MARKETING SAFE WATER SYSTEMS

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WHY IT IS SO HARD TO GET SAFE WATER TO THE POOR – AND SO PROFITABLE TO SELL IT TO THE RICH

BY URS HEIERLI

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POVERTY ALLEVIATION AS A BUSINESS SERIES

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List of abbreviations:

AFA	*Family Foundation of the Americas*
BSF	Biosand Filter
CDC	Center for Disease Control and Prevention
CRC	Cambodian Red Cross
CWP	Ceramic Water Purifier
EAWAG	*Swiss Federal Institute for Aquatic Sciences and Technology*
EPA	probly Environment Protection Agency (USA)EPA as in USofA
HLL	Hindustan Lever Limited *(renamed Hindustan Unilever Limited in 2007)*
HWTS	Household water treatment systems
ICAITI	*Central American Industrial Research Institute*
IDE	International Development Enterprises
MEDA	Mennonite Economic Development Associates
MSD	Markets, Sustainability and Development
P&G	Procter & Gamble
PET	Polyethylene terephthalate (bottle)
PFP	Potters for Peace
POU	Point of use water treatment and storage system
PSI	Population Services International
PUR	brand name for a water filter of HLL
RDI	Resources Development International (Cambodia)
SANDEC	*EAWAG Department of Water and Sanitation in Developing Countries*
SCP	Silver-impregnated Ceramic Pot
SDC	Swiss Agency for Development and Cooperation
SODIS	Solar disinfection system
SWS	Safe Water System
UNICEF	United Nations Children's Fund
UV	ultra-violet
WATA	brand name for a simple hypochlorite generator
WHO	World Health Organization
ZERI	Zero Emissions Research & Initiatives

Foreword

Why is it that the global market for bottled water is booming, with astounding annual growth rates, sometimes as high as 50 per cent, and why is the progress in providing safe water to the poor so sluggish? Why do more than 300 children still die of diarrhoeal diseases every hour? It is not for the lack of affordable solutions. Solar disinfection, chlorination, filtration by slow-sand and ceramic filters, and ultraviolet treatment are all effective methods and have been scientifically proven to reduce child mortality considerably.

For some years the right solution seemed to be to provide piped water to all households, with 'Point of use water treatment and storage systems' (POUs) considered either unnecessary or merely intermediate solutions. However, of late, two factors have put POUs much higher on the development agenda:

1. First, many poor people will have to wait for quite some time until they get access to piped water, and they need a solution now.
2. Second, even if piped water is available, it can be contaminated or re-contaminated on the way to the user, either by leaks in the piped system or by re-contamination during transport and storage.

There is thus a huge need for POUs that treat water and make it safe just before it is consumed. Several studies have shown that diarrhoeal diseases can be reduced considerably when sanitation and hygiene standards are improved.
POUs lack good dissemination and marketing strategies. Many POU systems are poorly marketed and have considerable deficiencies in respect of the five Ps of marketing:

1. The products are not very suitable, practical or well designed. If anything, they are practical but do not look like 'must–have' products.
2. The pricing of POUs is not attractive for either buyer or seller. While mobile phones can be paid for in instalments while being used, water filters need to be paid for upfront in cash.
3. There is no obvious point-of-sale to buy POUs because there is no money in it for retailers.
4. Promotion leaves much to be desired, even when it is present, despite the fact that safe water may require behavioural changes.
5. People (the 5th P) do not automatically put safe water high on their agenda, and there is very little continual social marketing to influence them. They claim they do not have 10 dollars to buy a filter but may spend much higher amounts on beer, cosmetics and other less-essential consumer goods.

For POUs to take hold would require a marketing campaign similar to that used with insecticide-treated mosquito nets. This means a concerted and comprehensive action programme involving the public and private sectors to bring about change and to scale-up dissemination from tens of thousands of POUs per year to tens of millions. We hope that this book provides inputs and suggestions for bringing POUs to that other, higher, level of dissemination. This will only be possible if the level of funding inputs is comparable to that used for mosquito nets.

François Muenger, Senior Water Advisor, SDC

Multi-media material
This book features many photos to illustrate its key findings. They are the fruit of extensive field visits by the author, as are many film clips on the companion CD in the back cover. These clips can also be downloaded from: www.poverty.ch/safewater

Introduction and Executive

Water has one level for the poor, another for the rich

How about this for a contradiction in terms?

- "Some 1.8 million child deaths each year as a result of diarrhoea – 4,900 deaths each day or an under-five population equivalent in size to that of London and New York combined. Together, unclean water and poor sanitation are the world's second biggest killer of children. Deaths from diarrhoea in 2004 were some six times greater than the average annual deaths in armed conflict for the 1990s. The loss of 443 million school days each year from water-related illness" *(Human Development Report 2006)*. Diarrhoeal diseases have several causes: lack of sanitation, lack of hygiene but also, to a great extent, consumption of contaminated water.

- "Bottled water consumption has grown steadily in the world for the past 30 years. It is the most dynamic sector of all the food and beverage industry: bottled water consumption in the world increases by an average 7 per cent per year, in spite of its excessively high price. …Although major consumers are located in Europe and North America, the most promising markets are in Asia and the Pacific, with an annual growth of 15 per cent for the period 1999-2001.
  In India, for instance, the bottled water industry, with more than 100 companies, has a turnover of about US$ 70 million, growing at an average rate of 50 per cent every year."[1]

This means that, on the one hand, the number of children dying from diarrhoeal disease is equivalent to 20 large airliners crashing every day with the loss of almost 250 lives in each. These deaths are partly caused by drinking contaminated water. On the other hand, another group of people is becoming ever more eager to purchase bottled water and is spending more and more on 'pure water'; bottled water is now considered to be a lifestyle product.

This publication is not about the striking 'injustice' that so many children die for lack of safe water while others spend 4 dollars on a small 20 cl bottle of Perrier on the terrace of a luxury hotel. Without question, this is as unacceptable as it is shameful. Nonetheless, to be pragmatic, perhaps this paradox contains some key lessons.

Why is one group of people so keen to buy bottled water at exorbitant costs while an even larger majority is so reluctant to drink safe water that they fall sick, cannot go to school or to work, and some even die? It has to do, in part, with affordability. Poor people cannot spend that much on bottled water, and if they do spend some of their hard-earned money on a bottle of drink, then they would at least prefer a soft drink or a beer.

[1] Catherine Ferrier: *Bottled Water: Understanding a Social Phenomenon*, WWF, April 2001, pages 6 and 13.

Cheap solutions do exist, so affordability is not the key problem. I visited one retailer for the IDE Ceramic Water Purifier, a hardware dealer in Cambodia, one year after the product had been introduced in his shop with a big promotional event. He told me that he sells one or two filters per month, and at US$ 9 it was an expensive item. When I came, he was busy selling a batch of soft drinks and bottled water for US$ 15 to some people who wanted it for a funeral ceremony. When it comes to beer at US$ 10 per case, he is selling around 100 cases per month.

This publication presents some of these cheap or even free solutions that provide safe water to the poor. It is now scientifically proven that household water treatment solutions can eliminate bacterial contamination effectively. Using filters, chlorination or solar water disinfection (SODIS) is effective and reduces diarrhoea and child mortality significantly.

Why then do poor people not use them? It seems to be difficult to persuade the poor to use them, and to ensure that those who have been persuaded continue to use them.

Is a ceramic filter for US$ 10 too expensive? It seems to be a matter of priorities: these people are buying soft drinks and bottled water for a funeral ceremony where 500 people are invited. They had spent US$ 15 to serve these drinks and the family prestige is the key motivation.

The problem seems to be one of priorities and of marketing. If rich people are going wild for the expensive solution of buying bottled water and the poor remain reluctant to accept cheap solutions, then something must be wrong with the marketing strategies for these cheap solutions. Why do even poor people buy bottled water for a funeral ceremony?

In many developing countries, and certainly in most of Asia, bottled water has reached the 'tipping point', as Malcolm Gladwell[2] calls that "magic moment when ideas, trends and social behaviours cross a threshold, tip and spread like wildfire". The habit of drinking bottled water has become contagious among the middle classes. Understanding this phenomenon and applying it to household water treatment solutions for the poor could go a very long way towards reaching the Millennium Development Goals.

Marketing safe water to the poor: the challenges

Contrary to the marketing successes seen in the bottled water market, the four Ps of marketing – Product, Price, Place and Promotion, and the fifth P, People – have rarely been applied in a

[2] Malcolm Gladwell: *The Tipping Point – How Little Things Can Make A Big Difference*, London 2000.

professional way to disseminate POUs (point of use water treatment and storage systems) widely. On the contrary, many NGOs, government and multilateral aid agencies have in fact harmed the dissemination of POUs, despite their best intentions.

Some major mistakes have been made with respect to the basics of modern marketing:

1. Targeting the products exclusively to the poor has lowered their status instead of making them desirable.
2. Disseminating the ideas through marginal rather than through reference persons (opinion leaders) has often discredited the solution.
3. Distorting prices by giving away POUs free of charge or with heavy subsidies has created an expectation that POUs are goods better to wait for than buying.
4. Setting up a parallel free delivery channel for POUs has exercised an unfair competition to private sector supply chains; selling POUs is not a good business. They remain on the selves while bottled water or beer are fast- moving items.
5. Where there is no viable supply chain, spare parts are not available and the use of POUs stops, even if only a minor part is broken.
6. Poor product design and development results in frequent breakages, low performance or in complicated, time-consuming procedures.

On the other hand, there is also some good news:

1. Both Population Services International (PSI) and Procter & Gamble (P&G) have introduced efficient mass marketing strategies for chlorine solutions and PUR sachets. A profitable supply chain has been set up with good margins for small retailers. PSI is now the world's largest implementer of POUs: in 2006, PSI interventions treated 8 billion litres of water in households, reaching out to some 1 to 3 million people in 23 countries. Even with this massive achievement, PSI is still a very long way from operating without subsidies, despite their success in achieving large-scale dissemination. It is still mainly the creation of demand for safe water through hygiene education and awareness creation that requires massive investments in social marketing.
2. In Cambodia, International Development Enterprises (IDE), Resource Development International (RDI) and the Cambodian Red Cross (CRC) have done pioneering work in marketing ceramic water filters. They have applied sophisticated marketing and public education campaigns to stimulate demand and educate potential users. By the end of 2007, about 200,000 filters had been distributed, a quarter of which were purchased by individual consumers at full price – not given away – the remainder purchased in bulk by NGOs and government agencies. Each year, an additional 75,000 filters are distributed, of which about 30,000 through private channels. The number of ceramic filters in Cambodia is rapidly approaching 10 per cent of the nation's households. With such numbers, it is quite possible to reach the 'tipping point' soon, where it will become essential to have a filter in every household. The costs of ceramic filter production and distribution are fully covered by sales revenue, although the social marketing costs, which remain a critical element in education and demand creation, are subsidised by donors. It is unfortunate that these activities are seriously hampered by lack of funding.

The need for point of use water treatment systems (POUs)

In the past, there was confusion whether point of use water treatment systems could significantly reduce diarrhoea. Earlier studies suggested that 'water availability is more important than water quality' and the emphasis was thus on delivering more water to allow families to perform a more hygienic life. If families are getting connected to the piped water system, this would not only solve the problem of safe water but also provide the water at significantly less cost. The injustice lies in the fact that the rich pay much less for their water while the poor must buy their water from water vendors, queue up in long lines before a tap or walk for miles to fetch water. Why, then, are POUs needed, if piped water is the solution?

The poor may still have to wait for many years until they get connected to the piped water system. But, even then, is piped water safe? Another confusion arose from the wrong perception that if the water was clean at the source, it was still clean when it was consumed: in reality, that water can easily be contaminated during transport, storage and consumption. Many piped water systems in the mega-cities of the Third World do not deliver safe water, either because of management problems with the treatment, or – more often – through a deficient piping system where contamination may occur during transport. Many millions of people do not trust piped water.

Are POU systems any safer? A systematic Cochrane[3] study by Tom Clasen has led to a common consensus that POUs can have a significant health impact and reduce the incidence of diarrhoeal disease by more than 50 per cent, thus reducing child mortality considerably.

Many promising technical solutions are now available. However, further development in product design is needed to make these products really viable, affordable and user-friendly. There is sufficient experience to prove what does and does not work, and while many POUs have been tested in many successful projects and programmes, a large-scale dissemination strategy is still lacking.

How can a common vision be developed so that safe water can reach the 1.2 billion people lacking it?

1. If a dissemination strategy is to scale up significantly, POU marketing has to become commercially viable, with profitable supply chains in place. Up to now, none of the POU solutions have reached this point, but the foundations are in place.
2. It is very urgent not only to research the technology and health impact but also to develop and test profitable business models for safe water.
3. A massive demand pull is needed through hygiene education and awareness creation for safe water. This will never be commercially viable: it is a public health task and will require massive subsidies for social marketing campaigns and political will.
4. Instead of building a weak supply chain exclusively for SODIS, another for filters and a third one for chlorination, a joint effort to promote a range of options should be made available in one common supply chain – maybe even linked to other programmes such as malaria bednets.
5. It is, of course, necessary to have many scientists in microbiology, water treatment and health on board, but professional marketing is now what is most needed.

[3] The Cochrane Collaboration is a global network of dedicated volunteers to document systematic reviews of the effects of health care interventions. See www.cochrane.org

To summarise: If all of the broad experience and knowledge available today is put together, if joint dissemination strategies are developed, and if the technical know-how is complemented by the best inputs in marketing and social marketing, then one thing is sure: the job can be done!

Part One: Water markets and POU systems

1. Dynamics of water markets and POU dissemination

1.1. Why some people pay more for water than for wine

The world bottled water market amounts to an annual volume of 89 billion litres, which represents an average of 15 litres of bottled water drunk yearly per person on the planet. Western Europeans are the major consumers, drinking nearly half of the entire world's bottled water, with an average of 85 litres per person per year. Within Europe, Italians drink more bottled water than anybody else: an average of 107 litres per person .

Some of these waters have become status symbols and prestige products; quite often, a small bottle sells for more than a bottle of wine. Subtle marketing has positioned some of these waters as 'must-have' products among wealthy consumers. Perrier is again the 'champion', selling 750 million bottles a year in 110 countries. As long ago as 1903, Perrier advertised its water in England as the "Champagne of mineral waters", trading on 'Frenchness' as a cultural value and as a symbol of 'haute cuisine'.[4]

"It struck me...

...that all you had to do is take the water out of the ground and then sell it for more than the price of wine, milk, or, for that matter, oil".

Gustave Leven, Chairman of the Board, The Perrier Corporation of France, *quoted in* P. Betts, "Bubbling Over in a Healthy Market," *The Financial Times*, January 13, 1988.

1.2. Why middle-class markets are booming, especially in Asia

Bottled water consumption has been growing steadily over the last 30 years – for example, in 1976, on average 5.7 litres of bottled water were drunk per person in the United States, as opposed to 17 litres in 1986 and 35 litres in 1999. World consumption is now growing by an average of 7 per cent each year. Although the major consumers are in Europe and North America, the most promising markets are in Asia and the Pacific, with an annual growth of 15 per pent for the period 1999 to 2001.

[4] Perrier is considered the number one brand for mineral water globally. See: http://www.thelicensingcompany.com/cms.cgi/site/brands/perrier.htm ; it is also worth browsing the history of Perrier and its advertisement strategies at www.perrier.com

In India and in many other developing countries, a very dynamic market for drinking water has emerged over the last ten years. Although, there are not many detailed figures available[5], estimates show that in India the bottled water market is particularly booming, growing at 50 percent per annum, as already mentioned. Estimated at US$ 70 million in 2001, this market has crossed the '1,000 crore of Rupees' mark (~US$ 250 million) in 2006.

Fifteen years ago, anyone who wanted to sell drinking water in India would have been considered 'crazy'. In the meantime, more and more offices have installed 20-litre (carboy) dispensers for drinking water, some even with a cooling or heating device, and it is common to see people with a bottle of water on their desk.

It is a very competitive market and huge growth is predicted for the future. The potential for growth is enormous: the average bottled water consumption is less than 3 litres per person per year, but there are at least 250 million potential consumers who can afford it.

At present, there is a strong tendency to lower prices in order to increase consumer demand. Affordability is still a limiting factor, especially among the lower segments of the middle classes. However, as most water is sold by the bottle, it is not so obvious that one pays 300 to 500 times more for bottled than for tap water.

It would be naïve to think that 'water is water' or something that can be simply expressed in the formula H_2O. Water has always been associated with a mystic dimension and much of this has been preserved in some mineral waters. The European consumption pattern is strongly influenced by 'mineral' waters from a specific source such as Evian (still the largest brand worldwide), Perrier, Badoit, Volvic or San Pellegrino; most of these springs do also operate spa centres, associating the water with a notion of health.

Most of the bottled water in developing countries is not from a 'mineral source'. It is often simply 'purified' water from a local source, sometimes enriched with minerals. Whereas classic mineral waters have been marketed as lifestyle products due to their 'mineral content', bottled water in Asia is mainly positioned as 'pure water', completely safe from bacterial contamination and free of viruses.

'Purity' is probably the most important value associated with bottled water in Asia, and there is a considerable amount of 'fear' or mistrust towards the quality of tapped water as a motivation to purchase it. This fear is there for good reasons: 'a significant proportion of samples were contaminated with faecal coliforms in a number of major cities in India.'[6] On the other hand, the more than 100 companies selling bottled water in India have also developed very effective supply chains and positioned their different waters as desirable lifestyle products. To walk around with a bottle of mineral water is no longer the stigma of the foreign tourist, but the status symbol of a yuppie working in the information technology industry.

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[5] Several market studies are offered on the bottled water market in India, each one costing from US$ 800 to US$ 3,500. This alone is an indicator that there is a great deal of money in this market.
[6] KJ Nath, S. Bloomfield, M Jones: "Household water storage, handling and point of use treatment", *International Scientific Forum on Home Hygiene*, 2006, page 18.

While living in New Delhi, from 1992 to 1999, my family used to boil and filter water from the tap. In the late 1990s, some press articles appeared about heavy metals in tap water. As a result, many families switched to bottled water, and suddenly we also had a carboy bottle in our kitchen. The 'purity' of bottled water is often questioned by critical consumer magazines and many bottled water companies are severely criticised if even minor traces of pesticides or other contaminants are found in their bottles.

What is evident is that in the last 15 years a massive shift has occurred among the middle classes in Asia from not boiling to boiling or filtering water and, increasingly, to the consumption of bottled water. Among the middle classes, the penny has dropped: they know that drinking unfiltered water is unsafe, and they are willing to pay considerable prices to avoid it. They pay from 10 to 12 Rupees for a litre bottle (US$ 0.20 to US$ 0.30) and a 20 litre carboy bottle sells for 35 to 55 Rupees (US$ 0.80 to US$ 1.20).

1.3. Why the poor are deprived of safe water

At the bottom of the pyramid, things are unfortunately quite different. It is scandalous that some people spend so much money on Perrier while half of the earth's population has no access to even the minimal 20 litres per person per day considered to be a 'human right'. This is exacerbated by poor people having to pay considerably more than the rich for their water, and some pay more than the rich even in the cities of London or New York. While the middle classes in most cities in developing countries have access to piped water – in the better-off neighbourhoods almost without interruption – many poor people have to either walk for miles, stand in long queues in front of public water stand posts or buy from water vendors, tankers or kiosks. Many poor people not only pay more than the rich[7], they pay an excessive proportion of their income for water.[8] To make matters even worse, the water they get is often contaminated or is being contaminated during transport, storage or consumption.

1.3.1. The poor are most affected

The poor are most affected by waterborne diseases and would gain most from an improvement: "Clean water and sanitation are among the most powerful preventive medicines for reducing child mortality" (*Human Development Report 2006*). Having piped water in the house reduced the incidence of diarrhoea by almost 70 percent in Ghana and by more than 40 percent in Vietnam[9]. Yet piped water is still a dream for many and, as shown above, when it arrives it may be nearer a nightmare than a dream, when it is not even clean.

Clean or safe water contributes to a reduction in diarrhoeal diseases, but the link between clean water and health is more complex than that. This is mainly due to the fact that pathogens

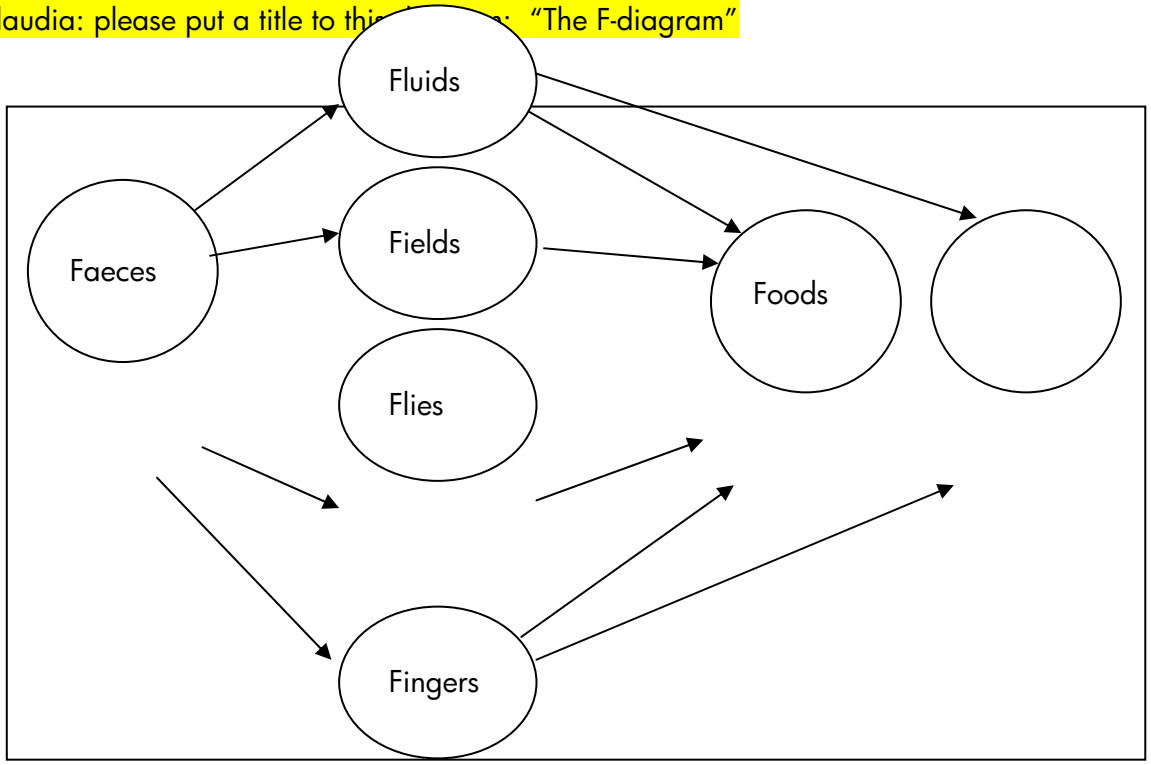
[7] Average monthly water bills of the poor in slums are US$ 10 to US$ 20 while households connected to piped water pay an average of only US$ 3 to US$ 6 per month. UNDP: *Human Development Report 2006*, page 52.

[8] Poor people often pay more than 20 percent of their household incomes just for water. UNDP: *Human Development Report 2006*, page 51.

[9] *Ibid*, page 44.

can take different routes of transmission, as Valerie Curtis et al. have pointed out, referring to the so-called F-diagram[10].

Claudia: please put a title to this figure: "The F-diagram"



It is thus not so easy to detect which factor can reduce diarrhoea, and multi-transmissions are possible.

In the history of cholera, a fierce debate took place on whether it could be transmitted through drinking water, and this debate may have caused the death of 100,000 people, as Richard Evans has shown in his remarkable historical document *'Death in Hamburg'*[11], a history of cholera in Germany. Max von Pettenkofer published over 70 articles – more than 1,000 pages – arguing that cholera was caused by fermentation gases from the soil, denying any relationship with drinking water. It took several decades until the famous Robert Koch could prove that bacteria were the main cause of this deadly disease and that it was contagious through water. As a last resort, Pettenkofer tried to prove his theory by drinking a glass of water contaminated with cholera bacteria he had got from Robert Koch's assistant. He survived this experiment with mild diarrhoea due to previous contact with cholera that had made him resistant. However, his battle was lost, and Robert Koch was able to influence the public health debate in Germany much more than his opponent.

1.3.2. Safe water is a complex issue

Similar difficulties have also led to some confusion on the issue whether POU water treatment systems are effective.

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[10] See Valerie Curtis: "Domestic hygiene and diarrhoea – pinpointing the problem", *Tropical Medicine and International Health,* Volume 5, no 1, page 27.
[11] Richard Evans: *Death in Hamburg – Society and Politics in the Cholera-Years of 1830 – 1910,* Oxford University Press, 1987.

1. **The old paradigm: Water availability is more important than water quality**. Diarrhoea can be prevented by a range of measures of domestic hygiene, whereas clean drinking water is just one element in a more holistic pattern. Hand washing and sanitation are major factors, and a review of 67 studies by Esray et al.[12] concluded that availability of water was more important than the quality of the water. People with piped water in Kenya, Tanzania and Uganda used on average 16 litres a day for washing and hygiene, while households without piped water used less than 6 litres a day[13] These conclusions were also supported by findings from Nicaragua, where children with poor water availability had a 34 percent higher rate of diarrhoea.[14] As long as there is insufficient water available (at least 20 litres a day per person as the *Human Development Report* postulates), minimum standards of domestic hygiene are not possible, even if people have the best intentions. This was the common paradigm until around 2003.
2. **The new paradigm: Water quality at household level matters indeed**: Thomas Clasen revised this paradigm[15] in a more recent systematic study and discovered that Esray's study focused on water quality at the source and did not differentiate if the water was still clean at the point of use. In fact, even if the water is safe at source, there are many ways it can become contaminated on the way to the point of use, through dirty containers, bad pipes, or unclean hands.

Several factors influence the water quality during transport, storage and consumption:

1. **The quality and irregularity of water supply** is disastrous for the poor: even in many cities with piped water the supply is often erratic. For example in Chennai, Delhi, Bangalore, Kolkata and Kathmandu, water – especially in the slums – is interrupted for several hours a day. Moreover, it is often contaminated: while samples of piped water and water from hand pump tube wells showed faecal contamination in less than 20 percent of cases, 85 percent of open wells, 100% of village ponds and up to 60% of household water reservoirs and containers were contaminated[16]. People often have no other choice than using this bad water.
2. **Not all water is consumed at home:** To make things even more complicated, many family members consume water not only at home but at school, at the workplace, in the fields and elsewhere. Access to 100% safe water everywhere is thus practically very difficult to achieve.
3. **The dangers of recontamination:** Even if the water is safe at the source, be it a tap or a hand-pump, it may easily contaminate during transport, storage and even while drinking, if the vessels are open, the hands not washed and the glasses are dirty. Without a hygienic environment, it is thus difficult to maintain the water safe, and this is one of the main reasons why a treatment at the point of use is so effective. There is now evidence that point of use water treatment can reduce the incidence of diarrhoeal disease by up to 63% in the case of filtration.

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[12] SA Esray et al: 'Epidemiologic Evidence for Health Benefits from Improved Water and Sanitation in Developing Countries', *Epidemiologic Reviews* 8, 178-128, 1986.
[13] UNDP: *Human Development Report 2006*, page 44.
[14] See Valerie Curtis: op cit.
[15] Thomas Clasen, Sandy Cairncross: 'Household Water Management: Refining the Dominant Paradigm', *Tropical Medicine and International Health,* Vol. 9 No. 2, pages 187-191, February 2004.
[16] KJ Nath et al: op cit, page 17ff.

1.3.3. Health impacts need more holistic interventions

Finally, as the F-diagram above shows, it is important to improve the overall hygiene behaviour of a family if one wants to achieve a significant reduction in diarrhoeal diseases, and this requires a more holistic approach. It does not mean that single intervention programmes are not effective. Even if there is not yet any scientific proof that multiple interventions are more effective, it seems obvious that links to overall hygiene programmes would help.

This all requires a more holistic approach, namely:

1. **Hygiene promotion is a subtle social process**: That people do not change behaviour related to hygiene 'just by being told' is well-known, confirmed by disappointing experiences as well as by scientific evidence. The 'father' of all research on 'diffusion of innovations', Everett Rogers, began his research with the very famous case of '*Water Boiling in a Peruvian Village: Diffusion That Failed*'[17]. Nowadays, the causes of failed rational hygiene education approaches are clear[18]. Similarly, it is recognised that successful and sustainable hygiene promotion requires a subtle process supported by social action, as people are often more influenced by peer groups, village leaders and sport idols rather than by NGOs or government hygiene 'teachers'. All successful action requires a deep and thorough understanding of prevailing cultures and values.
2. **Diarrhoea is not the only environmental disease**: If one could suddenly become healthy from drinking a glass of pure water, the overall task would be much easier. Unfortunately, the health impacts of one single action are rarely visible on their own. Many factors contribute to diarrhoeal diseases and especially to a disproportionate death toll for children. The main causes for diseases among children (0-14 years) in developing countries are a) diarrhoeal diseases, mainly due to poor hygiene, sanitation and unsafe water consumption; b) lower respiratory infections, mainly due to indoor- and outdoor air pollution, and c) malaria[19]. Some of these diseases are interlinked: for instance diarrhoea can weaken immunity to respiratory diseases. There is also some good news: hand-washing can prevent diarrhoea and respiratory infections at the same time.

