The Siphon water filter

Context

Of the millions of people without access to safe water, some 80% live in rural areas where often centralised water distributions and treatment system are to complicated or to expensive. In areas with piped systems, treatment plants often do not function well.
Contamination of drinking water also takes place between the tap point and point of use.
In all these cases water can be made safer to drink by treatment at the household level with so called Point of Use (PoU) treatment. Options recommended by the WHO and UNICEF include Boiling, SODIS, Chlorination, Biosand filters and Ceramic filters.[1] This last option is increasingly seen as a user friendly and commercially attractive option to improve quality of drinking water at the household level. In India and Brazil there are millions of candle filters in use. However high quality filters as Katadyne or Dalton are too expensive for poor families and low cost options often have an inferior quality. Other problems with traditional candle filter models are low filter capacity because of clogging, relatively complicated maintenance and lack of availability of spares. Ongoing development of ceramic filters led to the siphon filter concept.

The Siphon filter is innovative and cheaper than existing options. It is developed by Basic Water Needs together with Connect International (CI) and ARRAKIS and is being field tested in 3 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 and organisations as the Practica Foundation. 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. Evaluations of the research institute MIT and UNICEF indicate that the use of quality ceramic filters combined with education on maintenance and basic hygiene, reduce cases of diarrhoea among children under 5 with 46% (Cambodia) to 75% (Bolivia)[3]. A recent investigation of SCP filters by the TU Delft [4], Water lab Haarlem and KIWA (funded by Aqua for All) has again confirmed that silver impregnated pot filters are very effective in the reduction of harmful bacteria. Silver impregnated ceramic filters produce water that complies with the WHO norms for turbidity and harmful bacteria.
In the range of these ceramic filters the S*iphon filter* is innovative because:

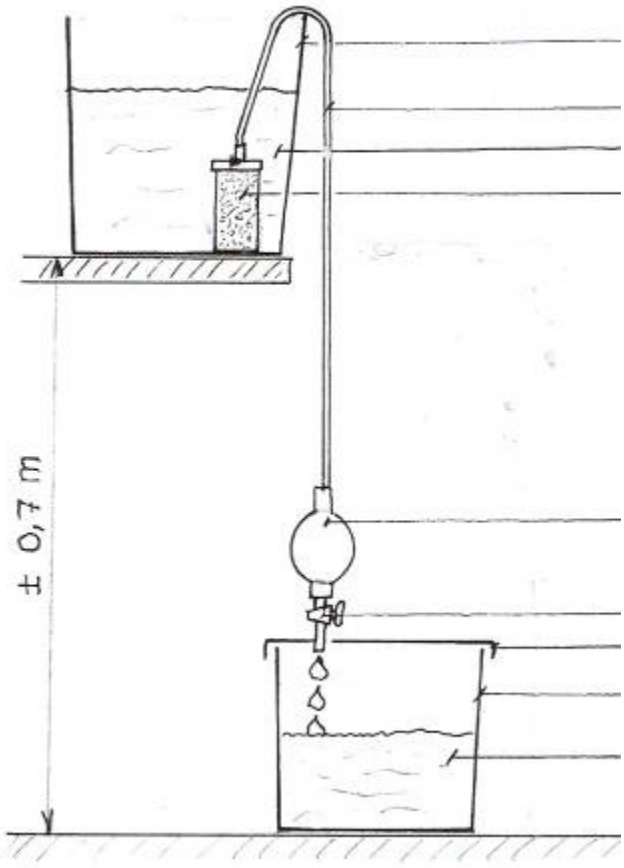
- It uses silver impregnated ceramic elements or a “carbon block” element. The carbon removes taste and colour and the silver avoids re-growth of bacteria.
- it uses a siphon hose that creates a vacuum, resulting in a high filter capacity of 3 to 5 litres per hour, 2 to 3 times higher than traditional 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 user friendly, easy to maintain and lasts longer than other ceramic filters because of the backwash option.
- It is an user friendly and attractive product and therefore has a high market potential
- It has a very low production cost , around 3 Euro, incl. profit on production
- It has a very low cost for the users, an estimated 7 Euro. incl, transport and profit of shop.

