Plants & Kiosks (home delivery)[89] | 0.54 | 4 |
| Plants & Kiosks (no home delivery) | 0.3 | 4 |
| Devices | 0.12 | 4 |
| Flasks & Tabs | 0.08 | 4 |
| Pumping & Harvesting | 0.002 | 10 |
| Pipes & Taps – Large utility operator | 0.02 | 60 |
| Pipes & Taps - 'Mini-Utility' | 0.04 | 60 |

*86 While the worldwide average proportion stands at 0.1%, there are differences between countries and regions. For the computations of this Report, regional averages were taken into account.*

*87 31% was used for all Devices, Flasks & Tabs, Pipes & Taps, and Plants & Kiosks, which aim at improving water quality (and access). 25% was used for Pumping & Harvesting, as these interventions mostly focus on improving water access. Source of data for assumptions related to impact of water interventions: Safe water, better health. Costs, benefits and sustainability of interventions to protect and promote health, WHO, 2008*

*88 Source: World Health Organization World Health Statistics 2010; Global Health Observatory Data Repository.*

*89 As water treated in Kiosks can be delivered at home (50% of customers typically avail this facility), the Project Team took the weighted average of both prices.*

The baseline prices are the price points observed in the case studies, which would still allow for financial viability of a safe water intervention, and multiplied those by the typical amount of safe water purchased/ used by a low-income household, as observed in a given cluster.

## Cost estimates

Cost estimates are given throughout the report, to size up investments needed to accelerate the emergence of proposed safe water solutions. Typically, investments can be categorized into three broad groups:

a) **Sector-wide investments**, e.g. social marketing campaigns: Estimates provided are based on cost levels observed in real case examples, brought down to the cost per person reached.

b) **Infrastructure development:** estimates provided are based on capital investments observed in real case study examples. Unless otherwise specified, they do include the program costs required to organize the procurement and installation of this infrastructure.

c) **Industry incubation efforts:** estimates are based on data collected for case study analysis (including cost structure, capital investment requirements, size and actual financial sustainability after 3 to 10 years of operations). On this basis, the Hystra Project Team extrapolated what investments would be needed to replicate the most successful enterprises, based on the scale-up strategies proposed. Given the optimal size that a proposed enterprise could achieve in 5-6 years,[90] the Hystra Project Team estimated how many users it could serve, and consequently how many enterprises would be needed to provide for an entire country.

All cost estimates numbers are provided for a hypothetical country of 30 million inhabitants. These estimates are based on average percentages of the population in need of safe water in all development countries, which live in environments where a given cluster solution would be appropriate. Taking conservative penetration levels observed in the case studies, the Team derived how many of these people would actually use a given safe water solution. All these estimates were then calibrated to a hypothetical 30 million inhabitants' country, to facilitate comparison.

## Rating of case studies

All case studies have been evaluated according to four criteria:

**IS THE PROJECT A POTENTIAL GLOBAL SOLUTION FOR BOP ACCESS TO SAFE WATER?**

**Does it solve the problem?**
- Is it functioning at scale?
- Is impact demonstrated?

**Is it economically viable?**
- Is it sustainable?
- Is it affordable for the poorest?

**Is it environmentally sustainable?**
- Is water treatment efficient?
- Are water resources managed appropriately?

**Is it scalable/replicable?**
- Is the operational model scalable?
- Is the operational model replicable?



90 *The Project Team also assumed that most safe water enterprises could achieve break-even within 5-6 years of operations, based on the growth of operations observed in the case studies.*

The best rating is four points, the worst is one. When information was not available, no overall rating was given. Points have been assigned according to the following criteria:

| | 1 | 2 | 3 | 4 |
|---|---|---|---|---|
| **Ability to solve the problem** | | | | |
| **Water quality** | No systematic quality ensured | Treatment for bacteria mostly, that removes turbidity | Treatment for bacteria and viruses mostly | Treatment against chemical pollution, and effective for brackish water |
| **Water access** | 10L/day/household | 20L/day/household (not home delivered) | 20-50L/day/household, home delivered | >50L/day/household |
| **Penetration (actual average)** | ≤10% | 11-20% | 21-30% | >30% |
| **Scale (regular users)** | 15-50k | 50-100k | 100-200k | >200k |
| **Compliance (i.e., daily consumption of treated water)** | Low | Average | High | Systematic |
| **Health, hygiene and sanitation components** | No social marketing on the importance of hygiene and safe water | Social marketing on the importance of safe water and hygiene | Promotion activities for hygiene and/ or sanitation | Integrated water, hygiene and sanitation intervention |
| **Economic viability** | | | | |
| **Share of opex and capex covered** | Covers neither opex or capex | Covers opex partly (excl. overhead) but no capex | Fully covers opex (ex. overhead), but no capex | Fully covers opex and capex partly |
| **Lowest level of BoP reached** | 2,500-3,000 | 1,500-2,500 | 1,000-1,500 | 500-1,000 |
| **Affordability (% of income of users)** | >5% | 4-5% | 2-4% | <2% |
| **Environmental sustainability** | | | | |
| **Water treatment efficiency and water use** | Not efficient water treatment technology | Neutral water treatment technology | Neutral water treatment technology, plus promotion of sustainable water use | Neutral water treatment technology and measures to ensure sustainable water extraction and use |
| **Scalability/ replicability** | | | | |
| **Scalability** | Can only be scaled-up through heavy, long-term subsidies | Can be scaled-up with adjustments in the business plan and subsidies on capex and overhead | Scale-up is only a matter of subsidies for capex and/ or overhead | Scale-up is only a matter of time |
| **Replicability** | Bound to a very specific context | Bound to given context, but can be applicable in other countries, given key requirements in place | Bound to given context, but can be applicable in other countries with limited adjustments | Model successfully replicated in other countries |

# IN THEIR OWN WORDS

The authors of this Report wanted to leave the final word to the social entrepreneurs and the leaders within corporations and NGOs - who shared their innovative work.

The quotes below reflect their vision of the safe water sector.

## The poor and how to serve them…

"AS IT WAS TOLERATED THAT THE POOR DID NOT PAY THEIR BILLS, THEY WERE ALSO THE ONES THAT GOT MOST OF THE WATER SHORTAGES. WHEN SDE TOOK OVER, WE IMPLEMENTED A "DEMOCRATIC WATER SHORTAGE MANAGEMENT APPROACH": NO NEIGHBORHOOD SHOULD REMAIN 24 HOURS WITHOUT WATER AND NO NEIGHBORHOOD SHOULD BE GUARANTEED 24 HOURS SUPPLY. IF THE POOR WERE TO PAY THEIR BILLS AS THE WEALTHY, THEY ALSO BECAME ENTITLED TO EQUAL TREATMENT IN TERMS OF SERVICE QUALITY."

Mamadou Dia, General Manager, Sénégalaise des Eaux

"THE POOR THOROUGHLY UNDERSTAND VALUE FOR MONEY AND ARE NOT NECESSARILY ATTRACTED BY THE CHEAPEST PRODUCTS. WHILE IT IS IMPORTANT TO GET THE PRICES DOWN, ONE MUST ALSO DEVELOP THE SUPPORTING ECOSYSTEM - PROMOTION, FAST AND RELIABLE DISTRIBUTION, AFTER-SALES SERVICE."

Deepak Saksena, Head Partnerships, Water Business, Hindustan Lever

"THE DECISION TO EXPAND WATER ACCESS TO INFORMAL, POOR URBAN AREAS RESTS WITH PUBLIC AUTHORITIES. VEOLIA IMPLEMENTS IT WITHIN THE FRAMEWORK OF THE PUBLIC-PRIVATE-PARTNERSHIP OUTLINED IN ITS OPERATOR'S CONTRACT… FOR US, TO EXPAND WATER SERVICES IN POORER OR PERIPHERAL AREAS REQUIRES INNOVATING AT MANY LEVELS: TECHNICAL, MARKETING, RELATIONSHIPS WITH THE POPULATION, LEGAL AND FINANCIAL… WE NOW HAVE LOCAL SPECIALIZED TEAMS THAT WORK IN THESE AREAS WITH SPECIFIC TOOLS, NOTABLY REGARDING THE MONITORING AND EVALUATION ASPECTS. FOR US, SUCCESS IS ESSENTIALLY BASED ON THE REALIZATION OF THE PUBLIC-PRIVATE-PARTNERSHIP, EXPERTISE AND INNOVATION!"

Olivier Gilbert, Délégué aux Innovations Sociales, Veolia Environnement

"CONTRARY TO WHAT ONE COULD THINK ABOUT THE BOP, THE POOR DO BUY WATER; THEY WANT SOLUTIONS NOT MADE FOR THE POOR, BUT QUALITY SOLUTIONS THAT WOULD SUIT ANYONE; AND THEY ARE NOT ONLY LOOKING AT MONEY BUT ALSO TO BE RECOGNIZED IN THE COMMUNITY.