1.4. Why cheap or free water treatment systems fail and why bottled water is booming

Point of use or household water treatment systems are not a miracle solution to all the problems mentioned here. However, they can close an important gap. All hygiene and sanitation campaigns are useless if people are forced to drink contaminated water. POUs are meant to purify contaminated drinking water at a household level, and it is proven that chlorination,

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[17] Everett M Rogers: *Diffusion of Innovations*, Fifth Edition, New York, 2003.
[18] See UNICEF: *Motivating Better Hygiene Behaviour – Importance of Public Health Mechanisms of Change*, New York.
[19] See A Pruess, C Corvalan: *Preventing Disease Through Healthy Environments – Towards an Estimate of the Environmental Burden of Disease,* and *Daniel Mäusezahl: More Benefits for Households from Water and Sanitation – a Daunting Task*, Aguasan Workshop 2006, SKAT, www.skat.ch

water boiling, filtering or solar water disinfection (SODIS) are cheap and effective methods of improving water quality even in desperate environments.

SODIS — solar water disinfection – is a solution practically free of cost to the user, affordable even to the world's poorest people. If people want to purify water, they only need to pick up a few of the several hundred millions of discarded PET bottles, fill them, put them on the roof and drink the water a few hours later. Why does this not spread like wildfire?

SODIS is an especially clever technique that has won many awards: it exploits a principle that even surprised the engineers of EAWAG, the Swiss Federal Institute for Aquatic Sciences and Technology, when they started tests in 1994: "Sunlight treats the contaminated water through two synergetic mechanisms: Radiation in the spectrum of UV-A (wavelength 320-400 nm) and increased water temperature work together as a catalyst. If the water temperature rises above 50°C, the disinfection process is three times faster".[20]

Despite being such an ingenious and simple method, its use is not widespread. It is widely known in Latin America, Africa and Asia, and yet it is still a long way from the 'tipping point'. Poor people will use SODIS if an effective promotion campaign has taken place, but they stop using it when the promotion efforts are halted. Similar experiences were reported with other POU techniques: the use of filters stopped when spare parts were needed but not available, and many programmes stopped when people had to continue paying even small amounts. Neither the cheap nor the free solutions are self-propelling and do not spread on their own, despite the proven fact that they can – and indeed do – save thousands of children's lives.

An evaluation of SODIS in Bolivia showed "high levels of primary adoption of the SODIS technology"[21] but very little secondary adoption. This is astonishing, as the SODIS method of exposing PET bottles to the sun for a combined heating and UV radiation treatment could simply be copied by other families. Perhaps remarkably, this copying does not happen. A constant grievance was the lack of PET bottles, and on many occasions the SODIS project had to deliver them[22]. This was surprising, as SODIS had – until then – promoted the use of recycled PET bottles. Such bottles are quite widely available almost everywhere. The question is more: do people really want to use recycled bottles? Do they want to use something with a label of a 'scrap' technology?

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[20] See www.sodis.ch

[21] Alvaro Paz, et al: *Estudio de Aceptación y Sostenibilidad de SODIS en Bolivia y Perú,* La Paz, Mayo 2003.

[22] See S Moser, S Heri, H J Mosler: *Determinants of the Diffusion of SODIS – A Quantitative Field Study in Bolivia,* Universities of Zürich and Berne, January 2005.

The reasons for the failure of POU dissemination will be examined in more detail later. At this point, it is clear that SODIS and all the other POU methods have failed to become the desired products, in contrast with bottled water. While companies have managed to position bottled water as 'must have' product among the middle classes, a similar desire among the poor has not been created. We are still too far away from the 'tipping point' and the lessons of what has gone wrong need to be learned.

1.5. Better promotion = combining social and marketing

The marketing of POU water treatment devices faces two major challenges:

1. **Tagging on an educational message**: People do often not make a direct link between contaminated water and incidences of diarrhoea. Fear of diarrhoea seems to be a concept which works with Western travellers and this fear has now also 'infected' the middle classes in Asia. However, this concept does not yet seem to work with the poor. To promote POU devices through conventional health education methods has not worked so far, and linking safe water to better health is a message yet to be understood by the target population.
2. **Working with prestige and status**: "It is often more cost-effective to rely on social ambitions rather than on health arguments to motivate people to adopt better hygiene"[23]. The booming water markets can bring home the lesson that if 'pure' water has become a lifestyle product, linked to ambition, prestige and status symbols, it can work much better. This is not at all a contradiction to 'fear'; many people drink bottled water also for fear of getting sick. However, the consumers of bottled water do not do this out of fear alone. What the marketeers of bottled water have achieved – and to do this they have invested lots of money – is to turn their brands into prestigious lifestyle products.

One fundamental mistake of the past was positioning POU devices as 'solutions for the poor'**.** This does not work. Nobody wants to be poor and buy a product for the poor – least of all the poor themselves. Their ambitions are to be like rich people; it is from the rich that they copy attitudes, not from their poorest neighbours. If POU strategies are to be more successful, then POUs must be positioned as desirable products for everybody. In particular, they should target those disseminating agents who can influence the poor. Rolex watches and iPods are promoted through tennis and football players, music idols and movie stars. If Roger Federer, Pelé and Angelina Jolie were to serve not only as UNICEF ambassadors for fund-raising but also as direct promoters for 'safe water', perhaps the dynamics could change – even more so if local movie and football stars showed the children of poor people how 'cool' it is to drink safe water.

Another challenge is to spread the right messages for hygiene promotion and to find suitable ways to embed POU devices in massive, intelligent and effective hygiene improvement strategies. Such communication strategies should take into account the reasons given below as to why adoption of POU water treatment is not a high priority for poor people yet.

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[23] Brian Appleton and Christine van Wijk: *Hygiene Promotion – Thematic Overview,* Paper, IRC, Netherlands, February 2003, page 16.

Some of these reasons – and the list may be even longer – are introduced here. The following five challenges must be addressed properly:

1. **There is no directly visible link between unsafe water and health;** It is impossible to see water contamination with the naked eye, not all contamination may lead to diarrhoea, and people may not relate a diarrhoeal incident to water consumed some hours ago. People also tend to forget diarrhoea that they suffered weeks or months ago.
2. **There is no single cause-effect relationship between safe water and health:** One may well drink safe water but still get diarrhoea due to poor hygiene and sanitation practices, through contaminated food, flies, dirty buckets and glasses, lack of hand-washing, as shown in the F-diagram. Only if all factors of infections are eliminated, can a family become – relatively – free of diarrhoea.
3. **Adoption of hygiene is a holistic educational and social process:** It can take years – and generations – to change long-standing unhygienic habits. This process will not happen just by relying on rational and educational messages; changing habits is a deeply social process. Would we come to work with a fresh shirt, nicely dressed, washed and with clean teeth, if it was just a rational attitude? Much hygiene behaviour responds to social expectations: it was our mother who first asked us to wash our hands, to clean our teeth. If this does not work, even the laziest boy will do it once he has a girlfriend. Moreover, it is certainly easier to implement hygiene practices in a middle-class environment where the infrastructure is more suitable than in a slum or in rural areas where there are no sewerage systems, where the roads are unpaved (and swamped when it rains) and where animals freely roam in the kitchen and living rooms. This does explicitly not mean that the middle classes are automatically more hygienic than poor people[24] On the contrary, it is amazing how much pride and effort poor people put into dressing their children when they go to school.
4. **Ambition is a better incentive than rational messages**: Factors such as prestige, status, lifestyle and well-being are very strong motivating factors that are widely used as incentives in modern marketing. It is thus important to position POU devices as desirable, 'must–have' products instead of positioning them as 'products for the poor'. Nobody wants products for the poor, least of all the poor themselves. POUs should therefore be positioned as prestigious products, but made affordable through various means.
5. **There is no sustainable adoption without a sustainable supply chain:** People drink Coca Cola or bottled water because it is available almost anywhere. This omnipresence is due to the simple fact that the shop around the corner can earn some money to make it available. Many POU devices have been disseminated by NGOs or government programmes outside a private sector supply chain. If filters are brought to the villages by NGOs their adoption rate will stop the very moment that the first spare part is required but not easily available.

If POU devices are to be marketed more efficiently and effectively, then these five issues should be addressed in a suitable strategy.

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[24] In another dimension, it is sometimes shocking to observe, in 5-star hotels, how few men wash their hands after using the toilet. There is, however, an anecdote that during a cocktail party in an embassy, the peanuts served were glittering in UV light, a clear sign of urine contamination by the invited guests.

- **Creating new markets through social marketing**:
  The first three issues require a behavioural change and should be addressed by means of professional social marketing strategies. Creating awareness for hygiene is a long-term task implying a social process. This can only be achieved through intensive social marketing[25] campaigns. Such efforts may spark a desire for safe water and thus create new markets for POUs. However, without setting up a supply chain and making them available in the market, dissemination will stop with the external intervention.
- **Tapping existing markets through marketing**:
  The last two issues require a proper positioning of the products in the market and setting up of viable supply chains. This task should be addressed by professional marketing strategies. Disseminating POUs in existing markets is achieved by targeting POU sales to the middle classes who can pay and who are already aware of hygiene, for example those who already boil their water. However, a dissemination strategy that focuses on existing markets will have a minimal effect on poverty alleviation, as it will reach only those who are already convinced. To target existing markets and create new markets will increase sales and bring down transaction costs. This will make supply chains more profitable: only if POUs and their spare parts are available next door, is a sustainable use possible.

The challenge of this publication is to show how marketing and social marketing should work together and thus achieve a better performance with a significant scaling up of operations. This is not an easy task and will require a great deal of money. It will not be possible to arrive at the 'tipping point' if dissemination efforts are thinly spread – some filters here and some SODIS bottles there. Creating a sustainable market for POUs requires a critical mass of clients who use them, profitable shops who sell them and need a lot of visibility if the adoption becomes 'contagious'. Such an investment is by no means a luxury: a more effective intervention may safe millions of lives. If the POU market became as dynamic as the markets for bottled water, then it would achieve a significant health impact, and – by creating a critical mass – could make POUs 'contagious' and reach, surpass even, the 'tipping point'.

[25] It is recognised that modern forms of social marketing include the marketing part of setting up a supply chain. The term social marketing is used here more to describe the methods for creating awareness for public health issues.

2. Disseminating POU water treatment solutions – an overview

This chapter gives an overview of a series of point of use methods to treat water at the household level. It is not a detailed technical overview and it is not complete; it is a selective sample with the main emphasis on dissemination issues. These issues will be discussed further in Chapters 4 and 5 on the specific marketing and social marketing issues.

2.1. How effective are POUs in reducing diarrhoea?

Many different point of use solutions are available and, while their usefulness was questioned for a long time, today, 'household water treatment and safe storage' HWTS methods have suddenly become a high priority on the development agenda. In February 2003, an International Network to Promote HTWS[26] was created in collaboration with the World Health Organization. This was a milestone and a turning point, basically due to the appearance of several encouraging studies on the effectiveness of even very simple HWTS methods.

In 2003, considerable progress was made in evaluating the impact of household-based filtration. In a large field trial, Rita Colwell and colleagues showed that simple filters made from sari cloth or nylon, combined with appropriate education, reduced cholera by 48%.[27] Locally produced slow sand and ceramic filters were evaluated by postgraduate students at Massachusetts Institute of Technology (MIT). In a field trial in Bolivia, locally-fabricated filters that used imported ceramic candles eliminated all detectable faecal coli form bacteria in household drinking water and reduced levels of diarrhoea by 64%.[28]

These studies and the emerging network reawakened interest in HWTS and came to the overall conclusion that HWTS have the potential to significantly reduce diarrhoeal diseases. Holders of the older position were sceptical about this and pointed to some studies suggesting that "the provision of safe water alone is unlikely to result in reductions of diarrhoeal and other infectious diseases in the absence of improved sanitation and other hygiene measures. This assumption is now known to be incorrect."[29] To a certain extent, the older paradigm was based on studies on water quality at source whereas measuring the water quality at the point of use gave a different picture. The 'refined' paradigm is thus attributing a very favourable health impact to safe point of use water and storage devices.[30]

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[26] Thomas F Clasen, Eric D Mintz: ,"International Network to Promote Household Water Treatment and Safe Storage", *Emerging Infectious Diseases,* CDC, Vol. 10, no 6, June 2004; http://www.who.int/household_water/network/en/

[27] R Colwell et al, *Reduction of Cholera in Bangladesh Villages by Simple Filtration*, Proc. Nat. Acad. Sci. USA, 2003, 100:105-5.

[28] Thomas Clasen et al: *Reducing Diarrhoea through household-based Ceramic Filtration of Drinking Water: a Randomized, Controlled Trial in Bolivia*, Am J Trop Med Hyg. 2004.

[29] Mark D Sobsey: *Managing Water in the Home: Accelerated Health Gains from Improved Water Supply*, WHO, Geneva 2002, page 4.

[30] Thomas Clasen, Sandy Cairncross: "Household Water Management: Refining the Dominant Paradigm", *Tropical Medicine and International Health,* Vol 9 no 2, pp 187-191 February 2004.

The real advantage of HWTS is that they can ensure safe water at the crucial point, the point of use,' and not at the point where the water is treated or collected. It was long argued that municipal water is safe, as it is treated at the source. However, studies have shown that much contamination may occur during transport, handling and storage of water.

However, there is consensus that HWTS are much more effective if they are accompanied by thorough hygiene promotion, proper handling and maintenance. The effectiveness of HWTS is therefore strongly dependent on technology-related, site-specific, environmental, demographic and social factors. Sobsey concludes: "Reductions in household diarrhoeal diseases of six to 90 percent have been observed, depending on the technology and the exposed population and local conditions."[31] There is common agreement that every measure that is capable of reducing diarrhoea by more than five percent should be actively pursued and promoted in scaling up programmes.

A systematic, comparative Cochrane review by Thomas Clasen[32] of different treatment methods at source and at household level revealed that HWTS is highly effective. The results are summarised here in a simplified form in the following table. In six studies of water treatment at source the risk reduction for diarrhoeal diseases was 27% for all age groups and 15% for children under five years old.

	All age group:		Under-5 age group:	
Intervention type (no. trials)	Estimate (random)	% Δ (1-RR)	Estimate (random)	% Δ (1-RR)
Source (6)	0.73	27%	0.85	15%
Household (32)	0.53	47%	0.56	44%
Filtration (6)	0.53	63%	0.36	64%
Chlorination (16)	0.63	37%	0.76	24%
Solar Disinfection (2)	0.69	31%	n.a.	n.a.
Flocculation / Disinfection (7)	0.48	52%	0.52	48%
Improved Storage (1)	0.79	21%	0.69	31%

As an important conclusion, Clasen has thus refined the prevailing paradigm, and it is now evident that point of use water treatment systems are indeed very effective and can reduce the risk of diarrhoeal disease incidence by a factor of 31% to 63%. Filtration, at 63%, is especially effective according to this comparison of different studies. Even slightly higher is the evidence for children under 5 years of age with a reduction of 64%.

2.2. Water boiling – the oldest method

Water boiling is the oldest method to disinfect water and has been known since ancient times. It is effective in destroying all classes of waterborne pathogens (viruses, bacteria and bacteria

[31] Mark Sobsey: op cit, page vi.

[32] Thomas Clasen, I Roberts, T Rabie, W P Schmidt, S Cairncross (2006). "Interventions to improve water quality for preventing diarrhoea" (Cochrane Review), *The Cochrane Library,* Issue 3, 2006. Oxford: Update Software.

spores, fungi and protozoa and helminth ova) and can be applied effectively to all waters, including those high in turbidity or dissolved constituents.

2.2.1. Water boiling and germs – the principles

Some authorities recommend that water be brought to a rolling boil for one to five minutes – the World Health Organization (WHO) recommends bringing water to a rolling boil as an indication that a high temperature has been achieved.
Boiling is the preferred thermal treatment for contaminated water: heating to pasteurisation temperatures (generally 60^{0}C) for periods of up to ten minutes will destroy most waterborne pathogens of concern. Even heating to as little as 55^{0}C for several hours has shown to dramatically reduce many pathogens.[33] However, as it is often not possible to measure the temperature exactly, the recommendation for boiling the water up to 20 minutes is to ensure that 'we are on the safe side'.
It is recommended that water is stored in the same container used for boiling and protected with a lid in order to reduce the dangers of recontamination.
Water boiling is thus a simple and effective method, but one disadvantage is that it needs time and fuel: it is estimated that one kilogram of firewood is needed to boil one litre of water. In areas where fuel is scarce, and especially where women have to walk for hours to fetch water and/or firewood, this is a severe hurdle for adoption.

2.2.2. The Chinese emperor who invented the tea brew

It was to become the world's first mass dissemination when a very smart (social) marketing 'trick' to make water boiling acceptable emerged in ancient China over 5,000 years ago[34]. According to legend, Shen Nung, an early emperor, was a skilled ruler, creative scientist and patron of the arts. His far-sighted edicts included the requirement that all drinking water be boiled as a hygienic precaution. One summer day, while visiting a distant region of his realm, he and the court stopped to rest. In accordance with his ruling, the servants began to boil water for the court to drink. Dried leaves from the nearby bush fell into the boiling water, and a brown liquid was infused into the water. As a scientist, the Emperor was interested in the new liquid, drank some, and found it very refreshing. And so, according to legend, tea was served – for eternity.

Tea came to conquer the world and it is still the most popular drink in the world. This time, the innovation came from China to the West: because of the success of the Dutch Navy in the Pacific, tea became very fashionable in the Dutch capital, Amsterdam, and then the major port of the Netherlands. This adoption was due in part to the high cost of the tea (over US$ 100 per pound) which immediately made it the preserve of the wealthy. Slowly, as tea imports

[33] See Mark Sobsey: op cit, page 13.
[34] See the history of tea at http://www.stashtea.com/facts.htm#Tea_Europe

increased, the price fell as the volume of sale expanded. Initially only available to the public in pharmacies, along with such rare and new spices as ginger and sugar, by 1675 it was available in food shops throughout the Netherlands.

2.2.3. Tea, a lifestyle product, conquers the world

As tea consumption soared dramatically in Dutch society, doctors and university authorities argued to and fro as to its negative and/or positive benefits. Known as 'tea heretics', the public largely ignored the scholarly debate and continued to enjoy their new beverage, though the controversy lasted a good two decades up to around 1657. Throughout this period, France and the Netherlands led Europe in the use of tea. As the craze for oriental things swept Europe, tea became part of the way of life.

By 1650, the Dutch were actively involved in trade throughout the Western world. Peter Stuyvesant brought the first tea to America, to the colonists in the Dutch settlement of New Amsterdam (later renamed New York by the English). Settlers in America were the first confirmed tea drinkers outside China and Europe.

Great Britain was the last of the three great seafaring nations to break into the Chinese and East Indian trade routes. This was due in part to the unsteady ascension to the throne of the Stuarts and the English Civil War. The first samples of tea reached England between 1652 and 1654. Tea quickly proved popular enough to replace ale as the national drink of England.

Indeed, on acquiring the American colony from the Dutch, the English found that the small settlement of New York consumed more tea at that time than the whole of England. As in the Netherlands, it was the nobility that provided the necessary stamp of approval and so ensured its acceptance.

2.2.4. Tea and diarrhoea control in China and India

The success of tea as a form of selling the concept of boiling water was – similar to the miracle of the bottled water markets – a clever marketing strategy. The fact that lots of money could be made with the cultivation of tea leaves, its trade, processing and especially its retail sales, also helped to disseminate something fashionable that was very useful at the same time.

According to the latest *Human Development Report,* India reports 450,000 deaths annually due to diarrhoea, while China with a comparable population accounts for only 150,000. An article in the newspaper *The HINDU*[35] attributes this to some extent to the fact that the Chinese drink more tea than Indians. The article does not present any scientific evidence for this correlation, but it seems at least plausible that a very strong tea drinking culture may save lives. In any case: while the so-called 'Delhi belly' is a popular expression for the diarrhoea that many visitors get in India, there is no corresponding 'Beijing belly'.

There is, however, little doubt, that tea has saved more lives and prevented more cases of diarrhoea than anything else, and the Chinese emperor who invented it should probably be eligible for a posthumous Nobel Peace Prize. If not, every traveller in the remotest country

[35] See Pallavi Aiyar: "China's different kind of hot water" *The Hindu,* 27 December 2006.

should always remember him. He or she can trust a cup of tea even from the dirtiest tea stall: as long as it is hot, it is safe.

2.2.5. The classic case of non-dissemination: boiling water in Peru

The tale of the non-diffusion of water boiling in Peru has become famous as a textbook case of sociology and is most relevant in the context of HWTS dissemination. It is the core case on which Everett Rogers has built his famous diffusion theory. It is the alpha and omega of all marketing theories. For this reason, it is presented here in detail.

Everett M. Rogers: the founder of the theory of diffusion of innovations

In 1955, "the public health service in Peru attempted to introduce innovations to villagers to improve their health and lengthen their lives. This agency encouraged people to install latrines, burn garbage daily, control house flies, report cases of infectious diseases, and boil drinking water. These innovations involved major changes in thinking and behaviour for Peruvian villagers who did not understand the relationship between sanitation and illness.'[36]
"A two-year water-boiling campaign conducted in Los Molinos, a peasant village of two hundred families in the coastal region of Peru, persuaded only eleven additional housewives to boil water. From the viewpoint of the public health agency, the local worker, Nelida, had a simple task: to persuade the housewives to add water boiling to their patterns of daily behaviour. Even with the aid of a medical doctor, who gave public talks on water boiling, and fifteen village housewives who were already boiling water, Nelida's diffusion campaign failed. To understand why, we need to take a closer look at the culture, the local environment, and the individuals in Los Molinos."

There are different types of people in Los Molinos:

1. **Mrs A: Custom-oriented adopter:** "Mrs A is about forty and suffers from a sinus infection. The Los Molinos villagers call her the 'sickly one'. Each morning, Mrs A boils a pot full of water which she uses throughout the day. She has no understanding of germ theory, as explained by Nelida. Her motivation for boiling water is a complex local custom of 'hot' and 'cold' distinctions. The basic principle of this belief system is that all foods, liquids, medicines and other objects are inherently hot or cold, quite apart from their actual temperature… Boiled and illness are closely linked in the norms of Los Molinos. By custom, only ill people use cooked, or 'hot' water. If an individual becomes ill, it is unthinkable to eat pork (very cold) or drink brandy (very hot). Extremes of hot and cold must be avoided by the sick; therefore, raw water which is perceived very cold, must be boiled to make it appropriate… Villagers learn from early childhood

[36] Everett Rogers: *Diffusion of Innovation*, pages 1ff, New York, 1995, first edition 1962.

to dislike boiled water. Most can tolerate cooked water only if a flavouring, such as sugar, lemon or herbs, is added….By tradition, boiling is aimed at eliminating the 'cold' quality of unboiled water, not the harmful bacteria. Mrs A drinks boiled water in obedience to local norms because she perceives herself as ill. She adopted the innovation, but for the wrong reason.

2. **Mrs B: Persuaded adopter:**
   The B family came to Los Molinos a generation ago, but they are still strongly oriented towards their birthplace in the High Andes. Mrs B worries about lowland diseases that she feels infest the village. It is partly because of this anxiety that Nelida was able to persuade Mrs B to boil water. To Mrs B, Nelida is a friendly authority (rather than a 'dirt inspector', as she is seen by other housewives) who imparts useful knowledge and brings protection from uncertain threats.
   Mrs B is marked as an outsider in the community by her highland hairstyle and stumbling Spanish. She will never achieve more than marginal social acceptance in the village… Because the community is not an important reference group to her, Mrs B can deviate from the village norms on health innovations.
3. **Mrs C: Rejector:** This housewife represents the majority of Los Molinos families who were not persuaded by the efforts of the change agent during the two-year water-boiling campaign. In spite of Nelida's repeated explanations, Mrs C does not understand germ theory. How, she argues, can microbes survive in water that would drown people? Are they fish? If germs are so small that they cannot be seen or felt, how can they hurt a grown person?… Mrs. C's allegiance to traditional village norms is at odds with the boiling of water. A firm believer in the hot-cold superstition, she feels that only the sick should drink boiled water."

The diffusion campaign in Los Molinos failed because Nelida and her superiors in the public health agency should have understood that the hot-cold belief system as it is found throughout Peru (and in most nations of Latin America, Africa and Asia) is incompatible with the message to boil the water. The indigenous knowledge system caused the failure of the diffusion effort for water boiling in Los Molinos.

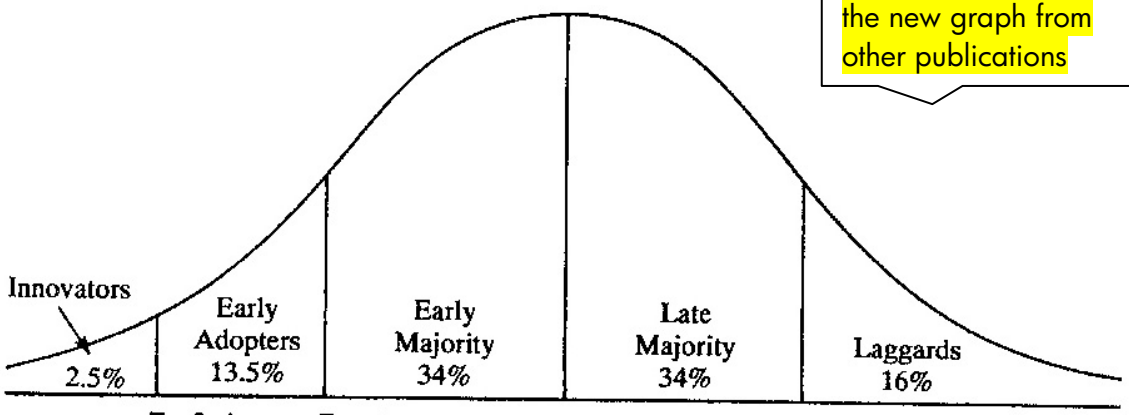
Nelida's failure also demonstrates the importance of interpersonal networks in the adoption or rejection of an innovation. Socially an outsider, Mrs B was marginal to the community and Nelida was a more important reference person to Mrs B than were her neighbours, who shunned her. Anxious to win more social status from the higher-status Nelida, Mrs B adopted water boiling not because she understood the correct health reason but because she wanted to obtain Nelida's approval. Thus it is clear that the diffusion of innovations is a social process, even more than a technical matter.
Nelida worked with the wrong housewives if she wanted to launch a self-generating diffusion process. She concentrated her efforts on the wrong village women who were perceived as a sickly one and a social outsider, and not as social models of water-boiling by the other women. The leaders of village opinion, who could have activated local networks to spread the innovations, were ignored by Nelida. As a result, the rate of adoption did not reach a critical mass, after which the diffusion process would have become self-sustaining.

From this example, Rogers developed his now well-known theory of diffusion of innovations as a social process. He divided people into innovators, early adopters, early majority, late majority and laggards. Rogers drew this segmentation as a famous bell curve. The different

segments of people have different perceptions about innovations and therefore have different levels of openness to adopt them.

It is also crucial to understand the social process and how the different groups influence each other. If one ever wants to achieve a self-sustaining dissemination process, then one must identify change agents and opinion leaders, who can influence others through their adoption. Only when members of the early majority group start adopting innovation is the critical mass achieved for a self-sustaining dissemination.

Claudia, please use the new graph from other publications



Legend: The essence of Roger's diffusion model is the segmentation of markets into different groups of adopters

2.2.6. Elsewhere, water boiling became popular

Despite this classic case of non-dissemination, water boiling has become very popular or even the norm in many countries, where the entire population is accustomed to boiling water. Unfortunately, very little is known about this dissemination process and, since Everett Rogers's studies, little follow-up research has been done on this topic.

There seem to have been no systematic studies done on this adoption process, despite the fact that – for example in Indonesia – water boiling has become almost a mainstream habit. It is intriguing – is it not? – how much people know about irrelevant things and how little about such an essential practice.

2.3. SODIS – the genius of a simple discovery

SODIS stands for Solar Water Disinfection and improves the microbiological quality of drinking water: It is a simple water treatment method using solar UV-A radiation and temperature to inactivate pathogens that cause diarrhoea.

