# 2 with 8

## Safe drinking water for 2 billion people with $8 billion

**The Idea**

In 2007 a WHO report indicated that Household Water Treatment and Safe storage (HWTS) could reduce water borne diseases by 60% or more if combined with improved hygiene and so could lead to a benefits of up to $60 for every $1 invested (WHO, 2007). HWTS seems by far the most cost-effective option to reach the goal of safe drinking water for all. Many projects applied HWTS but often were not very successful. On the other hand many rich people buy a HWTS product, especially Household water filters which now is a multi-million business.

*So why is it so easy to get HWTS for the rich and so hard to get it for the poor?*

After the call for "action now!" at the 2022 Stockholm Water Week a group of people guided by John Cherry (recipient of the 2020 Stockholm water prize), formulated a game changing idea to provide safe drinking water to 2 billion people with grants totalling $8 billion, so an average of $4/capita. The objective of this paper is to present this idea and so stimulate discussion and action for a wide scale dissemination of effective, attractive and affordable HWTS options.

**Context**

Over 2 billion people use water sources that are contaminated with faeces (WHO, 2022). Reasons vary from leaking water pipes in urban water schemes to contaminated wells in rural settings. Even if a water point provides safe water, it often becomes re-contaminated during transport or storage in the house. Providing safe drinking water with options like piped systems, water kiosks or hand pumps would cost at least $25 per capita for CapEx. Serving 2 billion people therefore would cost at least $50 billion. A much cheaper be it intermediate solution for quality is HWTS.

**HWTS**

Common treatment options include boiling, chlorine, UV and household water filters. Over 80 products are documented by the organisation CAWST and many were tested by the WHO testing scheme. Over 30 products comply with the WHO performance criteria for removal of turbidity and pathogens (WHO, 2022). Each option has its limitations. For instance, Chlorine eliminates bacteria and viruses but not cryptosporidium, a significant cause of child mortality. It also has a taste if not dosed exactly right and many people do not like the smell. Options with only UV do not function with turbidity. Boiling requires fuel and filters in general are expensive. Compared to other options filters proof to be effective in reducing water borne diseases. If they comply with the 3 Cs, (Correct, Consistent, Continuous use), and if combined with improved hygiene, they are very effective (Wolf. 2018). Filters also proof to be attractive and market based and many richer people who have piped systems buy inline filters. Others buy table top filters that function with gravity and cost $20 to $60. Options with ceramic or diatom filter elements can treat 30 - 60 ltrs/day and membrane filters can treat over 200 ltrs/day. Some models also remove viruses.

**Failures, lessons and success**

In the last 30 years HWTS was applied in several projects but not always with success. For instance, in a project in East Africa 900.000 filters were given away for free. After a short time most filters were not in use anymore (IRC, 2011). Reasons include complicated cleaning and as a free gift there was limited ownership by the users and no supply chain was build up. However increasingly there are successes. (Clasen, 2015). For instance some 10 million people are served with chlorine dispensors at water tap point in East Africa. Over 1.5 million biosand filters and over 2 million ceramic pot filters have been locally produced in many countries. In Brazil some 20 million table top filters were produced and sold in South America, Angola and Mozambique. In Bangladesh over 2500 shops sell paper water filters that can filter 20 to 40 litre and cost $0.2. The proof that water filters are market-based, a product that families are willing to pay for, is that an estimated 500 million families worldwide paid for their filter. With piped water system 'inline filters' are popular. In Asia and South America gravity water filters, or so called Table top filters, are popular. Africa remains a challenge.

**Ethiopia**
Several companies started the import of high quality diatom filter elements and produce the plastic parts locally. Now one company also starts the production of the filter elements.
Some 500.000 filters were sold by august 2023 with cost starting at $22. The funds to start up local assembly was around $0.3 mln. which was partly funded with aid money. Interesting is that over 100 water utilities in Ethiopia, who see that they cannot always guarantee safe water, as additional service now sell water filters. (Foppen, 2019; Aqua for All, 2023). Initially filters were purchased by NGOs who gave them to poor families but now most filters are sold to families directly. The combination of A); a national policy that promotes HWTS, B); utilities selling filters; C) local production, has much potential to scale. The Ethiopia example can be replicated in other countries.