TECHNOLOGY IS NOT THE ISSUE TO SERVICE THE BOP. IT IS THE LOGISTIC PART THAT REQUIRES CREATIVITY!"

Anand Shah, Founder and CEO of Sarvajal

## Success takes a lot of time and convincing…

PATIENCE, "SABAR" IN BAHASA INDONESIAN, IS THE KEY TO SUCCESS. THERE WERE A LOT OF FRUSTRATING MOMENTS INDEED. BUT THE STAKES WERE SO HIGH THAT WE NEVER DROPPED IT. THE PROJECT IS ALSO SO VARIOUS AND CHALLENGING THAT MOTIVATING THE TEAM WAS NEVER AN ISSUE.

Philippe Folliasson, Managing Director of PALYJA

I DISCOVERED THAT A MAJOR PART OF OUR WORK IS ABOUT PERSUASION AND THAT IT TAKES A LOT OF TIME. WE NEED TO CONVINCE PROJECT PARTNERS, AUTHORITIES, COMMUNITIES, WHICH IS SOMETIMES FRUSTRATING.

John Chimukho, Executive Director of BASEDA

TO BE SUCCESSFUL I NEED TO CONVINCE AND INSPIRE A LOT OF DIFFERENT PEOPLE: OTHER PROFESSIONALS IN THE SECTOR, MY COLLEAGUES, POLICY MAKERS, VENTURE CAPITALISTS, PRIVATE FOUNDATIONS AND THE INTERNATIONAL AID AGENCIES, BY DEMONSTRATING THE SUCCESS AND IMPACT OF OUR COMMUNITY-BASED SOCIAL ENTERPRISE.

Amit Jain, Co-Founder & President of Healthpoint Services Global Inc.

THERE IS ONE ESSENTIAL LESSON FOR ME: IT TAKES TIME.

1) ONE REALLY MUST BE PASSIONATE AND PATIENT ABOUT WORKING ON THE BOP, BECAUSE IT IS A DIFFICULT JOB AND BENEFICIAL TO USERS ONLY IF SUSTAINABLE.

2) ONE MUST REMAIN HUMBLE WHILE WORKING WITH THE COMMUNITIES, VALUING THEIR KNOWLEDGE, ACCEPTING THE LOCAL SPECIFICITIES, AND TAKING THE TIME TO ACCOMPANY THE BENEFICIARIES THROUGH THIS LEARNING PROCESS.

3) WORKING WITH LOCAL COMMUNITIES AT THE BOP IS ALL EXCEPT ROCKET SCIENCE. MISTAKES ARE USUAL AND NORMAL; WE MUST LEARN FROM THEM.

Boubacar Macina, Co-Founder and Manager of 2AEP

TO MAKE THIS WORK, I NEED TO CONVINCE THREE SETS OF PEOPLE:

FIRST, I NEED CONVINCE YOUNG BRIGHT MINDS TO LEAVE WHAT THEY ARE DOING AND WORK WITH ME. I SHOW THEM THAT THEIR LIFE CAN BE WAY MORE MEANINGFUL, AND THAT THE PRICE TO PAY IS ACTUALLY LITTLE.

SECOND, I NEED TO CONVINCE INVESTORS AND GOVERNMENTS THAT WE HAVE A MODEL THAT WORKS. ONCE WE HAVE DEMONSTRATED THAT, EVERYTHING ELSE WILL FOLLOW. HENCE THE IMPORTANCE OF SEEING BIG SINCE THE START: IF WE FAIL, WE WILL BE FORGIVEN. IF WE SUCCEED, WE WILL HAVE WON.

THIRD, I NEED TO CONVINCE POOR COMMUNITIES TO WORK WITH US. TO WIN THEIR TRUST TAKES NO LESS THAN TRUE COMMITMENT. ALL THE POOR PEOPLE OUT THERE ARE SMARTER THAN YOU AND ME. THEY EXACTLY KNOW WHAT YOU ARE ABOUT.

Manoj Kumar, CEO, Naandi Foundation

I REMEMBER MEETING A REPRESENTATIVE OF THE HEALTH MINISTRY TO SHOW HIM THAT IT IS POSSIBLE TO PRODUCE CHLORINE IN GUINEA WITH A VERY SIMPLE TECHNOLOGY. HE STARTED TO LAUGH. WHEN I GAVE HIM THE DEMO, HE WAS STAGGERED. FOR HIM IT HAD BEEN UNTHINKABLE. THAT WAS A SPECIAL MOMENT FOR ME.