2.3.1. The principles of Solar Water Disinfection

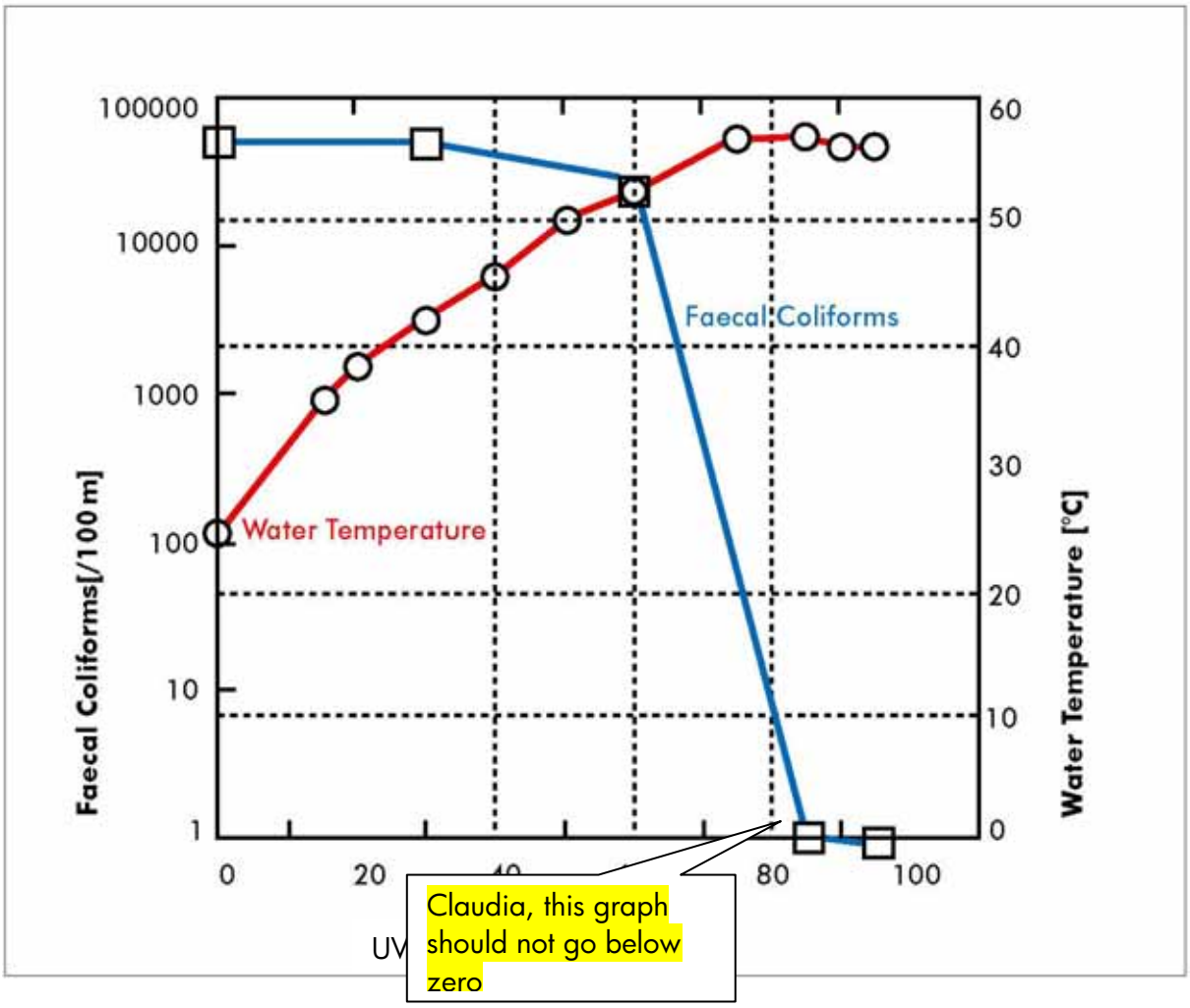
In 1991, EAWAG (the Swiss Federal Institute for Environmental Science and Technology)[37] and SANDEC(the EAWAG Department of Water and Sanitation in Developing Countries)[38]

[37] www.eawag.ch

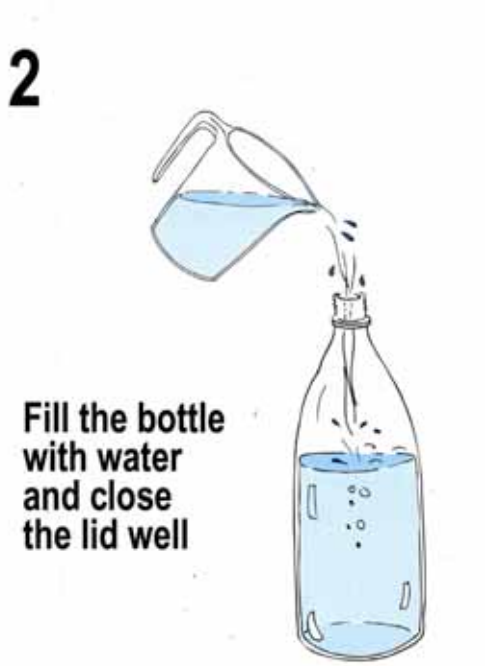
conducted extensive laboratory and field tests to develop and test the Solar Water Disinfection Process (SODIS). The laboratory tests, as well as the practical experience gathered during the application in the field, revealed a simple, low-cost technology with great potential to improve the health of those still without access to safe drinking water.

Since 1995, SANDEC has been engaged in providing information, technical support and advice to local institutions in developing countries for the worldwide promotion and dissemination of the Solar Water Disinfection Process, SODIS. Many projects have been launched and SODIS is now present in more than 22 countries. Initially, the bottles had to be painted in black on one side to attract more heat; however, later on, this requirement was dropped.

[38] www.sandec.ch



This graph shows how UV treatment and heat work together in a catalytic way to reduce the number of germs in contaminated water.



SODIS is a genius idea that exploits a physical phenomenon in a smart way: the combination of UV-radiation and heat acts as a catalyst and kills germs in a few hours (see graph on page??). To be on the safe side, it is recommended to let the bottles exposed for six hours. However, to handle SODIS in daily life requires a certain discipline; only when the use of SODIS becomes a habit will it be used regularly.

2.3.2. Reason and refinement in dissemination

The initial development of SODIS was carried out in the Swiss Federal Office for Environmental Science and Technology. It is therefore understandable that the dissemination strategy was – at least in the beginning – very focused on rational arguments around the methodology of reducing pathogens through heat and UV radiation.

Later the dissemination strategy became more refined and focused on the following elements:

1. As many target customers had to be educated about hygiene and motivated to change their behaviour, SODIS teamed up with local partners dealing with health and hygiene. These partners were farmers' associations, NGOs, and government health and water and sanitation programmes. In 2004, for example, SODIS worked in Latin America with 33 different partner organisations.[39]
2. Instead of addressing information campaigns to individuals, a policy was developed to seek more community participation and involve village leaders. Capacity building became not only more efficient, as groups could be addressed instead of individual families, but SODIS became more 'endorsed' by the village leaders.
3. Many education materials in the forms of cartoons, leaflets and promotional materials, such as SODIS caps for promoters, were produced to support the capacity-building campaign. As many target families are illiterate, the key messages were explained by promoters with the help of pictures and posters. Schools were also involved in order to inform children, in the hope that they would also influence their parents.[40]

Although the cartoons were very attractive, the dissemination process was still quite 'instructional and educational' and contained very few emotional elements. In Latin America, SODIS is now aiming to get 'celebrity promotion', for example by involving local football stars to promote clean water.

2.3.3. How SODIS spread out in Latin America

During a field visit in Ecuador and Bolivia in July 2004, the author had the opportunity to see SODIS at work in these two countries; the interviews with many of the people involved are documented on the following photo pages.

In the two SODIS areas visited in Ecuador, the great majority of the people were SODIS practitioners and – as the interviews show – most people knew how SODIS worked and seemed to use SODIS water regularly. However, it would be an illusion to think that all people will adopt SODIS; there is always a group of people who will not use SODIS for different reasons.
Among the non-users one can distinguish between the following three groups:

a. **Regular non-users**: Some people do not use SODIS, because they use another treatment method, for example they are boiling or filtering the water.

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[39] See *SODIS Newsletter Latin America,* Número 8, Febrero 2004, page 11.
[40] See SODIS: *Solar Water Disinfection – A Guide for the Application of SODIS;* this manual is available in English, French, Spanish and Portuguese. www.sodis.ch

b. **Irregular users:** Some people do not use SODIS regularly, for instance because they have forgotten to put the bottles on the roof. Some of them will then drink boiled water, but some will probably also drink water from the well.
c. **Determined non-users**: Some people prefer to consume the water directly from the well. They say 'it tastes better', and they are convinced that it does not do any harm to their health.

In the high Andes of Bolivia, adoption rates seemed to be considerably lower than in tropical Ecuador. People in Bolivia said that the procurement of bottles was a problem, and the overall consumption of water was much less than in a hot tropical climate. The impression was that farmers in the high Andes had other – more burning – priorities than water disinfection. The opinion that SODIS is more suitable for hot climates was shared by the SODIS Foundation in Cochabamba.

In some villages, villagers claimed that bottles were a problem, but just next to the road there was a big waste disposal with hundreds of discarded PET bottles; these bottles could have been collected, if it was felt that SODIS was a real necessity. On the other hand, the same people were very inventive when it came to introducing micro-irrigation devices to grow vegetables. They introduced home-made sprinklers (from perforated bottles) or purchased sprinklers made by local artisans to use the scarce water for a kitchen garden. Apparently a kitchen garden could generate considerable additional income.

Regular use of SODIS thus depends on perceived needs and on habits – with a higher likelihood of adoption in hot climates where people drink water very frequently. "The examination of the factors influencing the use of SODIS revealed that habits exert the strongest influence on the percentage of people drinking water treated by SODIS … Altering existing habits and the development of new habits is a rather difficult process and normally takes several months or even years."[41]

For the dissemination of SODIS, it is advisable to target densely-populated clusters. The dissemination effort is much more cost-effective if the same promotion can reach a densely-populated audience. Moreover, adoption of SODIS is more effective if the entire village is practising it. In addition, such clustering allows more effective promotion efforts, for instance having local women engaged as promoters. Research conducted by students concluded that the more the dissemination process is socially embedded and the higher the visibility of SODIS in a village, the more adoption will increase. The study recommend that SODIS bottles should be exposed in highly frequented and visible places, such as schools, health centres, community houses, but also in the homes of such high-profile citizens as the mayor, teachers and promoters.[42]

[41] S Moser, S Heri, H J Mosler, "Determinants of the Diffusion of SODIS", *op cit*, page 3.
[42] *Ibid*.

SODIS Adopters: *These families in tropical Ecuador (lowlands) are convinced of SODIS. The lady (upper left) produces and sells icecream. She has boiled the water before and feels SODIS water tastes better, 'like the water in bottles'. The couple and her grandson (upper right and below) are regular users and were boiling the water before.*

Promotion of SODIS: A team of local promoters is supported by medical personnel and motivates people through regular house visits. The three ladies (top left) are the local promoter, the doctor from the ministry and the nurse from the community health centre. The two ladies (top right) are neighbourhood promoters and visit some 60 households.

A local community leader is chosen for the promotion of SODIS in his community and he does it with charisma and dedication, assisted by his wife. SODIS is very popular in hot tropical climates where people drink lots of cold water during the day.

SODIS in Bolivia: safe water seems to be a lower priority in the cold high lands

This lady in Bolivia, living in a hamlet at over 4000 metres was told that her water was contaminated; she is now a convinced SODIS user.

She has always one bottle exposed to the sunlight. People drink much less water in the Bolivian highlands compared to tropical regions

SODIS staff perform water tests regularly with this mobile laboratory. It takes 14 hours until the results can be shown

If the water is contaminated, dark spots develop in these petri dishes. It is not always easy for local people to understand these tests.

For small farmers in the highlands of Bolivia, irrigation is a higher priority than safe water

To install irrigation devices people are very innovative and highly motivated

SODIS: Adopters and hard-core non adopters

This boy has heard about SODIS and that it kills germs at school, but they do not practice SODIS at school

This girl is well aware that one has to avoid drinking contaminated water; she knows SODIS and is aware of hygiene.

This young lady is very keen to avoid dangerous germs as she is pregnant

Convenience is important for this man: the family can store several SODIS bottles in the fridge and has always cool water

Hard-core non-adopters: This mother says they drink water from the well and dislike boiled water for the taste

Her daughter says she never has diarrhoea, but at the health centre she was regularly treated with severe diarrhoe as a small child

Lukewarm adopters: This family in a hamlet in the Bolivian Mountains knows SODIS; the father explained that they use it in order to kill the "bitchos", the animals, and claimed that they have 8 SODIS bottles for the entire family. However, when asked to show them, the boy brought one bottle full of dust from the store room; obviously they have stopped using SODIS regularly. When asked why they did not put the bottles on the roof that day, the boy said: "I did not have time".....

2.3.4. Could it have caught on better?

One of the great challenges after almost ten years of SODIS is the fact that there is very little spontaneous secondary adoption**.** An evaluation in Bolivia[43] points out: "The study found evidence of high levels of primary adoption of SODIS technology, although it is too early to estimate if the method will be included in the daily family habits. Families in the communities who were not trained in a direct or indirect manner did not adopt the method spontaneously. Families know how to do SODIS and why SODIS works. The four steps (illustrated on page ??) are known in an almost religious manner by SODIS users. Nevertheless, few of them know the technology details that could commit its effectiveness. There is a positive attitude towards the method but in many cases this attitude can be in conflict with the practice of boiling water."

If SODIS is so simple and so cheap, should it be the ideal method to be copied by anybody? It should spread around the world like wildfire, but the reality looks different: it takes a lot of effort to convince and properly instruct users; once they are convinced, they seem to be regular practitioners, forgetting only "from time to time" to use it.

Why has SODIS not spread like wildfire? One of the *promotoras* (promoters) said in a Freudian slip: "my job is to 'infect' people with SODIS", and then she corrected, "no, I should promote SODIS". Why has it not been possible to trigger off a SODIS 'movement' like an epidemic? Some of the key issues are:

1. 'Infections' (in the sociological sense) are only possible in 'dense' populations; if there is a movement to be triggered, then one should aim at a critical mass of users. Only then could it be contagious.
2. As SODIS is mainly a solution targeted at and for the poor, there are little chances that it will 'trigger up'.
3. A regular adoption of SODIS requires integrating it into a daily routine and developing a habit: changing habits is always a difficult task.
4. SODIS is not really a product – it is a technique, a method, and it demands rational behaviour and is not an emotionally desirable product.
5. In this sense, it is just one more of the 'good behaviours' as taught at school and by the promoters: one more addition to the 'Ten Commandments' that already exist.
6. There is also no supply chain as nobody can make money out of SODIS, and this delegates all dissemination efforts to public agents, whereas in market economies it is often the private sector that is surfing on and enhancing trends. An internal evaluation of a SODIS project by Helvetas (Swiss Association for International Cooperation) in Vietnam came to the conclusion that the PET bottles should be sold and not given in order to allow somebody to provide bottles as a sustainable small business.

It must be said that part of these issues are also valid for other POU methods.

[43] Alvaro Paz, et al: *Estudio de Aceptación y sostenibilidad de SODIS en Bolivia y Perú,* La Paz, Mayo 2003.

2.4. Water filters and dissemination

Removing pathogens from water through a physical process of sedimentation or filtration is also a method that has been used for centuries.

2.4.1. Filtration principles

The basic principle of filtration is described by Mark Sobsey as follows: "Microbes and other colloidal particles can be physically removed from water by various processes. The sizes of the microbes are especially important for their removal by sedimentation and filtration. Viruses are the smallest waterborne microbes (20 to about 100 nanometres in size) and the most difficult to remove by filtration and other size exclusion methods. Bacteria are somewhat larger than viruses (about 0.5 to 3 micrometres) but too small to be readily removed by plain sedimentation or settling. Protozoan parasites are the next largest in size (most are about 3 to 30 micrometres) and only the largest ones are likely to gravity settle at appreciable rates. Protozoan removal efficiency varies with parasite size and the effective pore size of the filter medium. Helminths are multicellular animals but some are important waterborne pathogens because their eggs (ova) and waterborne larval stages can be waterborne. Most Helminths of concern in water are large enough to gravity settle at appreciable rates; they are readily removable by settling and various filtration processes."

"Although viruses, bacteria and the smaller protozoans are too small to gravity settle, these waterborne pathogens are often associated with larger particles or they are aggregated (clumped)."[44] This aggregation can be stimulated through coagulation-flocculation methods.

These physical processes will not be examined in further detail here, but it may be noted that even such a simple filtration method as using a sari cloth reduced cholera in Bangladesh by 48 percent[45] as mentioned earlier. The focus here will mainly be on ceramic water purifiers in Central America and Cambodia, as observed by the author during extensive field visits in 2005.

2.4.2. Slow sand filters: how they work

A simple and effective method to purify water is the slow sand filtration method. It can be used at various scales and has been practised since the 19th century. Sobsey again: "Slow sand filtration is a biological process whereby particulate and microbial removal occurs due to the 'slime layer' ('Schmutzdecke') that develops within the top few centimetres of sand.

Reduction of enteric pathogens and microbial indicators is relatively efficient and generally in the range of 99 percent or more, depending on the type of microbe. Therefore, microbial reduction by slow sand filtration can be high, if the filters are properly constructed, operated and maintained. However, slow sand filters often do not achieve high microbial removals in practice, especially when used at household level. This is because of inadequacies in construction, operation and maintenance and the lack of institutional support."[46]

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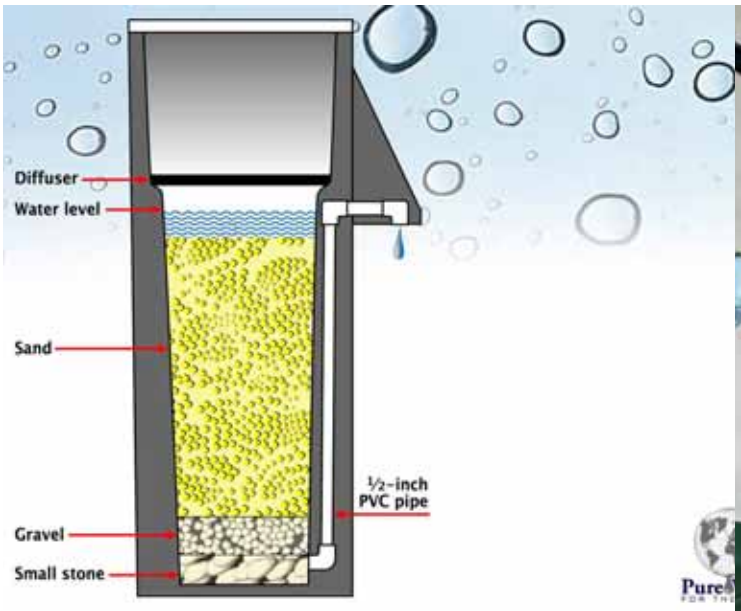
[44] Mark Sobsey: *Managing Water in the Home: Accelerated Health Gains from Improved Water Supply*, WHO Geneva 2002, page 21.
[45] Rita Colwell et al: *op cit.*
[46] Mark Sobsey: *op cit*, page 29.



Slow sand filters:
Several Rotary clubs have created the organisation 'Pure water for the world' aiming at the distribution of 5'000 slow sand filters in Honduras. The filters are manufactured by local craftsmen and are highly subsidised by the Rotarians. A donation of US $ 150 will provide a family with a filters, but community work is also done in cooperation with Rotary clubs from Honduras.

Slow sand filters are available in different sizes, from household to community level, and can be made from plastic or concrete. The most popular household level designs are made of concrete and may have a construction cost between US$ 15 and US$ 50 . The filtration rates of slow sand filters are quite high and reach up to 18 litres per hour, much more than a family needs. However, it is not always efficient enough at removing bacteria to meet WHO standards, and additional UV treatment or chlorination is recommended.[47]

Slow sand filters are regarded as a very attractive solution by many organisations: NGOs and Rotary Clubs in particular have been promoting them widely. The dissemination strategies have, however, not been successful for the following two reasons:

1. The filter is relatively clumsy, about one metre high and quite heavy. It requires a local craftsman to produce and install it and it has often not been possible for a viable trade to evolve. This hampers regular support for new construction, repairs and maintenance.
2. Probably most of the filters were given away by NGOs free of charge or with heavy subsidies. This may be preventing a market to emerge, impeding sustainability.

Rotarians from the USA have created the organisation 'Pure Water For The World'[48] supporting the local production and dissemination of slow sand filters in Honduras and other countries. This is a very altruistic initiative and the organisation's motivation must be admired. However, it is hard to see how these programmes would ever become self-sustaining and spread further on their own. It would be more practical if these admirable efforts could be channelled towards the creation of sustainable markets for HWTS, whichever technologies are most suitable.

2.4.3. The Hagar Biosand Filter programme in Cambodia

Hagar, a Swiss-based Christian development agency operating in Cambodia, has pioneered the dissemination of over 25,000 Biosand Filters (BSFs) in Cambodia. An independent assessment[49] concluded that BSFs may have as good a performance as ceramic water purifiers, are very reliable and have a significant impact on the reduction of diarrhoeal diseases. The mean reduction in diarrhoeal diseases was 44% in users compared with non-users, and in children aged two to four it was even slightly higher (46%).

Cambodia has the largest number and concentration of BSFs in the world. Together with the ceramic water purifier (see Chapter 2.4.5) there are some 200,000 families in Cambodia (almost 10% of the population) using a biosand or a ceramic water filter.

However, the BSFs are heavily subsidised, and the initial investment of some US$ 50 is relatively high, too much for most families. On the other hand, BSFs are reliable, heavy duty and long-lasting devices and have a very good performance, yielding between 20 to 60 litres of water per hour.

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[47] William F Duke: *,Comparative Analysis of the Filtron and Biosand Water Filters*, University of Victoria, page 13ff.
[48] www.purewaterfortheworld.org
[49] K Liang, M Sobsey et al: *Independent Assessment of Biosand Filters – Cambodia,* University of North Carolina, September 2007.

Slow sand filter programme of HAGAR in Cambodia:
The Hagar project has disseminated over 25,000 slow sand filters in Cambodia and tests have not only shown a high acceptance rate, it was also proven that users carry on with the filter for many years. The impact on the users in terms of reduction of diarrhoeal diseases is very high.

2.4.4. 'Filtron': the Ceramic Water Purifier (CWP) in Central America

Ron Rivera, a charismatic sociologist and potter, went to Nicaragua over 20 years ago to help the Sandinista Government in making ceramic insulators for electricity transmission. He was, as he is now, associated with Potters for Peace (PFP)[50], a US-based NGO working in several countries of Central America in support of local potters.

A. The origin and history of Filtron

In 1998, when the devastating hurricane Mitch hit Central America, PFP set up a ceramic filter factory and pioneered the production of what later became known as the Filtron ceramic water purifier. Mitch was one of the most destructive hurricanes ever recorded, affecting millions of people. Safe water was urgently needed as supply systems (already of borderline capacity and efficiency) had been badly damaged. In the first six months over 5,000 filters were distributed through non-governmental organisations. The workshop, called Filtron, evolved into a worker-owned cooperative and is now a privately-owned business.

This filter was an improved version of a filter originally developed by Fernando Mazariegos of the Central American Industrial Research Institute (ICAITI) in 1981. ICAITI had a mandate from the Inter-American Development Bank to develop a low-cost filter that could be manufactured at community level and provide potable water to the poorest of the poor. Production began on a small scale in Guatemala and later in Ecuador, when Ron Rivera became involved.
In 1994 AFA (Family Foundation of the Americas), a Guatemalan organisation, became interested in the ceramic water filter when it was found that other strategies were not yielding effective results. Chlorine tablets in rural communities were not well accepted; health complications associated with chlorine misuse caused additional concern. Boiled water often was ineffective when households failed to boil water long enough to purify it. AFA carried out a one-year follow-up study on the initial Mazariegos-led filter project, concluding that incorporating this filter into rural health education efforts reduced the incidence of diarrhoea in participating households by as much as 50 percent.

Potters for Peace has since provided consultation and training in setting up production facilities around the world: Bangladesh, Cambodia, El Salvador, Ghana, Guatemala, Honduras, Mexico, Myanmar, the Darfur region of Sudan and others. The CWP has been cited by the Appropriate Technology Handbook. Tens of thousands of filters have been distributed worldwide by organisations such as the International Federation of the Red Cross and Red Crescent, Médicins Sans Frontières (Doctors Without Borders), Plan International, Project Concern International, Oxfam, UNICEF and USAID.

B. Cost and performance of Filtron

Different models are available in Nicaragua, a smaller container for 8 to 10 litres a day and a bigger container for 20 litres per day; the filtration speed is one to three litres per hour and the cost is US$ 8 to US$ 12 for the simple plastic container models. PFP has also made upmarket models at slightly higher prices: models with ceramic containers are sold between US$ 17 and US$ 35.

[50] www.pottersforpeace.org

These models are efficient at removing bacteria – up to 99% – but the flow rates are relatively modest for the needs of a big family[51]. The filter is made of fired clay in the shape of a flowerpot and is impregnated with colloidal silver, an agent well known for its effectiveness in removing bacteria.

Several studies have tested the efficiency of the filter in the laboratory and in the field and conclude: "Results agree with historical data and show that the PFP filter is capable of removing almost 100% of bacterial indicators of disease-causing organisms. Although the ceramic filter alone removes a majority of the indicators, the colloidal silver is necessary to achieve almost complete removal."[52]

However, one problem is a danger of recontamination, especially if the tap of the container is infected, for instance when a dog licks the tap or if it is touched with dirty hands. In a hot climate, the lower container is an excellent breeding ground for bacteria if the water is recontaminated. Therefore, it is a challenge to introduce a double barrier, for instance by using a piece of ceramic treated with colloidal silver close to the tap. Recontamination is an issue for all filters, and it is pointless if safe water is drunk from a dirty glass,.

A ceramic filter factory on the outskirts of Managua has been set up to produce up to 6,000 filters per year (with a production capacity of around 50 filters a day). It began as a cooperative, but it failed to become a commercial success and was sold to a private company.

The production cost alone for one filter is around US$ 6 and the ceramic part accounts for about US$ 1.20, while the plastic container, the lid and the tap cost some US$ 3.80. It is thus questionable whether it is justified to call the filter a 'ceramic' filter, as the pottery part only represents some 20% of the production cost. It could be called a plastic water container with a ceramic filter element inside.

This distinction may look artificial, but from the marketing point of view it does matter if the filter is manufactured and marketed by a plastics factory buying a filter element, or whether a ceramics factory adds plastic parts worth more than three times the ceramic cost. It is somehow the same as if a tyre or motor factory tries to sell cars. This question will return later in this book.

C. Dissemination of the ceramic filter in Nicaragua

Overall, the pioneering work of Ron Rivera has led to an attractive, effective and low-cost HWTS device. However, its dissemination is not very impressive. Of course, that judgment depends on whether one is an optimist or a pessimist. According to Ron Rivera, some 26,000 filters have been sold in Nicaragua in the past six years, approximately 1,000 filters in Honduras, 2,000 in El Salvador and some 40,000 filters in Guatemala. If one takes into account that these sales were made mostly to NGOs and almost no resources and efforts have been available to undertake any marketing, then the figures are again quite impressive, as well as the fact that the idea has spread into many other countries. These factors, and the

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[51] William F Duke: *op cit*, page 13.

[52] D S Lantagne: *Investigation of the Potters for Peace Colloidal Silver Impregnated Ceramic Filters: Intrinsic Effectiveness and Field Performance in Rural Nicaragua,* MIT, 2001.

remarkable interest of so many institutions in disseminating the filter in other countries, make it imperative to look at the dissemination issues in the field.

The dissemination process was mainly driven by NGOs, and even more by the different post-Mitch programmes. This means that most of the filters were given totally free of charge or with high subsidies. However, there is one exception: Save the Children Canada has introduced a different approach in a village on the Atlantic coast with the aim of creating a local market and the stimulation of a private network of distributors. Some 50 to 100 filters are sold each month through different retailers such as a) ordinary shops, b) individual salespeople who are dedicated to promoting, selling and collecting payment, and c) NGOs that offer the services as intermediaries.

This mother is happy with the filter and says the family is better off now; children are less sick.

This lady has a filter for 6 months and sees considerable improvements in family health

Happy adopters of ceramic filters in Nicaragua

This lady is very happy with her filter and she sees much difference in the health of the family. She has 3 children and the entire family consists of 8 persons. She has paid 20 Cordobas (US $ 1.20, roughly 10 % of retail price) and finds this a very good price. If the filter was broken she would go anywhere to buy spare parts.

Adoption of filters and livelihood systems

This lady is also satisfied with the filter and says that their water is now much cleaner.

Her husband agrees and is aware that they have gained in better health

The livelihood system is quite sophisticated: they have a silo to store maize from the Postcosecha programme of SDC.

With this stored maize they can raise a pig: this is like a savings account for the family: whenever they need cash they sell the pig.

They also have a simple biogas plant allowing them to cook with gas instead of firewood.

This gas does not only prevent the family from collecting fuelwood, it is also free of smoke.

The tap of this filter is broken. A spare would cost 20 Cordobas, but there is no place to buy.

The husband is a day-labourer and he earns 25 Cordobas a day.....if there is any work.

Broken filters and no spare parts in sight

This lady does not know where to buy a new tap and for her even 20 Cordobas (US $ 1.20) would be a problem, as they are a very poor family. However, she is aware that drinking contaminated water may be even costtlier and threaten the health of her children.

This filter is broken. Ceramic filters are delicate and can easiyl crack if they are hit.

Mr. Ramon from Filtron says they can not give any guarantee for improper handling.

Broken filters and the lack of a supply chain

This lady has stopped using the filter after it was broken and she does not know where to buy a spare part. It would cost 70 Cordobas (US $ 4.00). The family of 14 people living in this house could probably afford this as her husband earns 2 US $ a day and she does sometimes tailor work.

Mr. Ramon of Filtron is taking water samples from the ponds and from the filters.

The HACH test is relatively cheap (~US $ 0.80) and shows results after 14 hours.

Testing water at source and filters for re-contamination

The first sample was from house two at the well and the sample in the middle is from the filtre. It shows that the filter protects (yellow colour). The sample from the filter in house 3 showed a recontamination of the filter. The HACH test does only indicate absence or presence of bacteria, not how many bacterias were present.

Let us first look at some good news: many families are very happy with the filter and use it regularly. Many mothers are well aware of the health benefits that purified water brings to their families (see photos). Most families had paid around 20 Cordobas (US$ 1.20) for the filter, around 10% of the common retail price. The families live in a very poor rural area near the city of Leon, where daily wages are low and erratic and where the prospects for viable smallholder farming are quite bleak. Some families have received land under the land reform programmes of the Sandinista government, but most of them had subsequently lost it due to lack of irrigation, farming skills or access to markets. It is thus most likely that these people would never be able to afford a filter at the full price.

It is also important to integrate the dissemination strategy for HWTS into the entire livelihood systems: if people have no income, it is hard for them to buy and sometimes even to maintain a water filter. One family has a small plot to grow maize, store it in a silo and raise a pig. This pig is one of the key sources of income: they sell it when they need cash for any agricultural input or any 'major' (a pig is worth some US$ 60) investments.