**2 with 8**
The goal of the "2 with 8" idea is to show that with an investment (grant) of around $4 per person, 2 billion people can have point of use treatment that can provide water that is free from biological contamination and protozoa. In case of chemicals like Arsenic or fluor an option is rainwater. Even in areas with 200mm rain/year, 6000 liters/year of rainwater can be collected from a roof of 30 square meters. With HWTS it can be made safe to drink. A question is what is needed to serve the 2 billion at the Base of the Pyramid. An answer is; **use a market-based approach**. Let people choose. Use the 5 P's for marketing (Product, Price, Place, Promotion, People). This and the question "*why is it so easy to get HWTS for the rich and so hard to get it for the poor" is* answered in the publication "Marketing safe water systems" (Heierli, 2007).

**Actions to reach 2 billion people include;**
**1. Increase awareness**
Awareness that clear water can still be contaminated, but also on the economic benefits of HWTS like reduction of health related costs or increased productivity. For example a visit to the hospital may already cost more than a filter. A good quality water filter can be paid with the money to pay 3 to 6 months of bottled or sachet water. Awareness is needed on low-cost options and training in use and maintenance. This awareness needs to be nationwide and for many years on radio, television, social media. An example of such a campaign has been executed in Cambodia (IDE, 2018)

**2. Build Supply chains including payment systems**
Build up commercial supply chains of effective, attractive and affordable HWTS products. In each city and town there should be shops or outlets that sell 2 or more options with different prices, so people have a choice. HWTS products should be approved by the national government. Options should also comply with the 3Cs and be sold on a commercial base so go on after projects stop. There should be supply chains that go on without external support. Also payment options are needed like micro credit, pay as you use, group credit. An example can be the Grameen bank

**3. Subsidize the poorest**
Of the 2 billion people an estimated 50% are too poor to buy an option like a filter. Families with incomes of $1/day can or will not even buy a filter of $10. This group needs a subsidy. To avoid that subsidies distort the market, a voucher system can be applied similar to what was used for bed nets. With a voucher of for instance $20 a family goes to the local shop, pay for instance $2 and gets a filter worth $22. If they want a filter that cost $32, they pay $12.
Households can be divided in: A. Those who can afford upfront payment, B. Those who need payment in instalments, C. Those who cannot pay the full price.
By subsidizing households of group C with vouchers, a commercial supply chain of products can be created for new products and spare parts for all groups.

**Use of funds**
To serve 2 billion people an estimated $8 billion (multiple grants) is needed. A very rough indication to use this is:

- 30% for awareness.
  Large scale, long term on social media communicating reasons for point of use treatment;
- 10% for building supply chains and payment systems.
  Selecting, training the private sector, supporting governments, monitoring and evaluation, payment options;
- 60% for vouchers (200 mln. filters @ $25/filter).
  Vouchers go to target groups like pregnant women and those who do not yet have "basic service" so an improved water source within 30 minutes walking from home.

**Organisation and financial resources**

Realisation will require the cooperation of all stake holders including, Governments, NGOs, Private sector and the Finance sector. The dissemination of vouchers could be realized by NGOs, faith organisations, health workers, etc. Funds could come from all who are interested in reaching SDG6.1 and / or SDGs for health (eg. stunting).

A promising (partial) funding option is carbon credits which requires pre-financing. Filter projects can receive carbon credits since they reduce the use of fuel to boil water. Even if people do not boil water they can be eligible with so called "supressed demand".

Income from carbon credits can be used to build supply chains and reduce the cost of products. Generating carbon credits requires a stringent monitoring including tools to track the filter location, usage and treatment performance. At the 2023 Stockholm Water week several water filter producers formed a group, similar to the solar light or cookstoves alliance. As a group it is easier to approach policy makers and funders. Actions can start small with a village, later a region and eventually country level. The $8 billion could, should come from all who support the human right to safe drinking water, from those interested in reaching SDG6.1 and SDGs for health (eg. stunting). From those interested in "leave no one behind"!!

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