IT IS VERY EASY TO SPREAD A MESSAGE AND KNOWLEDGE ABOUT THE RISKS OF DRINKING CONTAMINATED WATER BUT IT IS MUCH HARDER TO TRIGGER REAL BEHAVIOR CHANGE. WE SAW FOR EXAMPLE A HEALTH CENTER HEAD WHO SUBSCRIBED TO OUR CAMPAIGN BUT WHO CONTINUED TO DRINK CONTAMINATED WATER HIMSELF.

Aboubacar Camara,
Founder and Head of Tinkisso

## …as well as extraordinary collaboration

IT IS IMPORTANT TO RECOGNIZE THAT EACH PLAYER HAS HIS/HER OWN CAPACITIES AND THUS AN IMPORTANT ROLE TO PLAY. ORGANIZED COMMUNITIES CAN JOINTLY MANAGE A WATER SYSTEM THAT FULFILLS THEIR NEEDS. THE PUBLIC SECTOR MUST GUARANTEE EQUITY AND JUSTICE IN WATER PROVISION AND THE PRIVATE SECTOR CAN OPERATE IN INNOVATIVE AND EFFICIENT WAYS. ON THE OTHER HAND, COMMUNITIES FACE LACK OF TECHNICAL CAPACITY AND THE PUBLIC SECTOR LACKS RESOURCES. BY WORKING TOGETHER, DIFFERENT ACTORS/ SECTORS CAN OVERCOME LIMITATIONS AND REACH COMMON GOALS.

Gustavo Heredia, Executive President of AGUATUYA and General Manager of Plastiforte

NGOS OFTENTIMES SHAPE A LOT OF WHAT WE DO. ON ONE HAND, THEY PROVIDE VALUABLE SOCIAL MARKETING ACTIVITIES THAT MIGHT CREATE DEMAND FOR OUR PRODUCTS. ON THE OTHER HAND, HEAVILY SUBSIDIZED PRODUCTS HAMPER HEAVILY ANY ATTEMPT TO GET A LOCAL INDUSTRY GOING.

Olaf Olsen,
Managing Director of Hydrologic

## The challenges, looking ahead…

LOOKING AHEAD BEYOND WATER CONNECTIONS, THE NEED FOR WATER SANITATION AND WASTEWATER TREATMENT HAS BECOME INCREASINGLY IMPORTANT. ALL OF METRO MANILA'S MAJOR RIVER SYSTEMS ARE NOW BIOLOGICALLY DEAD, AND ARE MAJOR SOURCES OF WATER-BORNE DISEASES.

Gerardo C. Ablaza Jr., CEO, Manila Water Company

WORKING IN SEMI-RURAL AREAS IS A GREAT CHALLENGE, AS WE WORK IN AREAS THAT DO NOT HAVE PIPED WATER. THIS IS ALSO A HUGE OPPORTUNITY TO SATISFY A BASIC HUMAN NEED AND MOVE TOWARDS GIVING ALL COMMUNITIES ACCESS TO CLEAN, SAFE, ADEQUATE AND, MOST IMPORTANTLY, AFFORDABLE WATER.

Alfredo M. Salinda,
Managing Director of Balibago Waterworks Systems Inc.

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## About HYSTRA

Hystra works with business and social sector pioneers to design and implement hybrid strategies, innovative market-like approaches that are economically sustainable, scalable and eradicate social and environmental problems; and combine the insights and resources of for-profit and not-for-profit sectors.
Hystra itself is a hybrid organization, a for-profit tool for social change.
Hystra consists of a core team of full-time consultants and of a growing network of partners already present in 12 countries. For more information, visit **www.hystra.com**

## About Ashoka Innovators for the Public

Founded in 1980, Ashoka is the world's working community of more than 3,000 leading social entrepreneurs. It champions the most important new social change ideas and supports the entrepreneurs behind them by helping them get started, grow, succeed, and collaborate. As Ashoka expands its capacity to integrate and connect social and business entrepreneurs around the world, it builds an entrepreneurial infrastructure comprised of a series of global initiatives that supports the fast-growing needs of the citizen sector. Ashoka's vision is to create change today, for an 'Everyone is a Changemaker' society to become the reality of tomorrow. For more information, visit **www.ashoka.org**


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