The bad news comes when the filter has a problem: two women stopped using the filter, when even minor damages occurred. When the tap of one filter was broken, the lady did not know where to buy a spare part – as there was no supply chain developed – nor if she could pay the 20 Cordobas it would have cost. Her husband is a daily farm labourer and he earns only 25 Cordobas a day (US$ 1.40), if there is any work to do at all. During most of the year, there is no such work available.

Another lady showed us the broken ceramic part: a shock or abrupt movement may have caused a crack in the pot and the only option is to buy a new ceramic unit for some US$ 4. As the family is –relatively – better off, they may afford it. However this will not happen if the family has to go to Managua (more than 100 km) to buy it.

Here, a major weakness of programmes driven by NGOs becomes apparent: NGOs cannot be blamed for their inherent tendency to give away filters and other items free of charge or at a heavily subsidised rate: this may be justified and is in many cases the only way to make HWTS available to poor families. However, it is destructive to act as a donor rather than setting up a supply chain. NGOs could perform such programmes in two ways:

1. They could purchase a number of filters in bulk in Managua or directly from the factory and transport the filters on their own vehicles to the beneficiaries.
2. They could set up a 'dealership' by appointing one woman as a retailer for filters, give her some capital to buy 20 filters and have this womeran sell them to her neighbours. She would then also have some spare parts.

These two ways of handling would make a great deal of difference: not only could the second option give dignity and responsibility to the community itself, it could also be a way of creating local dissemination structures. In places where there are self-help or credit groups in place, such activities would stimulate not only the local economy, but also empower the women to help themselves in a much more sustainable way.

Another important task is to test the filters and the water from the wells regularly for contamination and recontamination. If instead of acting as intermediaries, NGOs could set up local retail points, the same women could also be equipped with testing equipment, for

instance HACH tests, and they could thus monitor the water quality of the wells and also check for filters with a recontamination problem.

In summary: Potters for Peace and its charismatic Ron Rivera have introduced a fantastic innovation in Nicaragua and a very attractive solution for the rest of the world. An affordable, effective and well-designed HWTS device has been developed. Unfortunately they have totally failed to set up a marketing structure and a sustainable supply chain. This is also a failing of many NGO and government programmes with a 'give-away' mentality. Nobody denies that subsidies may be needed to reach the poorest people, but it should also have been possible to sell the filter to those who can afford it. Unfortunately, most of the investments for dissemination have been spent for direct delivery and not for creating a sustainable market. This is also true for the social marketing part: after Hurricane Mitch, the Johns Hopkins School of Public Health designed a very good and effective hygiene social mobilisation campaign with a 'blue bus' going from village to village with songs, music and hygiene messages for schools and villages. Unfortunately, this campaign was stopped and is now almost idle.

2.4.5. Cambodia: the IDE marketing approach for the Ceramic Water Filter

International Development Enterprises, IDE [53], a Denver-based NGO, has practised a marketing approach since Dr Paul Polak founded the organisation some 25 years ago. In Cambodia, IDE has a national programme and has started to disseminate the ceramic water purifier (CWP) in 2002, following almost the same design as in Nicaragua.

The history of how the filter crossed the Pacific from Nicaragua is an interesting case of South-South cooperation. Some IDE staff attended an international workshop on the rope pump[54] in Nicaragua in 2001, and Ron Rivera showed his ceramic water filter at an exhibition. IDE Nepal and IDE Cambodia became interested and invited Potters for Peace to come to Asia and to assist them in setting up a ceramics factory in 2001.

IDE developed a thorough marketing approach and a National Roll-Out Plan after carrying out extensive field tests which were considered quite positive and confirmed the effectiveness of the filter. The essence of the IDE marketing approach and its results are summarised in the following chapters.

A. Shaping a National Roll-out Plan

IDE had already started in 2002 with a first phase to verify and document the promised benefits of the ceramic water purifier. 1,000 CWPs were distributed in 12 villages, and the following aspects were looked at:

1. The water quality was tested under laboratory and field conditions and the tests showed 100% removal of faecal *E. coli* in the laboratory and 98% to 99% of filters in the field meeting WHO low-risk standards (10 or fewer *E. coli* per 100 mL).

[53] www.ide-international.org
[54] See www.ropepump.com

2. The type of benefits perceived by the CWP users depended in large part on their water treatment practice. Those who boiled the water before (69% of households receiving the CWP) saved time and expense, for example saving up to 22 hours per month of firewood gathering and boiling water, or US$ 1.40 per month in firewood expenses, for those who bought the firewood.
3. Those households that did not boil the drinking water prior to using the CWP did not save on water-boiling expenses but did show significant health improvements, including a 47% decrease in the incidence of diarrhoea.
4. Almost all households (95%) reported a high degree of satisfaction with the CWP, saying that it produced water that tasted good. Households typically fill the CWP two to three times per day, producing 20 to 30 litres of clean water, which was adequate for the daily drinking needs of households with up to 9 people (average household size 5.8 persons)[55]

Based on these positive results, it was decided to scale up and streamline production in order to reduce unit costs. At the same time, two additional filter factories were being set up, one by Resources Development International (RDI) and one by the Cambodian Red Cross with technical assistance from IDE. All these factories together can produce about 7,000 filters per month.

At the same time, a National Roll-Out strategy and quality assurance plan was developed[56]. There are basically two distribution models pursued. The first model is comprised of bulk sales to NGOs who then sell, subsidise, or give away the filter to selected households. The second model is a private sector-driven retail network. This private retail network is of special interest here and is characterised by the following features:

1. Distributors: The CWP distribution is managed by the manufacturer and involves transporting filters in bulk by hired truck to one of five provincial warehouses. Periodic shipments are then made by motorcycle trailers to retailers, sometimes up to 50 kms away on bad roads.
2. Retailers range from health clinics to pharmacies to all-purpose household goods or hardware shops. A first assessment showed that – at least in the initial phase – health-related retail outlets had a higher turnover than the general retailers.
3. Cost and Margins: The production cost for an all-inclusive filter is US$ 5.25 and is sold at about US$ 8. This allows for the following margins as shown in the Table).

Value Chain Component	Direct Cost	Sales Price	Gross Margin
Manufacturer	$ 5.25	$ 6.25	19%
Distribution (managed by manufacturer)	$ 6.25 ($0.80 cost of transport)	$ 7.20	2.4%
Retailers	$ 7.20	$ 8.00	11%

[55] Michael Roberts: *Ceramic Water Purifier Cambodia Field Tests, IDE Working Paper no. 1*, October 2003, www.ide-international.org.
[56] See IDE: *Ceramic Water Purifier National Roll-Out Strategy and Quality Assurance Plan*, Phnom Penh, December 2004.

4. Payment method: Up to now, the retailers pay once they have sold the filter. This means that the IDE as a facilitator has to provide 'all trade financing' for the product without receiving interest payments.
5. Capital investments: A standard factory producing 1,500 units per month requires an upfront investment of some US$ 20,000 for a new production facility. If the manufacturer is already a brick or tile manufacturer (and has equipment that can handle kiln and clay) then the capital investment may only be US$ 5,000 to US$ 7,000.
6. Quality Assurance: The CWP must have an acceptable flow rate (one to three litres per hour) and must be properly treated with colloidal silver. As these quality parameters are not easily visible, it is important that the sponsoring NGOs keep the manufacturers under strict control, perform regular quality checks, and brand and certify the product.
7. Demand: The National Roll-Out Plan estimates the total demand for a ten-year period in the worst case scenario at 190,000, in the base case as 440,000 and in the best case as 755,000 CWPs. Current sales trends, after about three years, indicate that the best case scenario may be realised.
8. Cost and Returns: It is estimated that the realisation of the plan would cost US$ 2 million over five years for the facilitation and market creation (donor funding) and would generate a user investment in the order of US$ 5.6 million (700,000 filters at US$ 8). In a completely unsubsidised model, the users would pay the facilitation and marketing costs themselves for a net project cost of zero. In a completely subsidised model, on the other hand, the donor would pay all facilitation, marketing and hardware costs for a net project cost of US$ 7.6 million. If the filters were given free, then the donor costs would be at least US$ 4,375,000 (700,000 filters at US$ 6.25), the cost of filters plus distribution.
   These total costs could be compared to the potential reduction of diarrhoeal disease risks, estimated in a recent study at 46% over all age group[57]. It is difficult to assess the economic value of this reduction, but if 700,000 CWP are in use (allowing for the inevitable abandonment of the filters by some) 3.5 million people would get access to safe water, so these costs seem to be more than justified. Even the firewood saved would have a value of nearly US$ 6 million per year (US$ 1.40 per month for the 69% of users who stop boiling their water).

B. Marketing strategy: how to reach the right consumer segment?

In this National Roll-Out Plan the sponsors involved use different strategies according to their organisation's mandate: while the IDE approach and mandate is to develop the market to deliver benefits to poor consumers, the mandates of RDI and the Cambodian Red Cross are more focused on direct interaction with poor beneficiaries. It is remarkable that all the three organisations have decided to sell the filter and not to give it away.

The social marketing approach of RDI is considered in the next chapter; here the focus is on the IDE approach to set up a private sector supply chain. The principal element of this approach is to assist the entire supply chain with facilitation so that each link in the chain becomes viable and sustainable. This means that each link in the chain must become profitable.

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[57] J Brown, M Sobsey: *Independent Appraisal of Ceramic Water Filtration Intervention in Cambodia*, Final Report, Unicef Cambodia, May 2006, page 31.

In order to do this, IDE applies genuine marketing strategies as they are commonly applied in business, even though IDE is a non-profit organisation.

In the first phase of 2002 to 2004, the principal clients addressed were early adopters, usually representing some 16% of the total market. In a second phase, 2005 to 2007 the focus will still be on the early adopters but gradually shift to an early majority representing – as a rule of thumb – 34% of the market. After the fifth year the late majority may be addressed, and then finally some of the 'laggards'. (see the diagram on page?? on dissemination)

The strategy used to reach each of these groups is quite different[58]:

1. Early Adopters: These are the more innovative people, rather young and better educated, usually with a higher disposable income and with a more progressive orientation. Most of these people may be found in towns, but in every village there are also some people who are known to be more innovative. To reach this group, the CWP should be made known to them with a key message such as 'the key to good health'. If possible an endorsement of medical 'authorities' should be sought from doctors and pharmacists. It is not surprising that in the initial phase, more CWPs have been sold to this group through retail outlets linked to health than through general retailers. A large proportion of the group of early adopters is already aware of hygiene and is boiling water; for them, the CWP is thus a convenience product that reduces the time and cost of water boiling and provides health to the family at the same time.
   A survey has revealed that a very high proportion of the target group in Cambodia – even in rural areas – watches television every evening. It is envisaged to reach this group partly through TV advertising, and also through a series of accompanying measures. These will include promotional flyers, a product video and presentation of the benefits to institutions, associations, NGOs and micro-finance institutions.
   An important part of the promotion in this phase must be supporting the retailers with demonstrations, displays and booths at visible public places.
2. Early Majority: While the market of the early adopters is small and it is usually costly to reach them while sales are still low, the early majority can only be addressed once the market is growing. The early majority usually does not buy something new they have never seen at least at their neighbours' house. The early majority may hear of the product through a person they trust – a relative, a village leader or a reference person – and not through the item on television.. At this stage it is also likely that some competitors will appear on the scene, as they now also see a market emerge.
   During the Early Majority marketing the products should become available with general retailers as well, and they should now be aggressively defended against any – but especially low- quality – competitors. It becomes now more interesting for retailers to sell the product as volumes are going up while pressure on the prices may occur through the competition. In this phase, it is now essential to develop a strong branding campaign and promote the branded product rather than still introducing a new generic product. It is no longer the filter itself that needs promotion but the specific brand, mainly also to ensure the quality.

[58] See IDE Cambodia: *Ceramic Water Purifier Marketing Plan*, Phnom Penh, October 2004.

IDE Cambodia (International Development Enterprises) prepares for a sales promotion in a small town.

The IDE filter is branded as 'rabbit' filter and is sold through 130 retailers in Cambodia

IDE market promotion of the ceramic filter

A promotion stand is built-up with demonstrations and with music to attract the attention of potential customers passing-by. Members of the IDE marketing team are doing these demonstrations as a support to the IDE retailer in front of his shop.

The IDE promotion is happening in front of the shop of this retailer. Mr. Ni Chai has a retail hardware shop in Bekcham, near Phnom Penh.

IDE does not sell filters on their own but always promotes the business of their retailers.

The promotion is done in front of the shop of the retailer

Mr. Ni Chhai sells all kind of goods and the filter is one among many products. He was happy that he sold 4 filters during the demonstration and he will keep the filter in front of his shop. When asked if he would do demonstrations on his own, he clearly denied....and felt somehow embarassed. It looked as if such extravert activities are not appropriate for a hardware dealer.

This lady is a vegetable farmer and trader from a neighbouring village and sells products in town.

She has bought a filter because it saves her time compared to boiling the water.

The first buyer: the filter saves her time compared to boiling the water

This lady is better educated than the average people and is clearly aware that hygiene and safe water are important for her family. She is confident that her neighbours will also buy the filter.

This lady is also buying the filter in order to save time instead of boiling the water.

She is a rice trader and belongs to a group of somehow better off people.

Early adopters are most likely boiling water already

This lady is working in a garment factory. She is aware that safe water is important for her family with one child and she has no time to boil the water. For her, the filter is thus a convenience good.

The IDE team draws conclusions from the demonstration for refining their marketing strategy.

All 4 filters sold during the demonstration were bought by women who already boiled water.

IDE-team refining the marketing strategy

Liz Atkinson is a business volunteer from Australia assisting IDE Cambodia in developing a marketing strategy. During the introduction phase, the filter must sell as a convenience good to early adopters already aware of hygiene and boiling water.

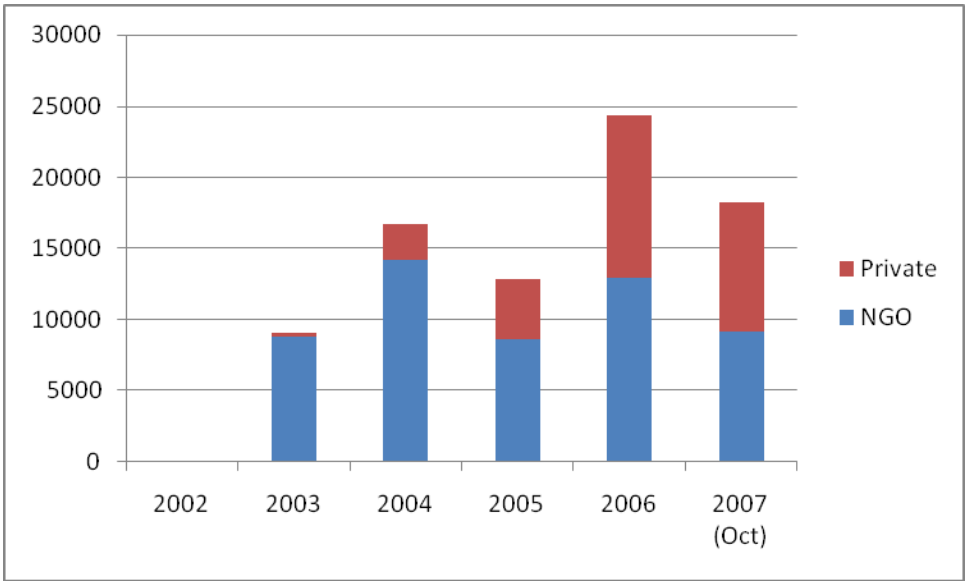
3. Late majority and Laggards: It is still important to reach out to this group of people, as they may represent the other half of the population. Often, this segment is composed of older people, and it is likely that this late majority may mainly be influenced by word of mouth and not through educational or promotional mass media. The village leaders play an important role in this process, but it is also crucial that children or grandchildren influence them.

This basic marketing strategy was introduced in 2005 and is – apart from some modifications due to budget constraints – under implementation now. Let us have a look at the first results.

C. Results achieved: over 90,000 filters sold

From 2002 up to 2007, IDE alone sold over 90,000 CWPs through their network of 140 private retailers and through NGOs. Sales have grown steadily and may exceed 25,000 in 2007.

The proportion of sales through the private network increased from 33% in 2005 to nearly 50% in 2006-07, while the proportion of sales through NGOs declined. This is a good sign of an emerging private market. The following graph shows these trends over time.



Sales of CWPs by IDE in Cambodia through private dealers and through NGOs

In one recent survey, IDE interviewed 60 households with and 60 households without a filter in Kampong Cham province. Among the CWP purchasers, 86% had previously boiled their water and 17% continued to boil their water. Interestingly, among the population without a filter, 83% were boiling their water; the general level of awareness is thus quite high and has risen since IDE did the baseline study in October 2003, where only 69% had boiled their water (although the studies were in different areas). The main reasons that people give for not boiling water is cost and lack of time: the CWP directly addresses these two constraints.

IDE expects that soon, the early majority will enter the market and the proportion of non-boilers – and poor people – will increase. They will thus put more emphasis on the health benefits in future promotions and a little less on convenience, as in the recent past when their majority customers were water boilers.

D. Dealing with the poor in a market-based approach

There is ample evidence that giving things for free to poor people has a devastating effect and does not only affect sustainability, it often also offends the dignity of the people and positions a product from the beginning as a 'charity product' instead of a desirable object people can dream about. However, selling CWPs may also exclude many poor families from essential benefits. How can the dilemma of affordability be solved without spoiling long-term sustainability?

IDE Cambodia has recently begun cooperation with Plan International to promote CWPs actively in one pilot project area. There will be training of trainers for project staff, school and village demonstrations and some free distribution of filters at schools and public places. However, there are deliberately no subsidies given for filter distribution. Instead, local retailers or sales agents are established, connected to the national distribution network, and supported through promotional and educational activities directed towards potential filter users. After about a year, targeted subsidies may be introduced to help CWPs to reach the poorest households who could not afford it otherwise. Subsidies should be implemented in a way that does not undermine the sustainability of the market distribution system, for example through a voucher system, linkages through micro-credit, or paying by instalments.

By using this approach, a number of long-term benefits are realised:

- The CWP retains an image of high quality – something that people buy, not something that is given away.
- The CWP is more likely to be properly used and valued by the purchaser, and the purchaser is more likely to invest in a replacement filter when necessary.
- The private sector supply chain becomes established without having to compete against subsidised CWPs distributed by an NGO.
- Households that can afford the CWP can purchase it immediately at full cost.
- Poorer, more conservative households are able to become aware of the CWP, to see it in use in other households, and to build a level of confidence over time.
- A sustainable, long-term supply of new and replacement filters is available in the area for as long as demand exists.
- Ultimately, more people are reached and they experience benefits that continue beyond the life of the project.

By starting with subsidised distribution in an area, there may be a number of negative effects:

- The CWP gains a reputation as something that you receive from an NGO, not something that you buy in the market.
- When the filter element needs to be replaced after one or two years, people will wait for another subsidy.
- Dependency is created.

- The subsidy may be used on households that could afford a CWP on their own, thus wasting donor funds.
- Households that could afford a CWP on their own delay their purchase decision in the hope of receiving a subsidy.
- Price confusion is created in nearby areas where full-cost CWPs are available in the market, causing people to distrust retailers and delay their purchase decision.
- Some recipients of subsidised filters will sell them on for profit rather than use the filters themselves, creating a secondary market with which private retailers cannot compete.
- If an NGO is subsidising CWPs in their target area, that area will become a low priority for extending the private distribution network since a private retailer is unlikely to be able to operate successfully.
- Ultimately, no long-term supply of new and replacement filters becomes established, NGO subsidy programs stop, and the end benefit to all people in the area is low to nil.

2.4.6. Cambodia: the social marketing approach of RDI

RDI-Cambodia[59] stands for Resource Development International. It is a US- registered, private, non-profit, organisation working internationally dedicated to serving the people of Cambodia in dynamic ways. The RDI approach combines 'technology, education and heart' and supports projects that stand independently in their own right, but the entire range of projects form a unique and strong outreach programme that works best as a sum of all its parts. It focuses on water, sanitation and hygiene, health, farming and education. It is best known for its innovative education methods through the production of videos, songs and karaoke clips as a new form of edutainment; the basic principles follow the method of the Sesame Street series and works with puppet shows.

Since 2004, RDI has been running a factory for ceramic filters marketed under the brand label 'frog' filter. Several video stories have been produced with a frog as the main messenger, and these films are shown with a small video van in front of every family, together with a demonstration of the filter. Whereas IDE with its market-oriented approach targets the filter – at least in the initial stage – more at people who are early adopters and people who are boiling water already, RDI is fully targeting its efforts towards poorer people who do not have the habit of boiling their water regularly. The efforts of RDI are also part of a more integrated hygiene campaign and include activities in sanitation and hygiene education. In order to make the health and hygiene messages more 'sticky', RDI uses karaoke songs very often. Karaoke is very popular in South-East Asia, and children and whole families are immediately attracted to sing popular songs when they see a microphone. In this way, RDI can compose songs on hygiene education and have them become popular among children very quickly. It is proven that songs can carry health messages much more effectively than just text messages or spoken words.

[59] See www.RDIC.org

RDI in Cambodia is promoting a filter by a house-to-house awareness campaign.

RDI produces films base on the 'sesame street' method with a 'frog' as messenger.

Cambodia: RDI's social marketing strategy for non-boiling families

RDI (Resource Development International) is an NGO promoting hygiene and health awareness in Cambodia. RDI's target market are those people not yet aware of hygiene and is focussing on health education messages; the branded "frog"- filter is sold to the customers at US $ 7.00.

As an organisation focused on education, RDI is also very strong in campaigning at schools. So far, RDI has presented educational programmes in 26 schools and reached more than 20,000 students. Its productions are also shown on television and radio. The films on the companion CD in the back cover of this book includes some RDI materials. They are also available for download – see the inside front cover.

Around 23,000 filters are sold annually at a full cost price of US$ 8; only in exceptional circumstances are filters sold at a subsidised rate to people who cannot afford them. RDI is working with Plan International on the distribution of filters and the hygiene campaigns. It achieves around 36% of total sales through the commercial channel of 26 retailers and one distributor.

2.4.7. The UNICEF evaluation of CWPs in Cambodia

Joe Brown and Mark Sobsey made an independent appraisal of the two large-scale implementations of the household-scale ceramic drinking water purifier (CWP) in Cambodia after two and four years of use.[60]

Their main findings were as follows:

1. The rate of filter disuse was approximately 2% per month after implementation, due to largely physical breakages.
2. Continued filter use over time was most closely positively associated with related water, sanitation and hygiene practices in the home, cash investment in the technology and use of surface water as a primary drinking water source.
3. The filters reduced *E coli* 100 ml counts by a mean of 95.1% in treated versus untreated household water, although demonstrated filter field performance in some cases exceeded 99.99%.
4. Microbiological effectiveness of the filter was not observed to be closely related to its time in use.
5. The filters can be highly effective against microbiological indicator organisms but may be subject to recontamination, probably during regular cleaning.
6. The filters were associated with an estimated 46% reduction in diarrhoea in filter users against non users.

The main recommendations of the team were:[61]

1. **Breakage rate**: This is indeed a problem and depends partly on proper handling and cleaning, but a significant portion of risk of breakage is due to the technology. As this disuse rate is quite high, it is imperative that spare parts and filter replacements are available and setting up a supply chain is essential. Both RDI and IDE have succeeded in this.
2. **Effectiveness in time**: Filters maintain their effectiveness when used properly and there is not – as the manufacturers recommend – a 2 years period after which the filter

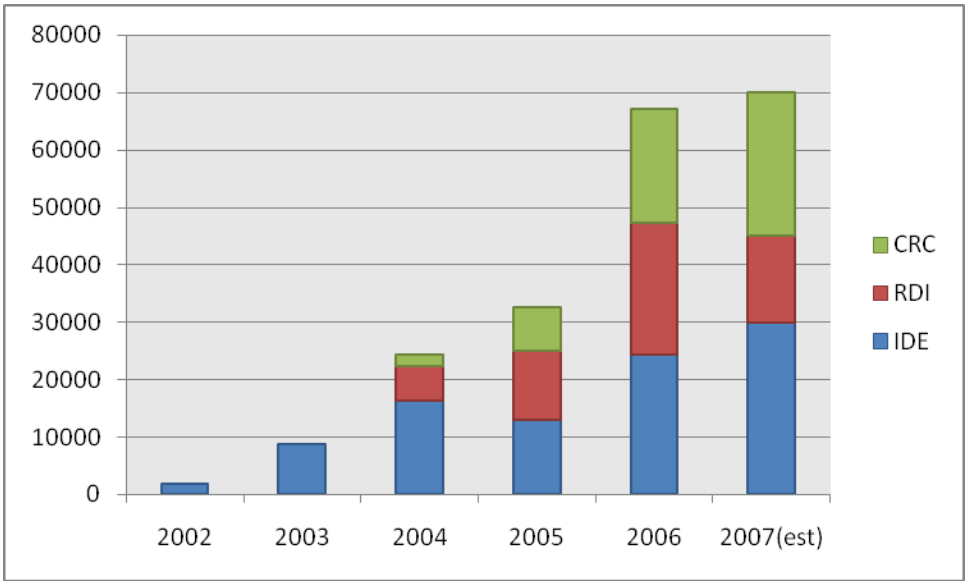
[60] Joe Brown, Mark Sobsey: *Independent Appraisal of Ceramic Water Filtration Interventions in Cambodia: Final Report,* submitted to UNICEF, May 2006.
[61] Joe Brown, Mark Sobsey: these recommendations are part of a forthcoming WSP field note.

is not effective. If maintained and cleaned regularly, it can be used for up to 4 years and even longer, but this has not yet been demonstrated.

3. **Filters and hygiene**: Where possible, filters should be integrated into comprehensive hygiene education and sanitation programmes, even though there is evidence that stand-alone water quality interventions contribute to health improvements as well.
4. **Selling versus giving**: The filters should be sold and not given away free of charge, as continued filter use was positively associated with cash investment by the families. Evidence shows that many Cambodians would be able to afford full-cost filters at less than US$ 10 each, with replacement filters for US$ 3 (on average, every two years). There is a risk that free distribution of filters by NGOs can undermine market-based programmes.
5. **Filter versus boiling**: CWPs should not be marketed as replacement technology for boiling until more extensive studies have shown that CWPs are also consistently effective against viruses and protozoan parasites when used properly.
6. **Scaling up**: More research is needed on appropriate scaling-up strategies, understanding cultural and social limitations to use of the technology, how to achieve positive behaviour change and the development of appropriate 'software' that is typically highly variable and context specific.

To summarise, the evaluation concludes: "The ceramic water purifier, as a public health intervention, holds much promise for Cambodia and her millions without access to safe water. The filter's demonstrated effectiveness in improving water quality and health, over a wide range of conditions, makes it among the best available options for household water treatment."

2.4.8. Getting up to scale: Cambodia is probably world champion



Total CWP units distributed in Cambodia

In all, by now, over 200,000 filters have been disseminated. Of these distributed filters, over 150,000 are still in use according to studies made about the lifespan of filters and usage rates. These 150,000 filters serve a population of more than 750,000, and at least some 60,000 filters are added every year. If one adds the 25,000 biosand filters distributed by Hagar International, Cambodia may really be the world champion in terms of coverage, reaching almost 10% of the population. This is probably the most successful dissemination of POUs in one single country.

The use of POUs in Cambodia is increasingly in the limelight and attracting the interest of the scientific community. Studies by Joe Brown and Mark Sobsey have been presented recently in a conference and are now published as a field note of the Water and Sanitation Programme.[62]

Claudia: hier wird noch ein Absatz kommen, dass inzwischen Filterfabriken in mehr als 20 Ländern existieren und ich habe eine solche Liste.

[62] Joe Brown, Mark Sobsey *Use of Ceramic Water Filters in Cambodia*, WSP, Unicef, Field Note, August 2007.

2.5. Chlorination and flocculation

There is a considerable range of chemical treatment methods, some known since ancient times[63]. Some of the most commonly-used methods, mainly chlorination and the use of a mixed process of flocculation and chlorination, are discussed here.

2.5.1. Safe Water System: CDC large-scale chlorination programmes

The Center for Disease Control and Prevention (CDC) of the US Government and USAID have launched the Safe Water System (SWS)[64] initiative consisting of three elements:

1. Point of use water treatment by consumers with a locally-manufactured dilute sodium hypochlorite (bleach) solution;
2. Safe storage of treated water in containers designed to prevent recontamination; and
3. Behaviour change communication to improve water and food handling, sanitation and hygiene practices in the home and in the community.

A family of five spends about 25 US cents each month to benefit from the Safe Water System. SWS products are produced and distributed through public-private partnerships and market-based approaches, with community mobilisation implemented by NGO partners to encourage correct and consistent use and reach high-risk populations. Safe Water System programmes exist in 23 countries in Africa, Asia and Latin America, and the programme will be launched in six more countries by 2007.

CDC has published a comprehensive manual[65] on how to run projects with chlorine-based disinfection in local environments. It promotes the local production of sodium hypochlorite with an electric-powered hypochlorite generator that can produce the disinfection solution through electrolysis of ordinary salt and water (see Chapter 2.5.3 for more details). Once production starts, the disinfectant can be produced inexpensively by a community worker and sold at approximately US$ 0.20 to US$ 0.30 per month for a family of five to six people. Chlorination is a very cheap method of water disinfection, especially if the sodium hypochlorite is produced locally. Claudia, diese Graphik kann man scannen aus dem Originalbuch, das

ich in Bern habe.

An important component is the safe storage of water. If water is stored in open-mouth vessels, it can quickly become re-contaminated. The vessels shown in the picture to the left are all

[63] For a detailed reference see: Mark Sobsey: *Managing Water in the Home*, op cit, pages 34ff.
[64] http://www.cdc.gov/safewater/index.htm
[65] CDC: *Safe Water Systems for the Developing World: A Handbook for Implementing Household-based Water Treatment and Safe Storage Projects*, produced by CARE/CDC, Washington April 2003.

probably recontaminating, while the containers in the picture to the right are relatively safe. If they have a narrow opening and if they have a lid, they are much safer. CDC also recommends developing a pricing system for selling such vessels and buckets.

2.5.2. Social marketing of Waterguard by Population Services International

Probably the largest ongoing initiative for safe water provision is implemented by Population Services International (PSI), a US-based NGO with extensive experience in social marketing. It is one of the main implementing partners for the CDC Safe Water Programme and applies the following three main principles to its dissemination programmes:

1. PSI employs private sector business principles to market and distribute needed health interventions.
2. Products and services are branded, attractively packaged and marketed via multiple channels
3. Products/services are typically sold at affordable prices, but not given away. This has three advantages:
   a) Ensures that product is more highly valued and better used by consumers;
   b) Provides profit incentive to distributors and retailers and ensures availability;
   c) Cost recovery enhances programme sustainability.

PSI now delivers some 8 billion litres of treated water per year through its interventions, thus – at an average consumption of 20 litres per person per day or some 8,000 litres per person per year – serving more than a million people. Waterguard used to be produced locally via electrolysis but PSI now sources the production from local manufacturers who use liquid chlorine to produce the water treatment solutions and fill it in small – branded – bottles. One 150-millilitre bottle costs US$ 0.15 to US$ 0.30, and one cap of the solution is sufficient to treat ten litres of water.

PSI has also introduced chlorine tablets under the 'Waterguard' brand: one tablet is good for treating 20 litres of water and costs only US$ 0.005; in other words, 4,000 litres of treated water will cost only one dollar.

PSI is working in 23 countries, and its approach is promising because it not only involves a simple technical solution, it is also addressing the problem more holistically by including social marketing components that address the necessary behaviour changes. For this, PSI has developed fully-fledged multi-media campaigns with films and mobile shows, road-show promotions, posters, leaflets and other media.

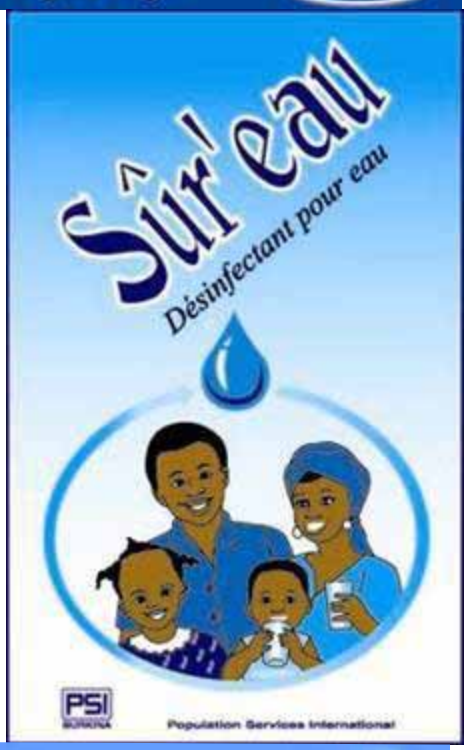
PSI aims at recovering the full cost of the products through the supply chain, making production, transport and sales fully sustainable. Supply comes through both the – private channels (the most important) such as typical wholesaler-retailers, but it also distributes through the health sector, selling the products at cost to NGOs, clinics and health posts which then distribute the products freely to their target group. While the commercial supply channel is fully recovering its costs, PSI requires substantial donor funds for the generic promotion of the product and for creating awareness that safe water is effective in reducing diarrhoeal diseases.

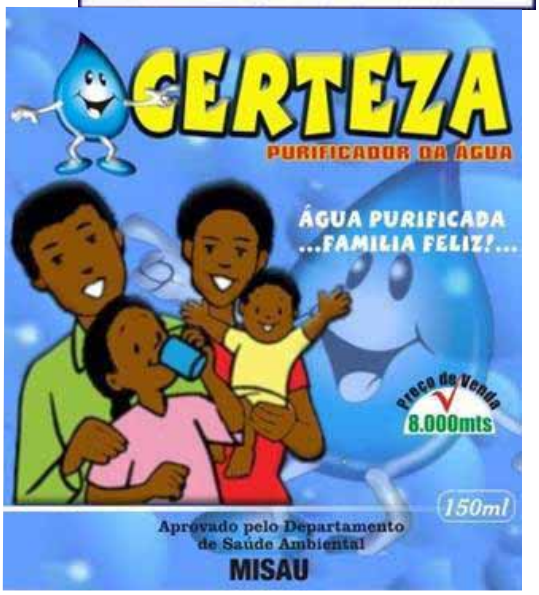
Waterguard: marketing and social marketing by PSI

Waterguard is a local chlorination product promoted by PSI (Population Services International) in Kenya, Malawi and other countries. Over 8 billion litres of water have been treated so far, serving more than one million people.

Waterguard: All PSI products are branded

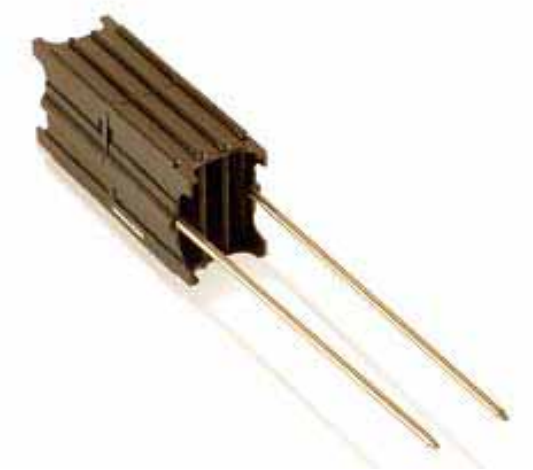
PSI uses the private sector for the marketing of their always branded products. On top of marketing, PSI creates awareness through intensive social marketing campaigns. Top left: waterguard in tablet forms, right row different brands in different countries. Below right: retail shop in Africa.





2.5.3. Local chlorine production in Great Lakes region – reaching to over a million people

Antenna Technologies is a Geneva-based NGO focusing on the development and dissemination of appropriate technologies. It has developed a simple hypochlorite generator[66] that runs on a car battery, and some smaller models can even be solar powered. This generator is sold under the brand name of 'WATA' for roughly EUR 160 and can produce one litre of chlorine per hour, good enough to treat 4,000 litres of contaminated water.



At present, a larger project is under way in the Great Lakes region, led by Zacharie Kasongo, a former student from Goma, who studied in Geneva. It aims at training some 50 chlorine producing-units and some 100 chlorine agents. A chlorine-producing unit can make up to 8 litres of hypochlorite solution per day. The solution is packed into small bottles of 250 ml (good for one thousand litres of water)

The region of Kalemie in the Katanga Province of the Democratic Republic of Congo has a population of 200,000 and is situated on Lake Tanganyika. It is affected by regular outbreaks of cholera. People are aware of the dangers of polluted water and are afraid of cholera, but they often have no other choice than to fetch water from the lake. There are hand pumps but it often takes women up to two hours of waiting to collect water.

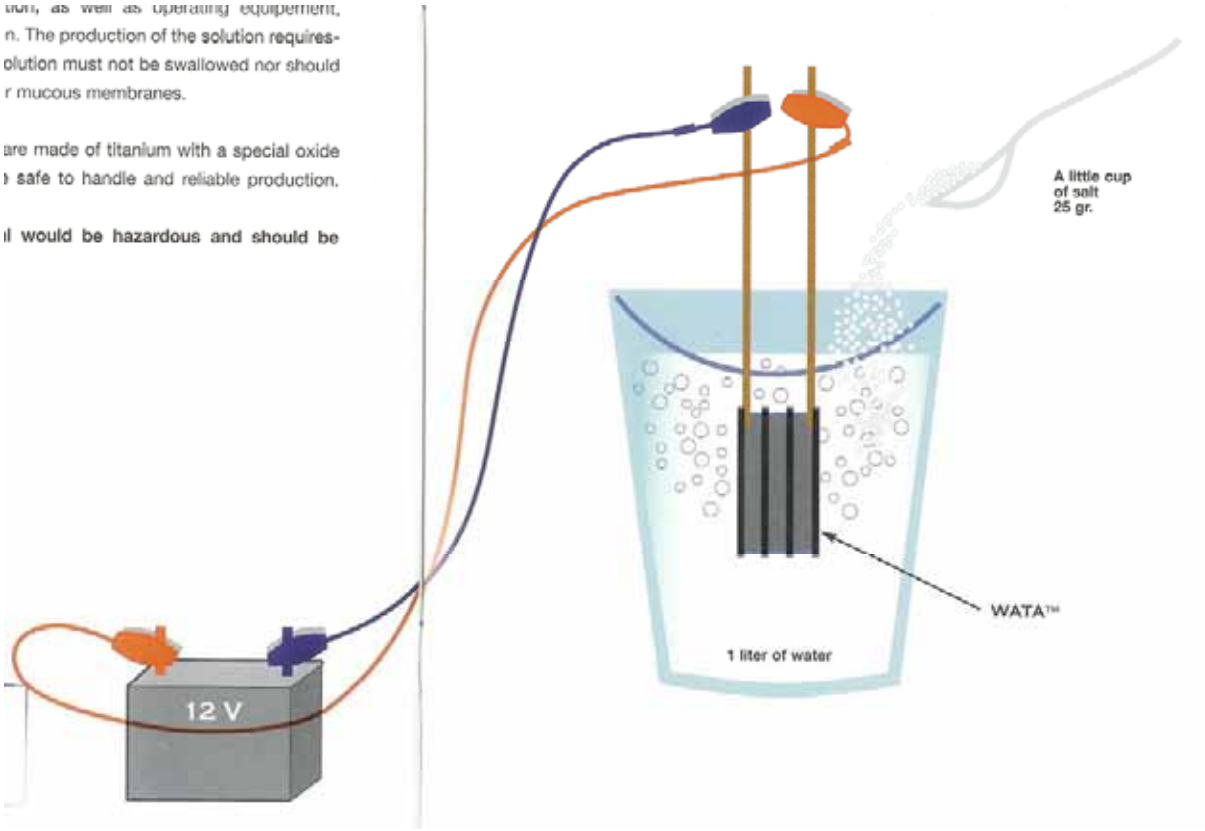
The project involves two main distribution channels for the chlorine: on the one hand, so called chlorination 'agents' are posted at crossings where people pass by after fetching their water from the lake. This agent injects 1 millilitre of chlorine into the vessels, free of charge. The other channel is through the health promoters in the public health centres, who pay regular house visits to all the families. They will distribute bottles of 250 ml of chlorine, sufficient to treat 1,000 litres of water, to the families for household chlorination with proper instructions, and it is intended that people will pay a minor sum of US$ 0.15 to US$ 0.20 for each bottle. Production costs are in the region of less than US$ 0.05 per bottle, basically consisting of salt and electricity. One car battery would last some five hours (five litres worth).

Although people are very aware that the chlorination of their water is a good investment, it may take some effort to ensure that the health workers are paid and get at least a contribution towards sustainability. What is required more than anything is a change of attitude and the insight that these essential inputs for safe water are not free of charge and are a much better investment than paying medical fees once people have diarrhoea.

A radical change of attitude is also needed among the many NGOs, international organisations and government agencies. Having become convinced that the WATA is a good thing, one NGO in the Great Lake region purchased a maxi WATA able to produce 20 litres

[66] For more information see: www.antenna.ch

of chlorine per hour and… gave the chlorine away. They may have the best of intentions, but this does destroy any prospect of sustainability and undermines an opportunity to create a



market for local chlorine production. It would be better if they assisted some small production units with a loan and then purchased the chlorine from them. Instead of distributing the chlorine free of charge, they could give the health promoters – at present acting as volunteers – a small source of income. In this way, a sustainable supply chain could be created or, as one villager said: "It would be better if we could be responsible for producing our own chlorine for safe water – better to teach a man how to fish than giving him a fish".[67]

[67] From an internal evaluation report by Denis-Luc Ardent: *Prévention des maladies hydriques dans la zone de Kalémie – Evaluation de projet*, Geneva, Antenna Technologies, July 2006.

At present, three different models of WATA are available from Antenna[68]. On the left is the Maxi WATA (ATW-30), in the centre the Standard WATA and on the right the Mini WATA. The following table describes approximate performances and prices:

Table ??: WATA electro-chlorinators and their performance

Type of WATA	Maxi ATW -30	Standard ATW	Mini ATW
Performance in litres of safe water / day (8 hours)	100 litres of chloride 4,000,000 litres / day	8 litres of chloride 32,000 litres / day	3 litres of chloride 12,000 litres / day
Number of people to be served @ 20 litres/person/day	~20,000 people	~1,600 people	~ 600 people
Approximate cost of WATA	US$ 1,500	US$ 200	US$ 40
Approximate cost of kit including battery charger, tester for hypochlorite and storage bottles, manual	US$ 1,800	US$ 280	US$ 60 (with a solar module)

[68] For more details: www.antenna.ch

(dieser Text ist noch provisorisch) Recently, a major scaling-up was possible: the product is now branded under the name of UZIMA and a supply chain has been developed. Next to 10 health centres, over 90 pharmacies are selling the hypo-chloride in flasks of 200 millilitres at a price of ??. But the main promotion system derives from the over 500 "mammans sensibilisatrices" (awareness creation mothers) that are going from house to house and educating their peers about safe water. They are also selling the hypo-chloride and can – together with a salary from the project – make out a living. Again, they can sell there more easily where a market was created, and in areas where NGOs are giving the liquid free of cost, it is not possible to sell anymore.

In the Katanga Province in the People's Democratic Republic of Congo, water supply is erratic and many women fetch water from the lake.

Every year, cholera outbreaks are frequent and people are very aware of this danger and afraid of contaminated water.

Antenna project: Cholera and contaminated water in the Great Lakes region

People know that the water from the lake is polluted and that they may carry home deadly diseases in their buckets. When asked for a solution with local chlorination, people said: 'give the chlorine production to us and let us manage it; better to teach people how to fish than giving us a fish'.

This man is producing small 250 ml bottles with chlorine for sale to families. One bottle is good for 1'000 litres and costs US $ 0.18 to 0.20.

At the crossroad where people pass with their buckets from the lake, a 'chlorinating agent' adds a drop of chlorine with a seringe.

Antenna project Great Lakes: Local production of chloride with the WATA

Antenna Technologies Great Lakes Region, a Geneva based NGO, is running a sizeable project to train local chlorine producers and agents with the WATA, a small battery run chlorinator developed by them. It can produce 1 litre of chlorine per hour, good for disinfecting 4'000 litres of water.

There is great interest for chlorinating the water In the Great Lakes region after consecutive cholear epidemics

However, awareness campaigns for safe water are still an important part of any programme. Antenna involves women for this purpose.

Antenna project Great Lakes: A distribution chain for chloride reaches over a million people

The local product is branded as "Uzima" (Suaheli for "life") and distributed by over 500 "mamans sensibilisatrices" (awareness creation women) who sell the chlorine to other mothers. Their major problem is that some NGOs give the chlorine free of cost and that makes selling impossible.

Insert page WATA 3 UZIMA new photos (diese Seite existiert noch nicht, Claudia)

2.5.4. PUR – a combined flocculation-chlorination method

Chlorination alone is not completely effective – particularly in turbid water – against viruses and other small pathogens. "Chemical coagulation-flocculation enhances the removal of colloidal particles by destabilizing them, chemically precipitating them and accumulating the precipitated material into larger 'floc' particles that can be removed by gravity settling or filtering."[69]

Source Water | Floc Formation after PUR Addition | Floc Formation after Complete Stirring | Decanting the Water Through a Cloth Filter | Clean Water Ready for Storage and Use

Procter & Gamble (P&G), the large multinational consumer goods company, is promoting such a combined chlorination-flocculation product under the brand name of PUR. It is a product aimed at contributing to poverty reduction on a large scale. P&G is committed to reaching a million children with safe drinking water education and considers PUR not as a commercial product but rather as a contribution of the company motivated by their Corporate Social Responsibility. In order to disseminate the PUR methods widely, P&G is in partnership with a wide range of development organisations.

PUR is distributed in sachets sufficient to purify 10 litres of water at a cost of US$ 3.5 cents and US$ 10 cents. PUR should be used as follows:

1. "Open a PUR sachet using a pair of scissors. Add the contents of the sachet to a vessel containing 10 litres of contaminated water. … Extreme precision is not necessary: if there are slightly more or less than 10 litres, the treatment procedure will still be effective.
2. Stir the powder steadily and vigorously in the water for five minutes. After adding the powder to the water, the water will become temporarily coloured, and after a minute or two, large particles or 'floc' will begin to form, with the water becoming clear in the process. At the end of five minutes, stop stirring and let the floc settle to the bottom of the container. If the water is still coloured, it can be stirred again and left to rest for another few minutes.
3. Once the water looks clear, and the floc, or precipitated material, is at the bottom of the bucket, filter the water through a clean cloth into a clean storage container. The filter must be a cotton cloth that prevents the floc particles from passing through.
4. Wait 20 minutes before drinking the water. This is an important step, because it is during this time that remaining bacteria are killed. The water should be stored in a container with a lid, if available, to keep it safe from recontamination."[70]

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[69] Mark Sobsey: *Managing Water in the Home.., op cit.* page 35

[70] Aquaya: *Standard Operating Procedure for the Deployment of Procter & Gamble's PUR Purifier of Water in Emergency Response Settings*. www.aquaya.org

PUR is a flocculation-chlorination method developed by Procter &Gamble and one sachet costs 3.5 to 10 US cents

One sachet is good for 10 litres of water and when the water gets clear it indicates that it is clean and can be consumed.

Procter & Gamble the marketing professionals

PUR is demonstrated to village women in Kenya and they are instructed how to use the sachets in a bucket. The water needs to be stirred for 5 minutes and then becomes turbid. After 5 more minutes, the flocs are settling (taking the germs with them) and the water becomes clear.

Retailers for PUR are an important part of the supply chain. They should make money out of selling PUR to the customers.

Here a roadshow is performed in Kenya to inform new customers on water treatment and to create a local market for PUR.

Marketing PUR as an act of social responsibilty

P&G sells PUR to PSI (Population Services International) without any profit. PSI then supports a supply chain with many small retailers such as this woman. This ensures that PUR sachets are available at the village shop regularly and it even provides for an income for the people.

3. Marketing sins and challenges for POU systems

Household water treatment systems have recently regained their earlier appeal, after some solid research groundwork. It is now internationally recognised that point of use methods are an effective tool to reduce the burden of diarrhoeal diseases and to bring down the obscenely high number of children still dying from diarrhoeal diseases.

Recently, some promising solutions have been developed and are available for large-scale implementation, but all suffer from marketing problems.

3.1. The main common marketing issues of POUs

In sharp contrast to the astonishing boom in the bottled water market in many developing countries, POUs are still facing a sluggish dissemination process. Every method still needs a great deal of promotion, and there is no sign of reaching the contagious 'tipping point' at which dissemination propels itself. Among the main issues are:

1. **No self-replication**: The cheapest solution, SODIS, is accepted if it is heavily promoted, and as long as it is promoted. Its use often stops once the 'promoters' no longer continuously visit the households. Being so simple and cheap, the most obvious thing would be that people just copy the process and use it.
2. **No supply chain**: People are happy with ceramic filters, especially if they pay something for it. However, as frequently happens, if spare parts are not easily available, they stop using the filter once it is broken..
3. **No day-to-day solutions**: Chlorination and flocculation methods are very attractive in regions with high incidences of cholera and during emergencies, where they are often promoted by massive programmes. Only rarely have sustainable markets emerged for chlorine production or PUR sales and heavy subsidies are still needed.

Many of these issues are related to the fact that they have been introduced by well-intentioned organisations from the non-profit sector but without the backing of a vigorous marketing strategy.

Some of these deficiencies are due to a lack of money; there has been far too little investment in proper marketing efforts. Imagination and flexibility have also been lacking, hindered by a misconception of market mechanisms, by ideological dogmas against market-driven solutions and, sometimes, by simple ignorance.

3.2. The main marketing 'sins'

3.2.1. Schoolmasterly messages...

When I was a schoolboy, our teacher one day showed us pictures of a lung affected by cancer; I was 14 then and used to smoke on the sly. I still remember that these pictures were disgusting, but they had no effect on my smoking. When my university professor said: "Intelligent people don't smoke", this made me sit up and think. I also remember an anti-smoking campaign: "Have you ever kissed a non-smoker?"

To some extent, past campaigns for safe water have been geared towards making people afraid of bacteria, and safe water practices were introduced – as in the famous case of water boiling in Peru – irrespective of cultural and social contexts in an aloof, schoolmasterly way: "You should boil or disinfect your water!" POUs were associated with a 'moralistic' image of fighting against a bad habit, and there was very little joy or fun in these campaigns.

Many – even poor – people are somehow aware that drinking contaminated water is unhealthy. The same is true for the well-documented facts that smoking, drinking, the lack of physical exercise is bad for people's health. Many people do not like to change bad habits, even if they know it is bad for them, or they simply can not change because they are addicted. Organisations such as Alcoholics Anonymous are excellent examples of how even 'hard-core' addictions can be overcome successfully.

Much can be learned from the example of lack of physical movement: jogging and walking have become a globally contagious trend, and recently in Europe the trend of 'Nordic walking' is totally booming. Why have these activities become so popular? First of all, the trend was promoted by large public health institutions, often supported by health insurance companies and involved a broad array of sports associations, schools and fitness clubs in developing and offering activities, such as sporting events, walkers' trails and public parks where people can meet. At the same time, this trend was supported by a huge supply chain and very innovative industries[71] for sport shoes, dresses, tourism resorts and, not least, by celebrities. Seeing world stars such as Bill Clinton, Madonna and Joschka Fischer go for their daily jog makes exercise and fitness desirable for (some) ordinary citizens.

3.2.2. ...without using the right marketing mix

With the exception of the social marketing efforts of PSI, there has been no such emphasis on status and desire with regard to POUs for safe water. Some of the innovative solutions applied by many well-meaning organisations have even committed major marketing 'sins' such as:

1. **All people are the same:** There seems to be a general perception that all (poor) people are the same. However, people are very different, whether they are rich or poor. Every marketing strategy begins with a proper segmentation of target customers as the base to address them properly. This segmentation is lacking, and so POU solutions are often made as 'one size fits all' models.
2. **Products for the poor:** By definition, poor people have to struggle hard to live and they do not have the purchasing power to buy costly products. Do they then deserve products for the poor? This is often a synonym for a poor product and it is disparaging. If a product has the status and is positioned as being 'for the poor' it loses all its desirability. The rich will not like it because they say 'this is not for me' and the poor will not like it because they would rather be rich than poor. On the other hand, it should be possible for organisations such as UNICEF to involve celebrities to raise the status of POUs to desirable 'must-have' products for all and create a market for them.

[71] For instance, the market for sports shoes is now US$ 8 billion a year. Twenty years ago, sports shoes were just a product one had to wear on one's feet. Now, brands like Nike, Adidas and Puma have managed to make sport shoes a fashionable lifestyle product.

3. **No products for the rich:** The mandate of most development organisations is to assist the poor, and thus the rich are usually excluded from their target groups and are not involved. This aspect of exclusion is a grave weakness of solely pro-poor market-driven approaches, for if the rich (or at least the better-off, since the really rich exclude themselves from this argument) use POUs, then they too become desirable for the poor. Furthermore, if a supply chain can also sell to the rich and generate income thus, it becomes much more viable.
4. **Charity dumping:** Many POUs are distributed free of charge because of the perception that the beneficiaries are poor and cannot afford to pay anything. This may be justified in emergencies, but it offends the dignity of poor people if they are given things free of charge. The affordability problem is a serious issue that needs to be addressed properly with non-distorting subsidies and pricing systems. Giving things free of charge for a long time is not only unsustainable; it affects the dignity of the people and portrays useful products as worthless.
5. **Smart or bad subsidies:** If an organisation feels that subsidies are needed, they can be given in a distorting way or they can be shaped to facilitate a sustainable supply chain by local people. Giving a voucher to the target population so they can purchase the POU solution at a subsidised rate (not totally free) from a local retailer is much better than acting as Father Christmas and distributing things like a relief agency (emergencies are of course different).
6. **Beneficiaries instead of customers:** If target people are considered as beneficiaries rather than as clients, they can be given whatever the donor organisation wants them to have, instead of what they need. Poor people deserve to be taken seriously and should receive products and services that serve their needs in accordance with their purse. It means that product development is a very demanding task.
7. **Lack of supply chains:** Many POUs have been introduced by private or public development agencies without caring whether a supply chain was evolving that could make the same POUs and spare or replacement parts available when people need them. This 'crime' could be forgiven if POUs were non-essential, luxury goods, but as they are lifesaving devices, children can die if there is no reliable supply. A sustainable supply chain means a participatory process instead of a paternalistic attitude that brings gifts to the beneficiaries. It would often be easy to involve local people who could make a living by supplying products, spares or services.
8. **Unfair competition:** One of the worst things that could happen is if development agencies act in unfair competition to an emerging private supply chain. As mentioned in Chapter 2.5.3, an NGO in the Great Lakes region bought a WATA chlorinator and started producing chlorine for free distribution, undermining the emerging supply chain. It would make much more sense if this organisation gave a loan to a private producer, bought the chlorine from him or her, or – even better– promoted the product so that people themselves can buy it. If they want to subsidise it, then they could give vouchers to their target population.
9. **Free distribution is less effective:** the remarkable study by Joe Brown and Mark Sobsey in Cambodia revealed also that continued use of the filter was strongly correlated with cash investments by the users: those families who had paid at least some of the cost made better and more continuous use of the filter than those who had received it free of charge.[72]

[72] Joe Brown, Mark Sobsey:*Use of CWP*, WSP field note, p17

These are some of the sins committed, and one could even call them marketing 'crimes', because they are largely responsible for some major failures. The intention here is not to blame anybody for these mistakes.They have occurred with the best of intentions and motivations. However, a paradigm shift is urgently needed among the POU-promotion agencies from a paternalistic, top-down approach towards a bottom-up market approach that would be needed to make POUs acceptable on a large scale.

3.2.3. Exceptions to the rule: PUR and Waterguard are marketed like toothpaste

Such shortcomings have not been made in respect of IDE, PUR and 'Waterguard'. The latter is a locally-produced chlorine water treatment in Kenya, promoted by PSI (Population Services International), a US-based NGO with strong social marketing experience. They have branded products and use much subtler marketing and social marketing strategies, including setting up viable and dynamic supply chains.

According to a report of the Center for Disease Control and Prevention, "The SWS (safe water systems) project in Kenya began in 2000 with a CARE/Kenya pilot project in Nyanza Province. Results from this project showed a 56% reduction of diarrhoeal disease risk in rural communities. Based on this successful pilot project, PSI Kenya began marketing an SWS product, a bottle of sodium hypochlorite solution branded as Waterguard in May 2003. Currently, PSI/Kenya sells approximately 50,000 bottles of Waterguard per month. The Waterguard product and distribution is recurring all costs, with marketing costs subsidised by PSI internal funding."[73]

The same principles should in fact be applied to all POU methods and technologies. At this stage, these approaches are, sadly, exceptions to the marketing sins committed so far.

3.3. Introduction: Marketing and social marketing

Advocating here the use of professional marketing and social marketing techniques and strategies does not necessarily mean that disseminating POUs to the target population is a commercial proposition. It is most likely that the introduction of POUs to poor people will require costly public investments. There are clear lessons to be learned from the dynamics of the bottled water markets, but this is by no means to say here that there is a vast and lucrative business waiting to be discovered in selling POUs to poor people. Nonetheless, it must be accepted that the sustainable delivery of POUs is only possible if the people involved can make some money from it and thus operate viably – be it the little guy selling chlorine or a lady selling a filter or spare parts to her neighbour.

[73] *Preventing Diarrhoeal Diseases in Developing Countries:* www.cdc.gov/safewater/publications_pages/fact_sheets/Kenya.pdf

3.3.1. POUs are new products and new ideas

Professional marketing and social marketing strategies are needed to make the dissemination of POUs more effective:

1. **Marketing strategies:** to ensure the right products or services are delivered to the right people at the right price at the right time with the right messages – in other words, applying the four Ps (Product, Price, Place and Promotion) as a marketing mix in the dissemination of POUs.
2. **Social marketing strategies:** As the right application of POUs towards full access to safe water implies behavioural changes, it is important to learn from experience with social marketing how such behavioural changes can be best achieved. People need to change old habits and switch over to boiling, disinfecting, filtering or treating their water and store it safely, if an impact on the reduction of diarrhoeal diseases is to be achieved.

3.3.2. Definitions of marketing and social marketing

What is the meaning of marketing and social marketing? Marketing is explained by the 'guru' of marketing, Philip Kotler, as follows: "The most fundamental principle underlying marketing is to apply a customer orientation to understand what target audiences currently know, believe, and do. The process begins with marketing research to understand market segments and each segment's potential needs, wants, beliefs, problems, concerns, and behaviours. Marketers then select target markets they can best affect and satisfy. They establish then clear objectives and goals. They then use four major tools in the marketer's toolbox, the 'four Ps' to influence target markets: product, price, place, and promotion, also referred to as the marketing mix."[74]
The term 'social marketing' was first introduced by Philip Kotler and Gerald Zaltman more than thirty years ago to describe "the use of marketing principles and techniques to advance a social cause, idea or behaviour."[75]

"There are a few important differences between social marketing and commercial sector marketing: social marketers focus on selling behaviour change, whereas commercial marketers are more focused on selling goods and services. Commercial sector marketers position their products against those of other companies, whereas the social marketer competes with the audience's current behaviour and associated benefits. The primary 'sale' in social marketing is the welfare of an individual, a group, or society, whereas in commercial marketing, the primary benefit is shareholder wealth."[76]

For POUs it is important to use both techniques, as the adoption of safe water use is only possible with a behavioural change together with the availability of suitable products and/or services. These issues will be explained in greater detail in the following chapters, based on existing POU examples.

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[74] Philip Kotler et al: *Social Marketing – Improving the Quality of Life*, Thousand Oaks, CA, and London 2002, page 7.
[75] Philip Kotler and Gerald Zaltman: "Social Marketing: An Approach to Planned Social Change" *Journal of Marketing*, 1971.
[76] *Ibid*, page 20.

3.4. Market segments and market research

3.4.1. Listening to what customers want

One of the fundamental characteristics of a marketing-oriented approach is to perceive the target populations as customers and not as beneficiaries. To do so requires knowing what the customer wants, needs, believes and can pay. Without systematic market research, it is impossible to understand the needs of the customers.

There are several techniques of market research applied by professional marketeers and they cannot be described here in any detail. It is advised to use market research professionals to assist in the development of POU dissemination strategies, as long as they have an understanding also about the needs of poor and of rural people.[77] Sometimes, the use of common sense and listening can also provide many insights. In a simple way, the task of market research was brought to the point as follows: "If you want to know what customers want, ask. That's the foundation of consumer research, and that's where true wisdom lies. The trick, of course, is knowing what questions to ask. And knowing how to listen to the answers."[78]

3.4.2. Classical segmentation

One of the most difficult things is to group the customers into segments in a suitable way. Mention has been made already about early adopters, the early and the late majorities and the laggards as important differential criteria for investing the marketing mix in the best way. Obviously, it is useless to focus on laggards while introducing a product, but how can these categories be identified – who is who?

There are many ways to group customers in different market segments: according to geographical origin (region, urban or rural), demographic attributes (race, gender, age, income, education, religion), psychographic criteria (social class, lifestyles, personality) and, finally, behavioural attributes (boiling or not boiling water).

3.4.3. Change-oriented segmentations

While these classic criteria can be a useful guide to selecting target groups and market segments, behavioural attributes are of special interest when it comes to influencing habits. Modern social marketing uses for example the following segmentation criteria according to stages of change[79]:

1. **Pre-contemplation:** People at this stage usually have no intention of changing their behaviour, and typically deny having a problem – a smoker who enjoys smoking says: 'I don't want to live for ever, I would rather enjoy the present'.

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[77] Some marketing agencies are completely focused on affluent markets and do not have the slightest idea of the realities of poor people in rural areas. In my personal experience in India, it was challenging to find suitable marketing and communication specialists able to understand the rural realities of India.
[78] Faith Popcorn: *The Popcorn Report on the Future of Your Company, Your World and Your Life*, New York 1992, page 148.
[79] Philip Kotler et al: "Social Marketing…", *op cit.* page 121.

2. **Contemplation:** People acknowledge that they have a problem and begin to think seriously about solving it – a smoker who wants to quit and is considering it… 'but not right now'.
3. **Preparation:** People planning their action – a smoker who announces that 'next week, I will quit smoking.'
4. **Action:** People who have just acted recently – a new non-smoker who is still tempted and nervous when he/she sees a sign of smoke.
5. **Maintenance:** People who have changed their habit and are now safe – a smoker who quit six months ago and is no longer tempted.

Such segmentations may make the job of reaching the right groups easier, and this is an important aspect of optimising the cost effectiveness of any marketing campaign. However, to achieve behavioural changes, much more in-depth understanding of the customer's needs, beliefs and constraints is required. As in conventional marketing, where 'our' product is running against competing products, the desired behaviour has to compete with existing behaviours. All social marketing efforts should thus aim to make the desired behaviour more attractive to the customer so that they outweigh the benefits of the competing behaviour.

3.4.4. Applying social marketing: an example

It would be too much to present here the key findings of social marketing on how to position desired behaviours against competing behaviours, but it may be useful to mention some examples. It refers to the classic four Ps of marketing (Product, Price, Place and Promotion) as explained in greater detail in Part 2.

This case is a campaign against littering the road with empty beer bottles [80].

1. It is important to know what benefits people see in throwing bottles on the road, rather than keeping them in the car and disposing of them properly. One answer with a product implication was that they were afraid that the beer would leak from the bottles on to the car floor. If there was a sealed plastic bag, they would not throw out the bottles.
2. Although littering is illegal and subject to a fine, many thought they would not be seen. A recommendation with a place and promotion implication was to install a toll-free phone number where citizens could report littering.
3. Many were not aware that they could be fined up to US$ 500. Making them aware has a price and promotion implication.
4. Even more effective as a sanction was a punishment consisting of five hours of collecting litter on the road, an action with a strong price implication.
5. Many did not know where to get free litter bags. Making bags available is an important place implication.
6. What benefits did they see for not littering? It was understood that being a good role model for their children was much more attractive as a benefit than being a good citizen or environment protector. This is an important promotion consideration.
7. Some felt 'embarrassed' to be seen with a free white 'littering bag' and developing a 'cool' litter bag was a product consideration.

[80] Summarised from Philip Kotler et al: "Social Marketing...", *op cit.* page 167 ff.

The essence of marketing and social marketing is to understand what the customer needs and what he wants, what constraints he is facing and then to find intelligent answers to serve these needs and wants and make it easier for him to overcome these constraints. It is in this sense that the four Ps are to be understood as strategic tools and as a dynamic process, not just static items.

3.5. What customers expect of POUs

Until now, very little market research on POUs has been done. Most research has not gone beyond testing their effectiveness in killing bacteria. However, customers may have other criteria, wishes and dreams, or simply some daily constraints on whether or not to use POUs. The following issues and answers are thus to some extent hypothetical and would need to be supported by solid market research.

1. Do people boil or not boil their water? This is an important consideration: whether the POU is a convenience or a health-related product.
2. Do all family members drink water only at home, or do they go to school, to work, to the fields? This is an important consideration for the product design. The question is whether POUs are sufficient to satisfy all the needs. There is a need for products for such heaviliy-used locations as schools, factories and offices, and for products that are easily portable.
3. What is known about the willingness and ability to pay? Do people prefer to pay small amounts daily or can they invest in a filter? This is a consideration related to pricing.
4. How much time do people have for treating water and for maintaining the HWTS? Is cheaper and slower really better? This is also a relevant consideration for product and pricing.
5. How long are POUs in use and when and why do they break down or fall out of use? This is important information related to product and place.
6. If people are not aware of the importance of clean water, to whom would they listen and who can influence them? This is an important consideration for promotion.

These are some of the questions to be addressed before any sound marketing strategy can be developed and the right marketing mix found. Only IDE in Cambodia has done some market research while testing their filter during the pre-dissemination phase. It may also be assumed that PSI did some market research for their programmes with PUR and Waterguard.

3.6. Is a commercial or a social route better?

Recently, some substantial progress was made on scientific Household Water Treatment Systems (HWTS). There is still considerable confusion about the right dissemination strategy. and most dissemination programmes have taken a social route driven by NGOs, often in association with emergency aid programmes (Mitch, Tsunami, Darfur) rather than tackling day-to-day problems on a large scale.

A recent thesis by John Harris looked at the commercial viability of POU products and came to the conclusion that, so far, not a single solution has reached the stage of being commercially viable. Even PUR is for Procter & Gamble (P&G) more a commitment of its Corporate Social

Responsibility and has not brought it any sizeable economic returns. Harris feels, however, that a commercial approach will be needed if scaling up should take place significantly. He explored reasons why a commercial breakthrough has not yet been achieved. "Nevertheless, the pursuit of commercial viability presents a promising strategy by which to promote POU products' adoption and sustained use. …Projects promoting POU products have to date been unsuccessful in achieving commercial viability. Should they do so in the future, these products, in conjunction with a commercial approach, have the opportunity to change the paradigm for the provision of potable water in lower income setting."[81]

Without making POUs commercially viable, there will be none of the scaling up needed to reach towards the Millennium Development Goals. For this reason, the five Ps will now help to explore why POUs have failed in the past, and what needs to be done so that this may change.

[81] John Harris: '*Challenges to the Commercial Viability of Point of Use (POU) Water Treatment Systems in Low-Income Settings'*, Dissertation Oxford University, September 2005.

Part Two: Applying the Five Ps of marketing to POUs

4. The First 'P' - Product: many solutions are still half-baked

Most products discussed in the previous chapters are very promising but they are still undeveloped and do not comply with rigorous product standards. Only PUR is considered to be a professionally-designed product. However, as it is often not clear exactly what customers want and what their possibilities and constraints are, it is still difficult to design and modify the products according to their needs.

4.1. The main weaknesses of the products

Here are some observations on many deficiencies and impediments which have until now hindered progress of the products so far:

1. **Image**: Some POUs (such as SODIS) have a poor image due to past efforts of targeting them at the poor.
2. **Convenience**: Many POUs need some time until the water is ready: SODIS takes several hours, and the flow rates of the ceramic filter are too low. Although the time needed is only waiting time, faster delivery would perhaps improve their acceptance.
3. **Security**: With the exception of PUR, there is no security indicator whether the water is sufficiently clean. Ceramic filters are also quite reliable in this sense. However, all methods are subject to recontamination.
4. **Holistic protection**: It may not be enough to have safe water only at home but to consider the needs of people who go to work, to school and to the fields.
5. **Breakages, maintenance**: Ceramic filters often break and regular cleaning is required. SODIS needs replacement bottles.

Many of these deficiencies could and should be addressed by design inputs and product modifications.

4.2. No single POU system is the only answer

Until now, each product has been promoted by a different group. People should be able to choose from an array of products. Different solutions have been developed, and it is quite natural that each group is heavily identified with its solution and naturally finds theirs is the best.

To the customer – and even more so for the Millennium Development Goals – it does not matter ultimately whether it is SODIS, a filter, a chemical method or water boiling that has done the job. It would also be easier to make supply chains viable if a retail network could offer a range of solutions. Moreover, people are different and have different constraints and for some the best solution is a filter, for others boiling and for some it may be PUR, chlorination or SODIS. To go even further, in many cases it is better to apply a combined method, filtration for removing turbidity of water and a drop of chlorine to prevent recontamination.

Substantial savings could be achieved if massive social marketing campaigns openedup markets for a range of POUs in a country and thus pave the way for large-scale adoption.

4.3. Design for the poor: the big global gap

It is a shame that "90% of the graduates of design schools focus all their time on solving the problems of the richest 10% of the world's customers" says Paul Polak, the founder and President of International Development Enterprises. "To design products and services that meet the needs of the three billion customers who earn less than two dollars a day requires a revolution in the way design is taught, both in Western and developing countries, based on the ruthless pursuit of affordability."[82]

4.3.1. SODIS and filters seen by design students

Fortunately, some of these ideas are already being implemented. In 2004, design students of the Stanford University and students of MIT worked on improvements of SODIS and filter designs.

The Stanford students had worked on an improvement of SODIS and presented their ideas in the form of an implementation plan: *Agua Para Vida: Introducing the HotBox to India.*[83] The HotBox water treatment system is a product for individual family use that disinfects water using radiation from the sun. The SODIS HotBox™ increases the temperature of bottled water by employing the greenhouse effect. The HotBox is covered with a transparent lid that will allow most wavelengths of light to pass through; however, the long-wave UV radiations that is emitted from the inner floor of the HotBox will be reflected by the transparent pane back into the box, thus generating a greenhouse effect'.

The proposed design improvements focus on several issues: increasing the speed (bottles in the HotBox should be ready in 3 hours); the box should not be free but cheap (less than US$ 3), and it should become a status symbol to have such a box on the house. Up to now, the students have not been able to produce an industrial prototype. They were also unable to complete work on reliable indicators for UV and temperature.

In a similar venture, engineering students from MIT worked on improved biosand and ceramic filters as well as on a continuous solar disinfection system. These contributions were part of a "Clean Water for Nepal" project directed by Susan Murcott and are published on a MIT website.[84]

One student, Xanat Flores[85], undertook a study on a semi-continuous SODIS water disinfection system consisting of a reactor made out of multiple sets of two glued PET bottles placed in parallel, where the water to be treated passes through and is exposed to solar radiation (see picture). With such a semi-automatic reactor, SODIS could be installed on the roof without the need to handle the individual bottles. The test results showed good performance and

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[82] Paul Polak: *Water and the Other Three Revolutions Needed to End Rural Poverty*, Paper presented at the Stockholm Water Symposium, August 2004. www.ideorg.org

[83] Stanford University Social Entrepreneurship Startup: *Agua Para Vida – Implementation Plan: Introducing the HotBox to India,* Palo Alto, March 2004.

[84] See http://web.mit.edu/watsan/

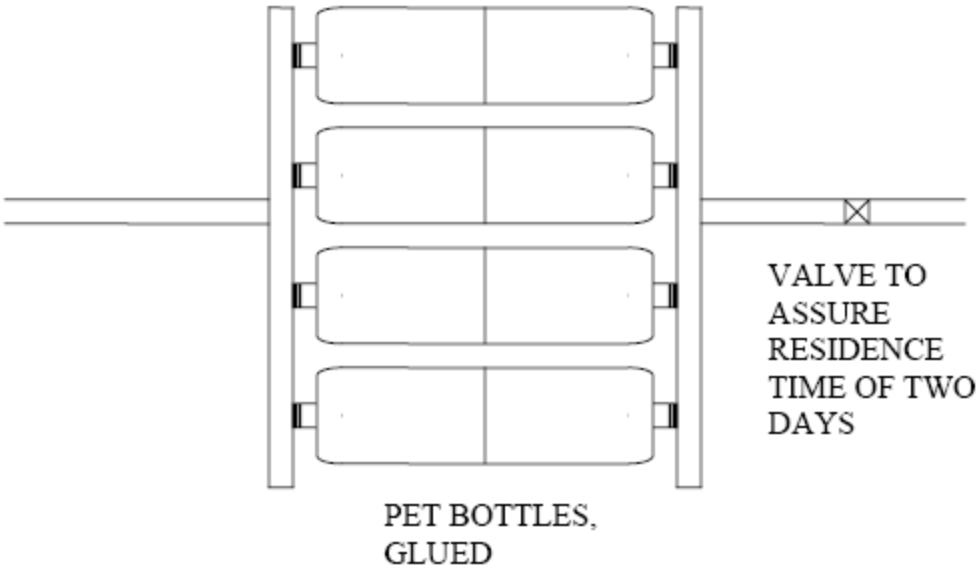
[85] Xanat Flores: *Feasibility of Semi-Continuous Solar Disinfection System for Developing Countries at a Household Level*, MIT, June 2003.

The design revolution needed: making design students work for the poor

Stanford University students have worked with different box-designs to SODIS to increase the temperature and to reduce the time needed to have safe water (photo left). The SODIS foundation in Bolivia has tested these aluminium lined boxes to put the bottles and to have more UV-radiation.

!! Claudia: ::: this line of text should be joined with the line of text 2 pages higher which ends in "this prototype"

would now need a systematic design input, and it would be fruitful if MIT and Stanford University could work together on such improvements.



Another student, Robert Dies, has worked extensively on improving the ceramic water filter[86] to make it easier to use, testing various design options as alternatives to the 'flowerpot' design.

Disc filters and candle filters looked the most promising and IDE Nepal is launching a small production and marketing effort for such a filter. It is, however, still quite demanding to achieve consistent product quality and a satisfactory flow rate. Candle filters have a great advantage in that they are less prone to breakages, easier to transport and handle and they look smarter. Similarly, disc filters seem to have a better flow rate than candle filters and are also less prone to breakages. It appears that there are many excellent inputs available that would just need

[86] Robert Dies: *Development of a Ceramic Water Filter in Nepal,* MIT June 2003.

some more systematic follow up to make them effective for product design. It should be possible to achieve important improvements for relatively small amounts of money invested in products of such paramount and life-saving importance.

4.3.1. LifeStraw and applying its design principles

A very interesting design concept is LifeStraw, a small filter developed by Vestergaard Frandsen, a Swiss-based Danish company focusing on speciality textiles. The company is also very active in malaria bednets. These are produced under the brand name 'PermaNet long-lasting Malaria bednets'; by November 2007 monthly sales were about five million nets.

LifeStraw has an interesting history. The Vestergaard company was involved with the Carter Foundation in the eradication of the Guinea worm in Africa and developed a simple cloth filter to remove the eggs. They recognised that most people take water not only at home but in the field, at school and while travelling, so they developed a mobile unit in the form of a drinking straw with the filter cloth inside.

After having disseminated over 20 million units of this straw filter, the company had the idea to further develop the straw into a filter that removes not only worm eggs but all pathogens, and the idea of LifeStraw was born. The filter is composed of cloth filters and a halogen-based resin that removes most disease-causing bacteria. It lasts for 700 litres and costs between US$ 3 and US$ 5. It is especially designed for post-disaster situations, and one of its great advantages is that it is mobile and can be taken along. A disadvantage is that every family member should have a separate straw. Vestergaard Frandsen have received the 2005 Index design award, a prestigious prize for designs 'that improve important aspects of human life.' Unfortunately, studies seem to have shown an unacceptably high leve of iodine in the water of the first series, but a LifeStraw Mark 2 model has been developed where this has been corrected.

Interestingly, Vestergaard Frandsen is now developing a low-cost household candle filter based on similar design principles as LifeStraw, called LifeStraw Family. This will be presented in Chapter 4.3.4.

LifeStraw: Applying modern design to products for the poor

There was only a small step from the Guinea worm straw to the LifeStraw filter. The company has won many design awards for this striking idea; however the product is still not fully mature. The company is now developing a cheap candle filter along the principles of LifeStraw.

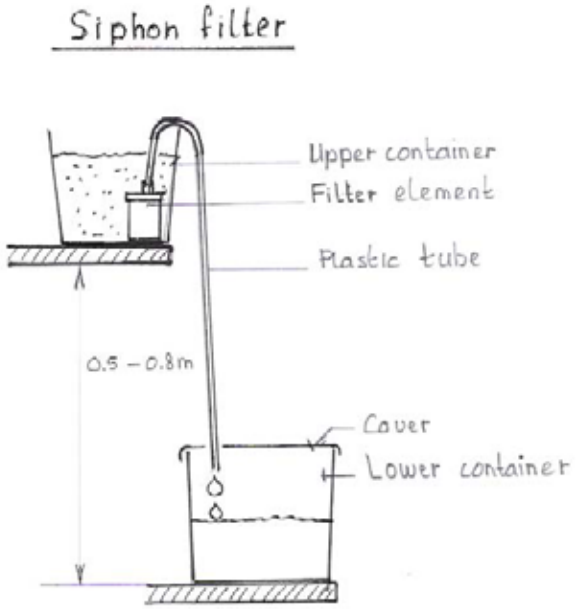
LifeStraw - how it started: A mobile filter to remove Guinea worm eggs

Vestergaard & Frandsen, a Danish company for speciality textiles had developed a filter cloth for removing Guinea worm eggs. When they realised that over 50 % of the people do drink water outside their home they developed a mobile "straw" (pictures top). Over 20 million of these filters were distributed in a large campaign supported by the Carter Foundation to erradicate the Guinea worm.

4.3.2. Improving filter performance: the Siphon principle

At present, a group of Dutch engineers are developing an improved candle filter with the aim of increasing the flow-through rate. The Siphon filter is innovative and cheaper than existing options. It has been developed by three Dutch NGOs, Basic Water Needs, Connect International and ARRAKIS and at the end of 2007 was undergoing extensive field tests in three countries in Africa.

The technology: The principle of the siphon is similar to candle filters or SCP (Silver-impregnated Ceramic Pot) filters as promoted by Potters for Peace, IDE and the Practica Foundation in the Netherlands. The combination of a filtering element with small pores to retain bacteria and the treatment with colloidal silver has proven to be very effective in removing turbidity and harmful bacteria. The siphon principle increases the amount of water that can flow through the candle from one to four litres per hour.

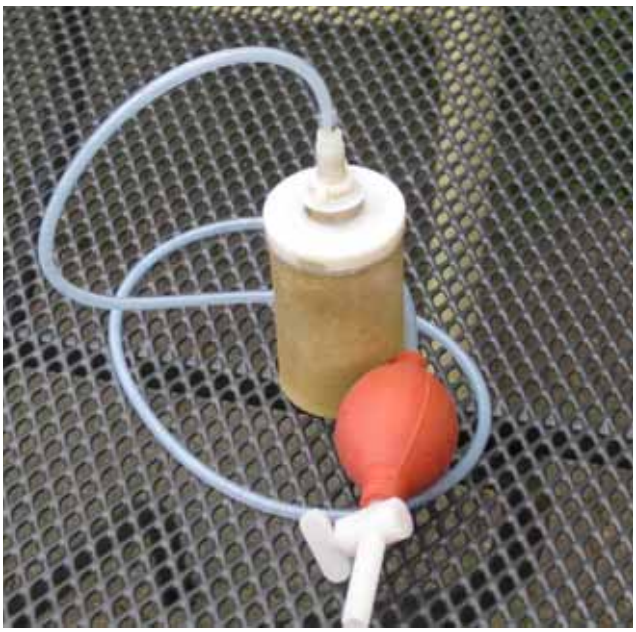


In the range of these ceramic filters the Siphon filter is innovative because:

- It uses silver impregnated ceramic elements or a 'carbon block' element. The carbon removes taste and colour and the silver prevents regrowth of bacteria.
- it uses a siphon hose that creates a vacuum, resulting in a high filter capacity of three to five litres per hour, two to three times higher than traditional ceramic candle filters or ceramic pot filters.
- It can be used with water storage pots that people already have in their house.
- It has a so-called 'backwash option', to clean the filter when clogged.
- It is small, which is attractive for transport and storage and results in less breakage than pot shaped filters.
- It is easy to use and maintain and lasts longer than other ceramic filters because of the backwash option.

Dutch group of engineers is increasing the water flow - the siphon filter

The siphon filter may well become the solution to some of the problems with filters: the slow flow rate. If the pressure of a one metre vacuum is applied to the candle filter, the flow rate may increase significantly. Siphon filters are now being field tested but have a performance of 2 to 3 liters per hour, considerably more than the conventional ceramic filters.



- It is a user-friendly and attractive product and therefore has a high market potential.
- It has a very low production cost, around EUR 3, including profit on production.
- It has a very low cost for the user, an estimated EUR 7 including transport and retailer profit.

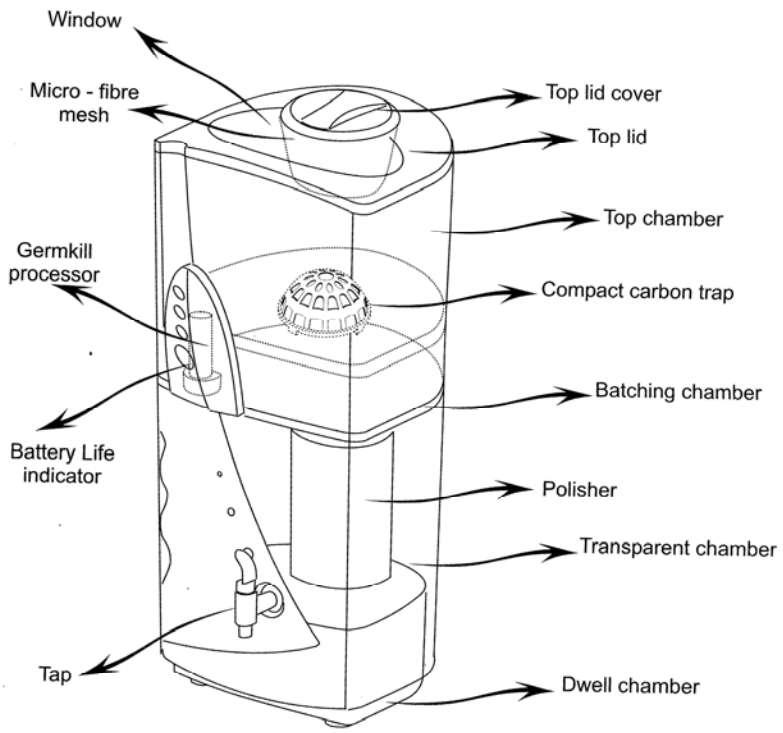
Maintenance of the filters consists of backwashing and, if necessary, changing the element similar to traditional ceramic filters. The filtering element lasts between six months and two years, depending on water quality. Replacement can be done by the user and will cost around EUR 3.

4.3.3. Pureit: a product for the (higher end) of the bottom of the pyramid

The Indian Hindustan Lever Limited (HLL)[87] consumer goods giant has entered the Indian markets with a relatively low-cost water purifier for lower income Indian households. Pureit is an excellently designed multiple barrier filter and is sold through direct marketing channels – door to door vendors – for a price of 1,600 Indian Rupees or US$ 35.[88]

After five to six months, some parts need to be replaced for a cost of some INR 300 (US$ 8) after 1,500 litres of water. The flow rate is between two and four litres per hour which decreases if the carbon filter is dirty. The filter is targeted at people who are boiling water and is meant to be cheaper and more convenient than boiling. The filter has multiple barriers, starting with a micro-fibre mesh, an active coal carbon block, a chlorine dispenser and finally a polisher to remove odours.

Hindustan Lever has introduced this filter into the market as a kind of BOP (bottom of the pyramid) marketing product. It is thus considerably cheaper than other filters (Aquagard, priced at some 5,000 Rupees). However, HLL can tap the 'upper crust' of the bottom of the pyramid only, the lower middle classes in semi-urban areas.



However, the potential market is huge, and Pureit is a very strong answer to the bottled water market. It is a real answer for many lower income families even in urban

Unilever Limited (HUL). In this edition, the more familiar former name is used.

[88] For more information see: www.hllpureit.com

areas where there is fear that the public tap water may be contaminated or has been recontaminated through deficient pipes or dirty tanks.

HLL has the interesting marketing concept of introducing it through door-to-door salespeople in very targeted markets. It started selling it only in the State of Tamil Nadu and recently in Karnataka, and the filter was selling already in 2006 at a rate of some 15,000 filters per month. In Bangalore alone, HLL has seven branches with some 20 salespeople each, and every one of them sells one or two per day.

The marketing concept of HLL is to introduce the Pureit filter first in those areas where there are low hanging fruits. thus in the lower income groups of mega-cities and then spread out to medium-sized towns and then gradually to rural areas. The filter is designed so nicely that it already has become a prestige product.
Pureit is an excellent product facing a booming demand in India and will revolutionise a part of the market that has boiled water up to now – the more conscious people – but could not afford bottled water. It may also pave the way for water filters in the poorer segments, but its price of INR 1,600 (over US$ 40) will not make it a product for the really poor.

What is very interesting with this filter is the design. It is especially made as a well-designed product for the more affluent urban customer – the top layer of the bottom of the pyramid. Apparently, the filter is so prestigious that many people do not hide it in the kitchen but put it in the living room. Just as the fridge is often put in the living room as a symbol of status, the Pureit filter has also become a status symbol.

Marketing to the (higher end of the) bottom of the pyramid

Hindustan Lever (HLL) has developed Pure-it, a nicely designed filter for the lower middle classes in India. The filter costs US$ 35.00 and replacing the chlorination package costs US$ 6.00. It is an attempt to market to the (upper crust) of the bottom of the pyramid and is a cheaper alternative to bottled water. HLL sells the filter through direct marketing agents - first in the mega-cities and then in medium sized towns. By the end of 2006, sales may be in the order of 20'000 per month.

4.3.4. "LifeStraw Family" – a product that could be the solution

Vestergaard and Frandsen are just launching a new product that could prove a big leap forward. It is an instant microbiological purifier, based on the earlier LifeStraw design principles. It claims to filter a minimum of 10,000 litres of water without any replacement and provides safe drinking water for a family for 18 months (based approximately on a family consumption pattern of 20 litres per person per day). It is based on a high-performance membrane and achieves a very high flow rate and removes, as it were, 99.9999% of all waterborne bacteria, 99.99% of all waterborne viruses and 99.9% of all waterborne parasites. To clean the membrane from time to time, a small pump mechanism allows reversing the water flow in order to wash out the dirt, if the membrane is clogged.

It claims to work even on highly turbid water and complies with EPA guidelines for microbiological water purifiers. No spare parts are required for the lifetime of the product.

Aside from these good performance features, there is one thing that makes this filter outstanding: it is the design. This filter looks like a gadget that every woman would like to have and could well become that kind of prestige object that everyone dreams about.

The pricing may be higher than other filters at around US$ 15. This is beyond the purchasing capacity of many poor families, but with the right subsidy strategy, micro-finance facilities and other smart pricing incentives, it may well become a 'runner'. It could be exactly what is badly needed for achieving a breakthrough.

The fact that it also works in turbid water may be an important sales argument, as people will be able to see for themselves the effect of safe water. This is one of the great advantages of filters.

The new LifeStraw Family unit is well designed and could become a “must-have” product

4.4. General deficiencies in product design

There are some general deficiencies in product design that should be addressed to make POUs – mainly filters and SODIS – suitable for large-scale dissemination.

4.4.1. No products for the rich

Many POUs have been developed for the poor with the very best intentions. However, this exclusive focus on the poor has some serious disadvantages:

1. Products for the poor must be sold with quite narrow margins that will hamper the profitability of any product. A better product mix would improve profitability for manufacturers, distributors and retailers.
2. As most people orient themselves with the 'elites' there is no imitation effect if a product is not used by the rich at all. In contrast, if the village leaders, the priests, the doctors, the nurses and the teachers have a similar product it becomes attractive for the poor.

It is therefore important that a marketing strategy can also cater to the affluent markets. This seems to be quite difficult in practice. In Cambodia, Mr Frank, a businessman of Taiwan-Chinese origin, had designed a line of upmarket products in stainless steel (see photo page). He also made models for schools, garment factories and public places. Unfortunately, he stopped production because it was a difficult market for him. This was unfortunate, as marketing to these segments is an important aspect of a comprehensive marketing strategy. It is difficult for NGOs like IDE or RDI, the two agencies promoting the filter in Cambodia, to address this middle-class market because targeting these people is somewhat outside of their poverty-oriented mandate.

What kids like – and spend money on:

During a visit to Cochabamba, we went to a small village and from there to remote farms high in the mountains. People there used SODIS but said they cannot find plastic bottles.

In the nearby village, young children were buying a small, monkey-shaped bottle with their pocket money. It was just filled with a sugary kind of water and the colour was probably artificial. This is not the 'cool' bottle proposed in this chapter.

4.4.2. No products outside the house

Many family members are busy at school, office, work or in the field during the day. It is pointless to have a filter with safe water at home which is not available during the day. Either children need to carry a water bottle to school, or there should be filtered or SODIS water available at school.

Mr. Frank has started producing dispensers for schools and offices...

Products for the rich and for schools, offices, garment factories

This 1'000 litre tank is meant for schools or garment factories (500 workers).

He used 4 ceramic filters as inlet, but it takes quite some time to fill the tank

This dispenser is used for advertising the filter at salespoints. It could also be used for offices and shops for safe water for staff and clients

Similar devices are needed for factories, markets and public places and for offices.

Three issues should be addressed by some serious product design competitions:

1. **'Cool' water bottle for kids** should be developed, either as a SODIS bottle to be exposed to the sun at school (each child would need two bottles) or filled from a filter or safe storage container. Such a bottle should be a 'must-have' product for the kids, either because of its look or because it has a 'celebrity' touch, for instance with a photo of a local football or pop star. Such a bottle would be able to raise the status of safe water with children and should obviously be part of a wider campaign for hygiene.
2. **Water dispensers** for schools, factories, public places such as markets, fuel stations. Several models could be designed to make safe water available in schools and factories. The designs of Mr Frank could be a model, the flow rate of the ceramic water purifier is too low to feed a 1,000 litre tank. Even with four filters and a flow rate of 2.5 litres per hour, it would take almost four days to fill the tank.
3. **Office dispensers** similar to the model developed by IDE Cambodia (see photo page showing a display stand for CWP retailers) could be produced for offices. It is important that the offices of NGOs and international organisations show to their target population that they drink filtered water and not bottled water. Models for offices – if properly maintained – would not only be a showcase but also quite economical and much cheaper than providing bottled water to office staff. The economics of such dispensers against bottled water will be discussed further in the chapter on pricing.

4.4.3. Low performance and durability

SODIS and the ceramic water filter in particular are low cost products with a relatively low performance. Handling SODIS bottles needs a routine and a certain discipline and requires much time, in the view of many households; they also reported that they tend to 'forget' to put the bottles out, unless they adopt the habit of handling the bottles regularly. These deficiencies can be addressed with the design proposal presented earlier. It may lead to higher costs but it may also offer the chance for somebody to start a business with SODIS and thus set up a supply chain.
The filter designs and its manufacturing process should be further improved and standardised in order to reduce breakages and increase flow rates. This will require further design inputs and process optimisation.

4.5. Design strategies for SODIS

SODIS is fascinating many Westerners for its simplicity and for its low costs, as many people have a very emotional feeling that clean water should be free to everyone. SODIS has received many awards and a great deal of support.

However, it is much less attractive as a product for the poor. This sounds contradictory, but it is well-illustrated by the following example. When the director of a samba school in Rio de Janeiro was asked by a tourist "Why do poor people spend such a fortune on a carnival dress that lasts only for one day?" he replied: "You rich people, you adore poverty – but if you were poor, you would also adore luxury."
SODIS should thus get back to the drawing board and addressthe following issues:

1. **Reducing time**: As mentioned earlier, the design students of Stanford and MIT tried to make simple models with a much higher speed. Products such as the HotBox could be the basis for reducing time. By adding pasteurisation, water could be made available in three hours instead of five or six.
2. **Enhancing status:** Using new and specially designed SODIS bottles would allow a supply chain to be set up and thus create a place where SODIS can be sold permanently. If nicely designed upmarket versions were available, the status of SODIS would increase and become attractive not only for the poor. The same function comes from the design of a cool bottle for kids. This will by no means prevent poor people using recycled bottles and do SODIS free of cost.
3. **Increasing reliability**: Initially SODIS had a wax indicator to show when the temperature reached 50^{0}C. This was dropped because it is also safe to use the water with a lower temperature and longer UV-radiation. Thus an indicator for both temperature and UV would be a considerable improvement. The Stanford design students have worked on this, but it needs to be done systematically.
4. **SODIS for the rich:** With new designs and in the form of 'reactors', SODIS could also be a 'cool' product for the relatively rich – not millionaires but those better-off people who are health-conscious village and urban leaders. One very big advantage of SODIS has not yet been exploited: UV radiation is a very modern method, and many bottled water companies have a sticker on their bottle that says 'UV-treated'.

It was probably a great shortcoming to position SODIS only as the method that costs nothing and uses only recycled bottles. The fact that recycled bottles can be used is an important add-on and a great advantage for those who can copy it for free if they want. However, it would be much better to involve all segments of the safe water market, position SODIS as a desirable and cool technology and let those who can pay. The equation 'SODIS= recycled bottles' has made SODIS equal to scrap, and this is not what SODIS deserves.

Interlocking bottles designe
ZERI

One option could be to use the interlocking bottles developed by Zero Emissions Research & Initiatives (ZERI), a 'global network of creative minds to solve global challenges'[89]. These bottles are carefully designed to be used for various purposes, and as they interlock like Lego bricks they are meant to be too precious to be thrown away (see photo).

4.6. Design strategies for filters

The present designs of the low-cost filters need upgrading, and some issues should be addressed by either design or by R&D inputs. Another group of issues should be addressed by further standardisation of the manufacturing process.

[89] www.zeri.org was founded by Gunter Pauli and a number of very inspiring environmentalists from all over the world.

The following issues should be addressed:

1. **Increasing speed**: Efforts should be made to increase the flow rate and to make it more regular. A recent thesis by Doris van Halem[90] carried out extensive tests with filters from Nicaragua, Ghana and Cambodia and recommended measures to increase the flow rate. The most promising solution is the siphon filter (see Chapter 4.3.2)
2. **Increasing reliability**: There is still an inherent danger of recontamination and it would be good to develop a system preventing the lower part of the storage tank from recontamination, for example by using colloidal silver near the tap.
3. **Filters for the rich, schools, offices**: This question was discussed earlier but it is worth repeating the need for a more holistic product range.
4. **'Filtron inside' concept**: The question of whether the filter is more a ceramic or a plastic product was discussed above. If candle filters can replace the flower pot filter, then the concept could move even more in the direction of having – similar to the notion 'Intel inside' – the concept of 'filtron inside'. This means that the core element, the 'processor' could be a branded product that can go inside many different containers. This would mean that several different brands of filters could come on the market, always having the same processor inside. To guarantee the quality of the 'processor' it is crucial to have a strong brand control. If LifeStraw developed a filter element based on their technology, the same concept might also work with 'LifeStraw inside'.

Fortunately, there are several research organisations involved in work on the ceramic filter and this will improve the reliability considerably. The same effort should be made with design schools in order to optimise the entire product range.

4.7. Chlorination, flocculation

It would be heresy to advise a company of the size and experience of P&G on product development: it is clear that PUR is the most mature product on the market and has all the elements of a suitable product. Waterguard is already sold under a brand name and WATA may have to go in this direction.

The common problem with all the chemical treatments is their 'character' and image of 'emergency' technologies. They are introduced during emergencies and may be most acceptable during cholera outbreaks, but it may be that the consistent purchase of sachets and chlorine bottles or tablets may decrease once the shock of the emergency is overcome and daily life has taken over again.

In this sense, the right answer could be that PUR and chlorination is the best solution in times of severe contamination and SODIS and filters the right product for long-term use in daily routine. It is also observed that PUR in particular tends to be used mainly for 'high quality uses' targeted to those in the family who are prone to suffering from diarrhoea. In this sense, PUR

[90] Doris van Halem: *Ceramic Silver Impregnated Pot Filters For Household Drinking Water Treatment In Developing Countries*, Delft University of Technology, Department of Civil Engineering and Geoscience, 2006.

and chlorination are considered to be like a 'medicine' instead of being perceived as a product for daily use.

4.8. Selling POUs or selling safe water – are water kiosks the answer?

A new idea suggested by Paul Polak is the marketing of safe water to poor people as a profitable business. Rather than bothering them with getting a POU water treatment system, they should get access to buy safe water from licensed water vendors or water kiosks. The most promising idea seems to be the creation of safe water kiosks at those sites where people at present buy water of doubtful quality. This idea is technically feasible but needs to be tested as a business model. This issue is examined in more detail in section 5.7.

5. The Second 'P' - Price: affordability and sustainability issues

5.1. POUs are quite cheap but compete with other necessities

Compared with costs of healthcare, lost labour and school days, any money spent on safe water is certainly a good investment. However, despite the optimism of Professor Pralahad, expressed in his famous book *The Fortune at the Bottom of the Pyramid*, marketing to those consumers at the bottom remains a difficult proposition. Unlike wealthier consumers, who are able to 'inventory convenience'[91] by buying in bulk the goods the need over a period of time, lower-income consumers are often forced to purchase items as they need them, with the money they have available at the time., POU products are thus competing against, and often losing out to, other items of household necessity or convenience.[92]

Pricing therefore becomes , a key instrument of the marketing mix. Making the products affordable is a challenging task. "In order to stimulate demand, some products seek to peg their product's price against a common everyday product. Potters for Peace, for example, sought to peg their product's price with that of a machete, used daily in the fields; P&G sought to peg PUR at the price of an egg; Pureit was priced similarly to the cost of boiling water."[93]

The following table – based on John Harris and own information – shows some comparative costs for different products providing safe water:

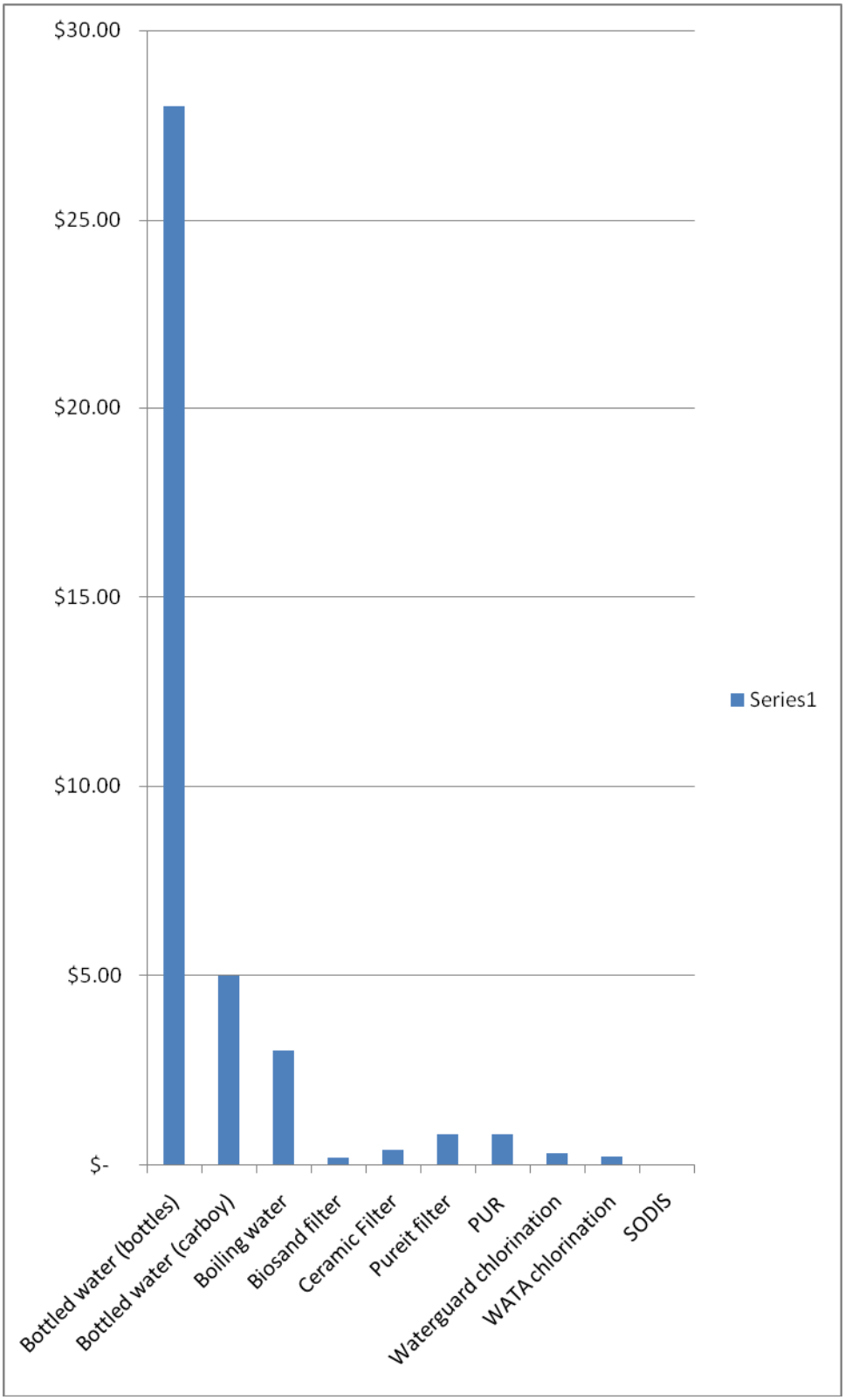
[91] See C K Pralahad: *The Fortune at the Bottom of the Pyramid*, New Jersey, 2005.
[92] John Harris: *Challenges to Commercial Viability of POU Systems in Low Income Settings*, Oxford Thesis, September 2005, page 44.
[93] *Ibid*, page 45.

Product	Cost per 100 litre in US dollars	Cost notes
Bottled water (India) in litre bottles	US$ 28.00	Usual prices (INR 12) per bottle retail (INR 42 = US$ 1)
Bottled water (India) in 20 litre bottles 8carboy)	US$ 4.00 to US$ 6.00	20-litre bottles are sold at INR 35 to 50
Boiling water	US$ 1.00 to US$ 4.00	Depends on fuel prices: in Uganda the charcoal for boiling one litre is almost US$ 0.04.
Biosand filter	US$ 0.18	Sells for between US$ 10-30, flow rate 60 litres per hour, no replacement required, assume 2 years of use and purchase price of US$ 20.
Ceramic filters (Potters for Peace)	US$0.38	Filter costs US$ 12; it can work continuously for 2 years, at a flow rate of 1.75 litres per hour
Pureit	US$ 0.80 - US$ 0.40 (claimed by HLL)	US$ 30 initial purchase cost, filtering unit costs US$ 6 which treats 1,500 litres of water, assume unit is used for 5 years.
PUR	US$ 0.80	One sachet costing between US$ 0.035 and US$ 0.10, treats 10 litres of water, assume purchase price of US$ 0.08.
Safe Water System (Aquaguard) WATA	US$ 0.30 US$0.20	1,000 litre for US$ 0.30 for a 250 ml bottle Same from WATA charging US$ 0.15 to US$ 0.20
SODIS	No cash needed	Depends on availability of water

This table shows astonishing differences, and at first it is incomprehensible that people will pay such exaggerated prices for bottled water, if one could have the same for much less. The graph on the following page shows these enormous differences: and it was difficult to apply a comparative scale to the graph to make the differences visible. It is also surprising to see that boiling water is by no means a cheap method.

While realising these cost implications, it is also very hard to explain– if cost was of any importance – why people do not go for biosand filters, by far the cheapest method. However, there is a considerable difference in convenience between a 400 kilogram concrete block filled with sand and a handy, branded bottle of water.

Ceramic filters are also competitively priced, and even the higher-end solutions such as Pureit or PUR are far cheaper than boiling water. Chlorination is also a very attractive method: The WATA chlorinator is very well designed and chlorination is very cheap in general. Why do then these methods not sell on their own?



Graph ??: Cost in US$ for 100 litres of safe water

5.2. Upfront investment or sachet by sachet

The constant struggle for cash and the competing needs of a poor family make it difficult for them to make up-front investments. Even US$ 7 or US$ 10 represents a huge investment for people who earn barely a dollar a day, and then with great fluctuations.
For this reason, the breakthrough in marketing to poor people came through the well-known 'sachet revolution', the phenomenon that poor people buy shampoo, soap, snacks and many other small items by the sachet and cigarettes one by one. They will often end up paying more for a litre of shampoo, but they could not afford to buy a whole bottle at at once.

In this sense, PUR is the best option for people as they only have to invest in one sachet each time they need to purify one 10-litre bucket. In the long run, however, PUR is the most expensive of all solutions.

In terms of price, SODIS is obviously also very attractive, even if it would cost something, for instance up to 3 dollars for a HotBox, or a few pennies for decent bottles.

5.3. Cost of diarrhoea is much higher

The cost people pay in cash or in kind or loss of income is much higher than any of the POU options. Women in Bangladesh told me that one single diarrhoeal incidence costs them at least US$ 5, and several studies come to similar conclusions about the costs of diarrhoea. A study from India estimated the cost per patient at INR 276 (more than US$ 6)[94], and in Peru, costs for ambulant treatment of severe diarrhoea was between US$ 7.50 and US$ 16.50, and the cost of one hospital day between US$ 33 and US$ 46.
[95]

Indirect costs of diarrhoea are the days lost for patients unable to go to school or work, or in reduced productivity. However, these costs are not directly usable for investments in POUs, as a visit to a doctor or a hospital are emergencies, and people will immediately raise the money if confronted with such a situation. However, it is no uncommon for the children or patients simply to die.

On the other hand, from a public health point of view investments in diarrhoeal prevention are highly beneficial, as several case studies have shown.[96] What may not be so easy is to find the right ways of subsidising POUs in a non-distorting manner to make them available to those who need them most.

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[94] Gokhale RM; Pratinidhi AK; Garad SC: "Cost analysis of diarrhoea treatment in the infections diseases Hospital in Pune City", *Indian Journal of Community Medicine.* 1999 Jul-Sep; 24(3): 104-10.
[95] Ehrenkranz P, et al: "Rotavirus diarrhea disease burden in Peru: the need for a rotavirus vaccine and its potential cost savings", *Revista Panamericana de Salud Pública,* 2001.
[96] J. Borghi et al: "Is Hygiene Promotion Cost-effective – a Case Study in Burkina Faso", *Tropical Medicine and International Health,* November 2002.

5.4. How to subsidise and make products more affordable

Finding innovative pricing solutions may be one of the keys to a breakthrough for POUs. The fact that many goods need up-front investment has been overcome in very creative ways by marketing specialists: scooters, cars, taxis, mobile phones, diesel pumps and many other items have been successfully made available to low-income households. This is even true for consumer goods such as refrigerators, television sets, radios, furniture and electronic goods. However, it seems that credit is not as readily available for POUs. An MIT student in Nepal[97] came, perhaps wrongly, to the conclusion: "For those at the cashless end, many projects have investigated the role of micro-finance in seeking to defray the purchase price of POU systems. But getting micro-finance right is difficult and expensive". This is not quite the case. In reality, very little serious thought has gone into making POUs available through intelligent pricing, smart credit and subsidy systems.

Pureit provides consumer credit schemes and instalment buying for urban customers. Dealers' systems of buying in instalments seem to be an interesting option for filters. Voucher systems could be tried to subsidise filters and even create an incentive for dealerships, as vouchers would increase the markets without distorting them.

Large-scale social marketing campaigns would be able to increase the volumes of sales and thus reduce transaction costs, making it much more attractive for dealers to sell.

Involving savings groups and self-help groups in POU promotion and sales could also be a promising option. There should be an investigation into whether self-help groups could become filter retailers and sell them in instalments to their peers and neighbours. Again, such an activity would become much more viable if supported by social marketing activities. It would also help if such groups could offer not only one solution but a whole range of options, from PUR sachets to chlorination to filter, and even promoting SODIS.

Another promising avenue is a voucher system such as the one applied to purchasing subsidised malaria bednets. The Mennonite Economic Development Associates (MEDA) group, a US-based NGO, is running a nationwide voucher scheme in Tanzania where every pregnant women receives a voucher worth US$ 2.50 when she visits the antenatal clinic, and she can redeem this voucher against a bednet at the village shop. She only has to pay the difference of some US$ 0.80 in cash to the village shop. Such a voucher system can increase demand considerably and help in setting up a viable supply chain.

5.5. Pricing and margins in the supply chain

Viability does not only depend on the affordability to the consumers, it also depends on the sales and profit margins that make the supply chain viable. Sufficient margins must be built in in order to make it attractive for distributors and dealers to sell the products and spare parts. These margins often double the factory gate price.

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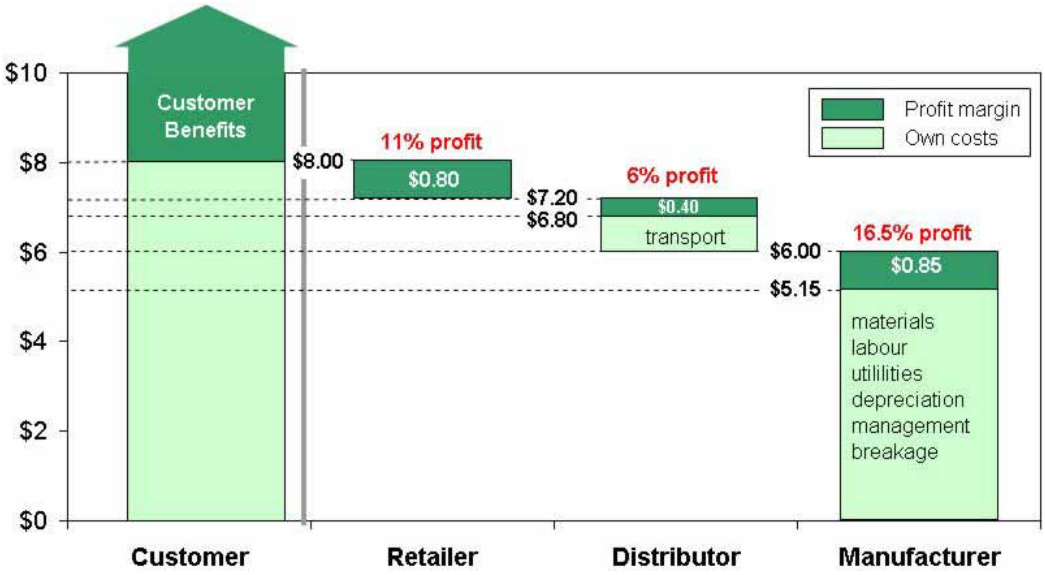
[97] John Harris, *op cit*, page 46 based on a study by M Serafini: *Promotion and microfinance of Kanchan Arsenic Filter in rural Terai region of Nepal,* MIT (Susan Murcott), August 2005.

For instance, PUR – which is purposely a non-profit activity and part of P&G Corporate Social Responsibility – has the following margins included: P&G sells one sachet – in containers containing about 1 million sachets –at the rate of 3.5 US cents to PSI. The landed cost after shipping will be roughly 4 US cents. PSI takes one cent for their handling, which is usually nowhere near enough to cover the social marketing cost. The dealers receive 3 US cents per sachet and – where the country does not charge customs duty – the retail price can thus be 8 US cents. Where the country charges import duties – such as Uganda – the retail price can climb to about 12 US cents.

IDE Cambodia has applied the indicative margin system shown in the graph below. This is apparently working but the margins are still wafer-thin and only viable if a certain volume is realised. The viability of the supply chain thus depends significantly on IDE and the other partners of the National Roll-Out Plan to create an increasing market through promotion and social marketing.



Graph ??: The IDE margin system for the CWP (Ceramic Water Purifier) in Cambodia

The margins for the other POU systems are not known or not revealed. It appears that Pureit has a very effective direct sales system with a high turnover: one sales person sells on average one or two filters per day and earns a commission of INR 100 (US$ 2.20) per filter.

5.6. The best donor investment is to subsidise market creation

To make supply chains more viable and reduce the high transactions costs is crucial task for a breakthrough in POU dissemination to be achieved. As long as the volumes are low (partly because NGOs are distorting prices by giving away POUs free or with heavy subsidies), it will be difficult to set up a viable supply chain for POUs themselves and for their spare parts. Such a supply chain would engender a network of self-promoting sales agents: nobody would be more interested than a dealer to persuade other people to buy a POU system or use it. The

best that donors can do to promote the large-scale dissemination of POUs is invest in market creation and increasing volumes of adoption.

Significant investments in promotion and in social marketing campaigns for hygiene would be the best way to increase the demand for POUs and thus create a market for them. However, such investments should be made on a much bigger scale and in a more methodical way (not one filter here, one SODIS there). It should not become a competitive promotion of SODIS against filters or against PUR: it would be much more helpful if the dissemination efforts were combined to embrace the whole range of options, not just for one solution.

5.7. Radically new concepts: selling safe water through water kiosks?

Paul Polak, the founder of International Development Enterprises (IDE) has created a new organisation. It is called "D-Rev"[98] and stands for design revolution. This new initiative proposes to develop an affordable system of water kiosks that would enable the widespread development of grassroots business ventures focused on providing safe, low-cost water to poor customers.

Paul Polak says: "D-Rev proposes to create a system whereby a micro-entrepreneur could purchase, for under $500, a water chlorination system capable of treating up to 4,000 litres per day of unsafe water using nothing more than salt water and a small sealed lead acid battery for power, the battery being either AC or solar recharged. To this end, the small-scale electro-chlorinator system will be designed to optimise affordability and produce safe water at competitive prices.

"It is proposed to test a business model with some pilot kiosks and learn from the experiences with the intention to scale-up the business model, once it is successfully proven. While one aim is to provide safe water at a reasonable cost, the test should mainly determine the profitability of the water kiosk. The more profitable a kiosk is the faster can it be scaled up and attract private investment. It is obvious that such a system can only work with strict branding – or even franchising – principles that allow a strict quality control.

"It is a fact that the poorest people pay the most for water, and it is scandalous that they do not even know whether this water is safe. The new concept would fill this gap and provide safe water for similar prices. At present, the market for purified water is well established and runs at least US$1 for a 20 litre bottle or bucket of purified water from a local supplier or water truck. Often, this supposedly treated water is not safe and estimates from India and Mexico suggest that ~40% of sold water is, in fact, untreated (this includes fraudulently produced but very expensive bottled water) and in China more than 65% is untreated local water. Besides the residual treatment benefit of chlorinated water, if properly dosed there is a light chlorine taste which assures the consumer that the water was in fact treated. This taste can be subsequently eliminated with trace amounts of ascorbic or citric acid, such as from lemon juice should the taste prove a barrier to adoption.

[98] D-Rev is newly founded by Paul Polak and wants to achieve a design revolution. He argues – very rightly – that the great majority of designers in this world work exclusively for those 90 percent who already have everything and almost none of them work on "designs for the other 90 percent". www.d-rev.com

"Even if the vendor sold water at one-quarter of the going rate, for 4,000 litres this would yield a daily profit of over $40, thus paying off the system cost in less than 2 weeks. In addition, during light demand, the concentrated chlorine bleach has a value in excess of $1 per gallon for such varied uses as basic cleaning, medical disinfecting, food sterilisation and cloth bleaching.

"One of the major challenges will be to distinguish the highly profitable water kiosk model from the sometimes exploitative and unreliable practices of common water vendors. This positive image will be achieved by branding the kiosks, applying strict quality control and by involving the slum population and their organisations. The slum dwellers will basically pay the same price as they do now but get the assurance that their water is safe. In addition, we believe that the market price for safe water will be brought down by competitive forces in the marketplace stimulated by this project."[99]

6. The Third 'P' -Place: where to get POUs all the time

'Place' in marketing terms is the place where one gets the product and the services needed to maintain it. For the place to be sustainable, it is essential that it is commercially viable in the long run to maintain it. The supply chain must therefore make a profit. If new users and promotion groups are involved creatively in the supply chain, a breakthrough in POU dissemination can be achieved.

6.1. One-stop shops?

Instead of each POU system having its own promotion system and supply channel, it would be much better to set up 'one-stop shops' where all suitable technologies are made available. Until now, the large promoters such as the USAID-sponsored PSI have only promoted PUR or chlorination systems, but not SODIS nor any filter systems.

It may still be a little unrealistic to hope to achieve common supply chains as other products do not have the same maturity as PUR. However, with a relatively small effort, it should be possible to bring all the options to the same level so that a common marketing channel could be envisaged.

6.2. Local manufacturing and quality control

Local manufacturing has advantages and disadvantages:

1. PUR is the most advanced industrial product and is certainly the most homogeneous product in terms of quality; the disadvantage is that it must be shipped, and shipping requires large quantities (about one million sachets in one container) if transport costs

[99] Paul Polak and Kurt Kuhlman, *D-Rev: Design for the Other Ninety Percent A Market-Ready Energy-Efficient Small Scale Water Treatment System,* Denver Colorado, 2008.

are to remain reasonably low. The capital investment to ship one container is approximately US$ 40,000.

2. Local filter production has the disadvantage of a more demanding quality control but a higher degree of flexibility and relatively low start-up costs. A local ceramics factory with a production capacity of 3,000 units per month can be installed in existing premises for a few thousand dollars, Thorough technical assistance, systematic quality testing and branding would be necessary, to ensure that the filters produced are of the required quality. Ceramic filters should not be produced by the informal sector, as ceramic filters are life-saving devices and flow rates and proper impregnation with colloidal silver have to be guaranteed. On the other hand, it is relatively easy to ship a moulding machine to any place where larger numbers of filters are required and where local pottery workshops already exist. Potters for Peace and IDE have successfully started local productions in Darfur, Ghana and regions in Sri Lanka that were affected by the tsunami.
3. An ideal product would be a centrally manufactured filter device that can be put into local plastic water containers, with a branded guarantee that it contains this filter as the 'processor' (similar to 'Intel inside').
4. However, it is not essential to have a local ceramic filter production for setting up a local value chain, as the ceramic part is only a small portion of the entire filter. There could still be a considerable local value-added component if filter candles – made from ceramic or other materials – are shipped from a larger industrial production.
5. The WATA allows manufacturing hypochlorite locally at a very competitive cost. If a market could be created for chlorination through social marketing campaigns, it would be possible to set up local small enterprises, create jobs and thus a sustainable provision of chloride. It could be difficult to control the quality of these local production centres, so branding is an important part of a successful marketing strategy.

Overall, one can conclude that a product depending on imports might be a good solution in the short and medium terms but not for a long-term sustainable solution. On the other hand, the advantages of local production may be hampered by the more intricate needs for quality control.

The production process in Central America: it starts with measuring clay and sawdust.

Six pounds of sawdust are mixed to 60 pounds of clay of good quality.

Producing ceramic filters step by step: clay preparation

A 'ball' of roughly 14 pounds of mixed clay is prepared....

...and put into a mould with a plastic sheet layer to prevent the clay from sticking.

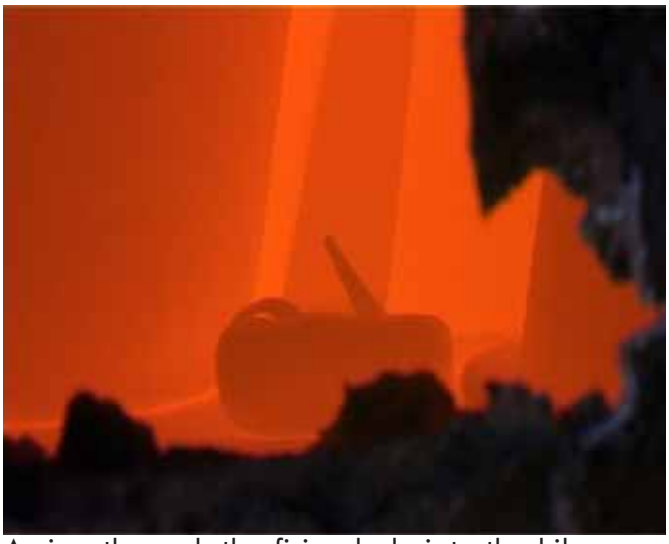
The filter is formed in a hydraulic press and the inner form is released.

Every filter is sealed with a batch and a serial number

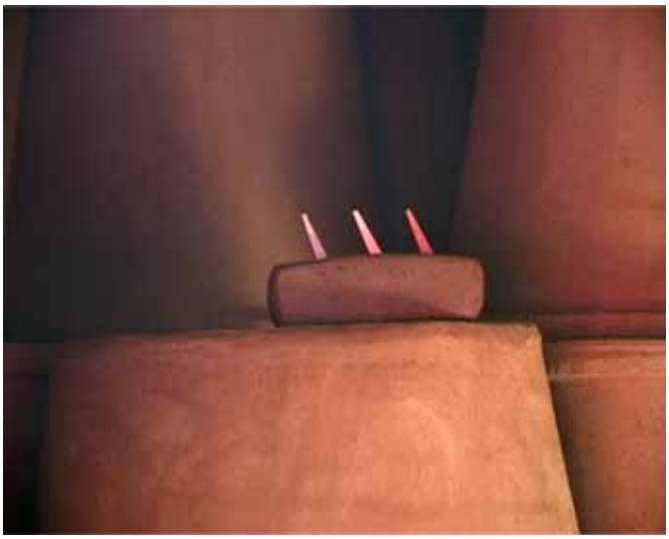
Then the filters are meticulously stapled in the firing kiln.

Some 50 filters can be fired in one batch in this firing kiln.

Producing ceramic filters: firing



A view through the firing hole into the kiln. Only one cone has still not melted.



3 cones are used to control the firing temperature, they melt at 866 0, 887 0 and 950 0 C.

If two cones will melt and the last one not, then the fire has reached the required 900 0 C

Ron Rivera of 'Potters for Peace' in Nicaragua, the 'father' of the ceramic filter.

The filters are treated for 45 seconds in a bath with colloical silver.

Colloidal silver is known to kill bacterias and is relatively cheap, roughly US $ 0.40 per filter.

Impregnating filters with colloidal silver, quality testing and branding

All filters are tested for quality: they are filled with water for one hour....

...and pass the test if the filtration rate is more than one and less than 2.5 litres-

Instructions for use and maintenance are printed on the bucket.

Branding of the filter is an important element of marketing but also reliability.

6.3. Distributors, retailers

IDE Cambodia has a three-tier distribution network with the filter factory, three distributors and 131 retailers in the area assigned to IDE in the National Roll-out Plan. The distributors are basically transporting filters in bulk and storing them in the marketing area. From there, they bring the filter to the retailers by motorbike on, often very rough, roads.

IDE counts on several types of retailers, but in the beginning health clinics and pharmacies were selling more filters than general retailers. Only once the product becomes a common item will it be sought from hardware shops. During introduction of the product, health-related sales posts are more suitable.

IDE acts as a facilitator and door-opener for the retailers and creates a market for them through demonstrations, branding and promotion activities. While IDE was selling many filters to and through NGOs, the proportion of private sector sales is now more than 50%, and during 2006 and 2007 more than 9,000 filters were sold each year directly to private households in Cambodia.

In Nicaragua, the 'Filtrón' factory set up by Ron Rivera now belongs to a Dutch businessman, who appears to be supplying a good number of filters to NGOs. Unfortunately, no efforts were made to set up a private supply chain and very few filters are sold to private households.

A similar role is played by PSI in marketing Waterguard and PUR. The retailer network of PUR is very broad and close to the clients selling sachets in small shops and kiosks. The retailers receive a considerable margin – almost 40 percent of the retail price.

The more a retail network is developed, the easier is it for the customers to obtain the products and the spare parts or services required. For instance, with WATA, a network of chlorination agents can reach the very point where people fetch their water from the lake. Such a retail network is by its very nature extremely costly and even more difficult to set up while sales are still low. Once it has developed, it is one of the most precious assets and should be carefully maintained so it stays sustainable. The margins are the fuel to achieve this, so it is therefore very important to have an intelligent pricing and margins policy.

6.4. Involving local users groups

Introducing a new product is always challenging, and it could be very useful to involve groups that can help to raise awareness. Complementing the private retailer network with activities supported by NGOs can increase market volumes and reach poorer groups of customers.

However, it is important to do this in a way that both distribution channels are complementing rather than undermining each other. IDE Cambodia has signed an agreement with Plan International where the latter supports user groups through training and awareness creation. Both parties have agreed not to subsidise any filter during the first year of introduction until a network of dealers has been established. Only after this, subsidies in the form of vouchers, credit or instalment buying may be introduced.

Groups of local users can play an active role and not only in awareness creation: it could even be useful to involve such groups – for instance savings and credit groups – directly in the supply chain. Nothing works better than word of mouth promotion from neighbour to neighbour. Enabling a group of women to make a small income from selling filters to their peers would greatly enhance the supply chain and target POUs better to the poorer sections.

6.5. Actual sales figures and prospects

The sales figures so far appear impressive indeed, but they are still miniscule compared to the real needs. The table below shows estimated sales so far, but these figures should be read with great caution, as the information is not very accurate:

What and where	Sales/installations per year	Cumulative sales worldwide (estimated indication)
Slow sand filters promoted by many projects all over the world	No figures available, but estimates numbers would be several tens of thousands	Probably more than 100,000; in Cambodia alone over 25,000
SODIS working in over 22 countries	No reliable figures available, but estimates suggest several tens of thousands of new adopters	Probably more than 500,000 adopters trained
Ceramic Water filters Central America	To date some 3,000 filters have been sold in Nicaragua; similar numbers from Honduras	Nicaragua: 26,000 filters; neighbouring Central America: further 23,000
Ceramic Water filters Cambodia	IDE, RDI and the Cambodian Red Cross are selling more than 60,000 filters per year	Total may exceed 200,000 filters
Pureit Filter South India	HLL Pureit sells only in two States: 15,000 filters per month/ 180,000 per year	Probably more than 200,000 filters sold in first two years
PUR	In 2006 16 million sachets sold, of which 50% private market, other 50% emergencies. These sachets serve some 50,000 households	55 million sold, with peak in 2005 with 31 million mainly due to tsunami and Pakistan earthquake. Total households served ~250,000
Waterguard	In total, treatments for 8 billion litres are sold per annum; this means a coverage of roughly one million people at an average of 20 litres per person per day	Treatments for over 22 billion litres have been sold.
Antenna WATA	A relatively large pilot project in the Great Lakes region (Goma) has installed more than 50 WATAs	The total population reached so far is close to one million people and a very high reduction in cholera cases has been reported

Although these figures already look quite impressive, this is less than the tip of an ice-cube, one can not event talk of an iceberg: altogether there may be some two to three million households in the world that have benefited from POUs thus far. What is needed is to reach to more than 1.1 billion households. This means that a massive 500-fold scaling-up is needed, and this will only be achieved by making it a viable business proposition.

6.6. Supply chain development needs public support like malaria bednets

As POUs are a new product and not a felt need by many poor people, it is unrealistic to expect the private sector to build up the supply chains without public support. John Harris found from interviews with major stakeholders in POU marketing that the so-called fortune at the bottom of the pyramid is quite a theoretical one: "I think there may be a fortune in the market, but I think you might lose that fortune trying to get that product into every household". Another interview partner said: "Our investment to create public health awareness was higher than the commercial return of the amount of product we are selling".[100]

Only in high-potential urban areas like southern India is the density of demand such that a product like Pureit can be sold profitably and the investment made in setting up a huge mobile sales force (in the city of Bangalore alone, Pureit has more than 200 door-to-door sales people).

It is therefore neccesary that public health agencies support the creation of the market through massive public health and hygiene campaigns and through promotion. The private sector could contribute to the specific promotion of their shop or brand, but the generic promotion of POUs would need a much more systematic effort.

7. The Fourth 'P' - Promotion: Reaching customers with the right product

Promotion is not only advertisement through mass media. Introducing new products to new customers requires a set of measures that go far beyond television advertising or written messages. Very often, new customers need to try something first before they could even think of adopting it, and this can happen best if a reference person is involved rather than by diffusing an anonymous written or oral message. Important message carriers can be children, teachers, medical staff and religious leaders. Many messages are passed on from one person to another, influencing them as reference persons.

A distinction will be made here between the fourth 'P' – Promotion as the promotion of a specific product or service and the fifth 'P' – People for the generic promotion of POUs.[101] While the first has more to do with bringing the product to the customer, showing and

[100] John Harris: *op cit,* page 47.

[101] PSI defines their social marketing strategy as follows: "A key ingredient of successful social marketing is effective communications to encourage the adoption of appropriate health practices (including proper use of the products and services. This is done by brand-specific advertising as well as by generic educational campaigns, using a mix of strategies and channels, including mass media and interpersonal communication, to reach the target audiences." PSI Profile: *What is Social Marketing?* www.psi.org

demonstrating it, the latter has more to do with social marketing and aims at changing habits and attitudes. In practice, these two functions are not always clearly distinguishable, and it may be difficult to draw a clear line between them. What is clear is that both measures are necessary and should complement each other. In order to make promotion effective, thorough market research is needed to reveal people's needs, perception, dreams, fears, potentials and constraints. Only then is it possible – with the help of professional marketing agencies who know the local context – to design effective promotion and social marketing strategies.

7.1. Segment the market and target low-hanging fruits first

The right promotion strategy depends very much on the market segment to be targeted: if people are already boiling water then they need only to be convinced that the proposed method is cheaper, faster or has a better taste. It it likely that the early adopters are already accustomed to water boiling and are therefore an easier target as primary adopters. Even more importantly, because of their influence on secondary adopters, they can 'endorse' the product for their peers, relatives and neighbours.

In this case the POU is a convenience product, and the benefits should be demonstrated in the right environment and with the right communication media. Visual demonstrations at market places, schools and in offices, clinics and health posts, would be much more effective than leaflets and advertisements.

IDE Cambodia found that a very high proportion of the potential target population watched television regularly, and television advertisements or demonstrations during specific programmes on children's health, education or programmes for farmers can have an impact. It is extremely important that these messages reach women as well as men. "I think the worst marketing I have ever seen for our product was at a soccer game with teenage boys and little kids running around, and no women in the entire group. Some of the best marketing I've seen is the wraps that women wear around their waists with chlorine product branding on it, and baby clothes with the chlorine product branding on it".[102]

7.2. Positioning safe water as making children healthy

Positioning in classical marketing means pitting the product against the position of its competitors, whereas in social marketing it is more related to competing behaviour. If people consider diarrhoea as normal, then it is difficult to overturn that belief: "I've interviewed women in Latin America, Asia and Africa, very young women with young children, and I asked them if their babies have diarrhoea. They just looked at me weird and said: 'of course they have diarrhoea well, babies are babies and babies are supposed to have diarrhoea".[103]

To get a double message to a new customer is easy: a) convincing a young mother that babies do not necessarily need to have diarrhoea and b) that a filter, SODIS or chlorination will be an effective tool to prevent it. It requires more subtle forms of promotion to reach a new customer.

[102] Quotation from D. Lantagne/Rob Quick of CDC in John Harris, *op cit*, page 51.
[103] Ron Rivera quoted in John Harris: *op cit*. page 39f.

However, one can count on the fact that every mother wants the best for her children, and with proper messages and demonstration it should be possible to give POUs an attractive and desirable image.

The messages should become contagious, so it is crucial to trigger a social dimension: involving women's movements, savings and credit groups, schools are all measures with a chance to make POUs as contagious as bottled water is 'in' in the middle classes, using local celebrities, singers, sports people, movie stars and religious leaders as promoters,

7.3. Use humour too, especially your Granny's

'Rhäzuenser', a Swiss mineral water company that branded its water after the village of the source, 'Rhäzüns', produced two TV spots that won many advertisement awards.
The first one shows a group of grandmothers joyfully playing football and having fun. When one is wondering why these ladies have so much energy, the spot continues: "these are the grandmothers from 'Rhäzüns", then showing a bottle with a text "….something must be in it".
The second one shows two young mothers chatting while their prams are parked next to each other. Suddenly, one of the babies, a boy, gets out of its pram and slips into the pram of the girl. Again the text appears: "…these babies are from Rhäzüns" and then the bottle with the text: "…something must be in it".

This famous spot shows that a subtle message can be passed with humour and creating sympathy for something 'in it'; something mystical that goes much beyond simply H_20. Such subtle messages are also manifold in the most successful brands of mineral water.

8. The Fifth 'P' – People: Using social marketing for changing habits

When it comes to changing habits, things become again much more challenging and subtle. Habits are individual attitudes on the one hand, but many of them are heavily influenced by social factors. This applies even more for changing habits: people may change their habits rarely through rational conviction – after having been educated – but more often this is done under the influence of a reference person. Some people cannot stop smoking on their own, but if their child says to them: "I want you to enjoy playing with your grand-children, one day", they may stop. This is not only a rational message but one that is enforced by social pressure.

Social marketing 'combines education to motivate healthy behaviour with the provision of needed health products and services to lower-income people', and it includes social factors such as peer pressure, celebrity endorsements and other communication strategies that are more effective than rational messages alone. Social marketing is thus more than just an educational campaign: such a campaign is often at the core of the social marketing strategy, but it also combines the delivery of suitable products and services to sustain the behaviour change, once there is a willingness to change and to adopt new habits.

8.1. Educational programmes as 'sticky' as Sesame Street

Educational programmes should be attractive and 'sticky' so that children and adults get hooked on it rather than being turned off. An effective educational programme is 'Sesame Street', a popular programme for children's education, a programme developed by psychologists with an explicit methodology to attract the attention of – low-income – schoolchildren. Malcolm Cladwell calls this the 'stickiness' factor, the degree of attention people give to a programme even if they are distracted. Cladwell describes in detail how a psychologist observed a group of children watching 'Sesame Street' while he was trying to distract them; the less the children were distracted, the better the 'stickiness factor' of a programme. This aspect of 'stickiness' is one of the clues to getting the attention of children and to initiating a 'tipping point' situation.

RDI in Cambodia[104] has successfully made educational programmes following the broad lines of 'Sesame Street' to educate families in hygiene awareness. A mobile van goes from house to house and gathers a family and their neighbours with all the children while the educational videos are played. After this, RDI staff will demonstrate their ceramic water purifier. A frog plays an important role in this play and the filter is also branded as 'frog filter'.

These materials could easily be translated into other local languages and adapted to other cultural contexts and seem to be an ideal instrument to create awareness on a large scale. Some film clips of RDI are included in the Companion CD in the back cover of this publication.

8.2. Hygiene campaigns made professionally

The Johns Hopkins University has setup a special communication centre[105] focusing on communication strategies for public health issues. This centre was created with the purpose of improving the effectiveness of health communication and learned from many 'schoolmasterly' campaigns that had not had any long-lasting impact.

The blue star campaign for hygiene in Nicaragua is a good example of how things should be done. After the Hurricane Mitch, a large communication campaign was launched in Nicaragua under the label '*estrella azul*', the blue star. This campaign was designed with the help of the communications centre of the Johns Hopkins University and included radio and TV messages, songs, films, booklets and a blue bus that went from village to village. Before the arrival of the bus in a village, everyone – especially the schools – had to prepare for the visit by discussing such issues as hygiene, hand-washing, sanitation and water quality. Inside the bus, amongst other features, there was an exhibition to create awareness and a small laboratory where children could analyse their water under the microscope.

This campaign reached about 800,000 people and was evaluated through a survey of 1,000 households with children below the age of five. Forty-six percent of those who had heard of the campaign had shared and discussed the themes with other people, and 75% had taken

[104] See photo page in Chapter ?? and for further information: www.rdic.org
[105] http://www.jhuccp.org/

preventive measures such as teaching children to wash their hands[106]. This campaign has thus initiated a change in habits and modified wrong perceptions such as the belief that chlorine destroys the stomachs of children, that faeces of small children do not cause diarrhoea and that if water looks clean it is also safe. Unfortunately, this excellent campaign was a post-Mitch event only and not an action that continued with the same intensity. The blue bus is still operating but at a much slower pace than after the hurricane.

One of the most effective media to pass on messages are nursery rhymes and children's songs. These songs can become very popular and remain in the mind like an 'earworm', another 'stickiness factor'.

8.3. Social marketing in beauty salons

Malcolm Cladwell cites an interesting example in his '*Tipping Point*'[107]: "Not long ago a nurse by the name of Georgia Sadler began a campaign to increase knowledge and awareness of diabetes and breast cancer in the black community of San Diego. She wanted to create a grassroots movement towards prevention, and so she began setting up seminars in black churches around the city. The results, however, were disappointing". Of over 200 church goers, only 20 stayed on and most of them already knew about the topics. So, the nurse needed a new context. "She needed a place where women were relaxed, receptive to new ideas, and had the time and opportunity to hear something new. She also needed a new messenger, someone who was a little bit Connector, a little bit Salesman, and a little bit Maven (expert). She needed a new, 'stickier' way of presenting the information. She needed also to make all those changes in such a way that she did not exceed the very small amount of money she had. Her solution? Move the campaign from black churches to beauty salons. "It's a captive audience", Sadler says. "These women may be at a salon for anywhere from two hours to eight hours, if they have their hair braided… The stylist is your friend. She takes you through your high-school graduation, your wedding, your first baby. It's a long-term relationship. It's a trusting relationship."

I thought this was an excellent idea and when I told Ron Rivera, he too thought it would be worthwhile to take it up. However, the first hairdresser we asked in the market place of 'Leon' turned us down. She bluntly refused to even look at our filter. This does not mean that the idea is bad or not feasible, but implementing it would require more: maybe first convince a few hairdressers or 'beauty stylists' in a seminar where they are invited to hear about the latest shampoos and cosmetic products. Then they should get a filter for their beauty salon so that they can serve safe water to their clients, and then they could become involved in a thorough training as health messengers with messages that go alongside beauty but also beyond beauty. As Procter & Gamble is one of the leading cosmetics firms, perhaps the cosmetics department of P&G could make exactly the missing link to promote PUR, filters, SODIS and other hygiene tasks to the right target population, soon. In Africa particularly, where hairdressers have such an important role and status, this is something that could work, if done properly.

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[106] This and other campaigns are presented on the website of the communication initiative, www.comminit.com . See: http://www.comminit.com/la/evaluacion/laimpacto/lasld-446.html

[107] Malcolm Cladwell: *The Tipping Point – How Little Things Can Make A Big Difference*, op cit, page 253.

8.4. Is Hollywood or Bollywood too far?

A great deal of progress has been made on the research front. While it is now clear and proven how many days of diarrhoea can be averted by which measure, maybe there is also a need for some messages that are much more emotional. Is it a dream to involve Hollywood or Bollywood for such a noble cause? Is the tragedy of a jumbo jet of children dying every hour not a story that is worthwhile for a big movie company to do something against? Is it not also good for stories that would get the message of safe water out packed into a sticky story of the calibre of the *'Jungle Book'* or *'Winnie The Pooh'*?

If the recently-created International Network to Promote Household Water Treatment, operating under the auspices of WHO, wants to step beyond the borders of a narrow scientific community, the message should be carried by more powerful and more emotional channels. UNICEF has many sports and film stars as ambassadors, and for many stars it has become fashionable to perform their own CSR, Celebrity Social Responsibility. Bono, Bob Geldof and others have become development experts, and from Angelina Jolie and Brad Pitt to Sharon Stone and Madonna, it has become a passion of fashion to go to Africa and do some good. Why not use this movement to create a massive awareness around the globe and to support safe water initiatives, not only with the brain but also with the heart?

9. Concluding remarks: Scaling up POUs

Everything that has been done so far to promote household water treatment is a great step forward, and the engagement and applied intelligence of the key actors is admirable. Even so, it is all, sadly, no more than a drop in the ocean. How can HWTS be scaled up?

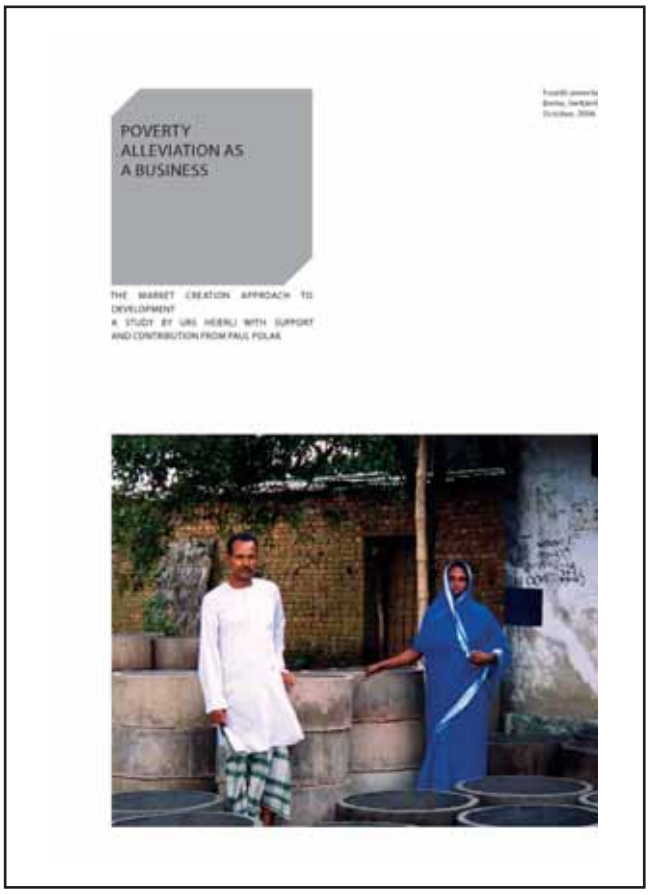
For HWTS to have reached only two to five people in every 1,000 is unacceptable. To go from these two to five million people to the more than one billion who are still waiting for access to safe water is a task that requires concerted action that builds upon progress made. To do this, an honest assessment is needed of what has been achieved and what has failed, addressing these three 'Pleas':

1. **Plea to become more serious, and end 'tinkering'**: Many past and present efforts are laudable initiatives, but they have not received the support and continuity they deserve. Students of Stanford and MIT have provided marvellous inputs in product improvements, but there is nowhere near enough serious follow-up in place. It is important that the Network of HWTS should coordinate a systematic R&D initiative – maybe in a competitive form – to arrive at a range of more mature product solutions catering to the different needs of customer segments. This should include products for the opinion leaders, the middle classes, schools, offices and market places.
2. **Plea for a strategic approach combining marketing and social marketing:** Neither the private nor the public sectors alone can achieve anything at the required scale for safe water. The only solution is a new form of cooperation in the form of Public-Private Partnership programmes, where social marketing (to change habits) and marketing (to make affordable solutions available) are combined.
3. **Plea for aiming at a critical mass**: Even the relatively large programmes of PSI are relatively isolated initiatives. The way forward lies in such pioneering efforts as the

National Roll-Out Plan in Cambodia, and in inter-agency cooperation. Unfortunately, this Plan is severely under-funded and new initiatives should aim at long-term commitments and a critical mass so that finally the safe water movements gets contagious and can reach the tipping point.

This 'tipping point' is now within reach and the foundation has been laid with all the laudable efforts made and lessons learned. The next step is a common initiative to bring safe water up to the scale the world is waiting for.

POVERTY ALLEVIATION AS A BUSINESS - THE MARKET CREATION APPROACH TO DEVELOPMENT



is the title of the original study by the author of this - unrevised - 2006 volume, Urs Heierli. Published in March 2000, it summarised the experiences of his 12 years working as country director of SDC in Bangladesh and India (1987-1999).

Can poor people make a business with goods and services that are relevant for poverty alleviation? The answer is yes, as the six examples of the original study show. To make it happen, markets should be created and techno-logies must be validated, tested and introduced. If a critical mass of demand is created, small private enterprises will emerge to respond to these new business opportunities.

The following six examples are examined in detail. They are analysed according to the 4 Ps of marketing (Product, Price, Place and Promotion) and various performance parameters, especially in view of the potential for scaling them up and replicating them in other countries.

1. 'Hundred million trees as a social insurance scheme: the village and farm forestry programme in Bangladesh'

2. 'Pedalling out of poverty with the treadle pump in Bangladesh, India and Nepal'

3. '60 kilograms more maize per family with "Postcosecha" silos in Central America'

4. '2'000 micro-concrete roofing workshops produce over 150'000 roofs per year'

5. '6'000 private workshops produce over one million latrines per year in Bangladesh'

6. 'The rope pump in Central America: the scope for private drinking water supply'.

ORIGINAL PUBLICATION:

Poverty Alleviation as a Business - The Market Creation Approach to Development
by Urs Heierli, with contributions from Paul Polak
SDC Berne, March 2000

Hardcopies of the original publication can be ordered from
SDC, Employment and Income Division
Freiburgstrasse 130
CH-3003 Berne Switzerland
email: e-i@deza.admin.ch

Electronic copies can be downloaded from: www.poverty.ch

POVERTY ALLEVIATION AS A BUSINESS (NEW SERIES)

A NEW SERIES OF CASE STUDIES WILL PROVIDE DEEPER INSIGHTS INTO THE 'MARKET CREATION APPROACH TO DEVELOPMENT' AS A FOLLOW-UP TO THE ORIGINAL STUDY (SEE INSIDE BACK COVER).

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ENDING POVERTY WITH WATER CONTROL AND MARKET ACCESS
ONE FLY IS DEADLIER THAN 100 TIGERS - TOTAL SANITATION AS A BUSINESS AND COMMUNITY ACTION IN BANGLADESH AND ELSE-WHERE
WHY IS IT SO HARD TO BRING SAFE WATER TO THE POOR - AND SO PROFITABLE TO SELL IT TO THE RICH?
CONNECTING FASHION DESIGNER AND FARMER - THE ORGANIC COTTON VALUE CHAIN (WORKING TITLE)
MAKING INSECTICIDE TREATED MOSQUITO NETS AFFORDABLE WITH-OUT DESTROYING THE SUPPLY CHAIN (WORKING TITLE)
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WHY IS IT SO HARD TO BRING SAFE WATER TO THE POOR - AND SO PROFITABLE TO SELL IT TO THE RICH?

The present publication escribes the marketing challenges of point-of-use water treatment devices such as SODIS (Solar disinfection), different types of water filters and chemical treatments such as chlorination and flocculation.

Since there is scientific evidence that purification of contaminated water at the point-of-use, mostly in the household, is very effective in reducing the burden of diarrhoeal diseases, there is a revival of household water treatment devices.

Whereas considerable progress has been made in the development of low cost and suitable technical solutions and even more on the health impact of point-of-use water treatment systems, there is a considerable gap in large-scale dissemination. The marketing challenges have so far not been addressed systematically and scaling-up strategies have only exceptionally been successful.

This publication addresses thus the main marketing challenges with a discussion of the 5 Ps of marketing: Product, Price, Place, Promotion and People and proposes a mix of marketing and social marketing strategies to reach the dissemination that household water treatment systems would need to achieve if they want to make a dent into the millenium development goals.

It is proven that point-of-use water treatment devices can provide a solution to reduce the burden of diarrhoea and to reduce the scandalous number of children dyeing from it.

The challenge is huge but it is feasible to stop the tragedy that every hour a jumbo jet full of children is dyeing from diarrhoea.