Maintenance of the filters consist of backwashing and eventual scraping the element similar to traditional ceramic filters. The filtering element last between 6 months and 2 years depending on water quality. Replacement can be done by the user and will cost around 3 Euros.

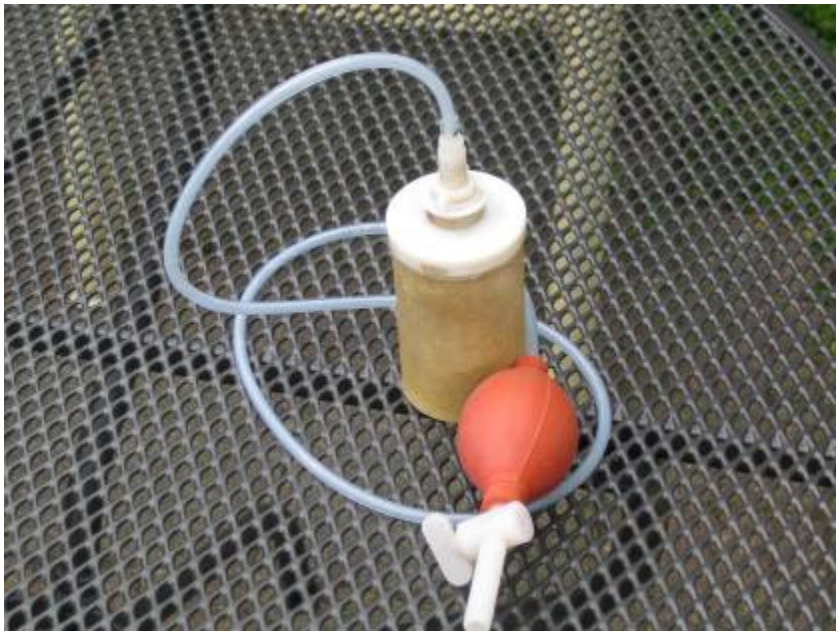
Dissemination

Projects can start with the dissemination of siphon filters by importing existing parts as the ceramic candles, hose, bellows and valve and assemble them locally.

Demonstration filters can be distributed through the network and programs of local organisations but to develop a sustainable market the filters should be sold at a commercial cost via a network of dealers. When there is a proven market a feasibility study can be conducted to assess the possibilities of local production Once there is a critical mass and the filters have proven their market potential, the assembling, production, distribution and sales can be taken over by commercial local companies. The role of the local NGOs can than be combine the dissemination of the filters with education on use, maintenance and hygiene aspects.



SIPHON FILTER Schematic drawing



Siphon filter

Training on use in Mozambique

1 Information on PoU options, see website of the WHO network for Household treatment HWTS
2 Safe water means water that complies with WHO norms for NTU (turbidity) and bacteria.
3 Some investigations are: Colloidal Silver Impregnated Ceramic Filter. D.Lantagne, MIT. Fund. US AID
"Ceramic water purifier field tests " UNICEF / IDE Cambodia,
"The reduction in diarrhoea was 72% among children of filter users in Bolivia" (Clasen et al, 2004) London
School of Hygiene and Tropical Medicine
4 Report see www.drinkwater.tudelft.nl, 'Onderzoek' en 'MSc research completed'.
- Improvements in water and sanitation bring US$ 5 to 28 for every dollar invested.
- "*Evaluation of the Cost benefits of Water and Sanitation Improvements at global level*". WHO, 2004
- Market creation of low cost products see "*Poverty alleviation as a business*" www.intercoop.ch/sed/product/heierli/main.html
- Filter information in "**Smart Water Solutions**" NWP (Netherlands Water Partnership) www.nwp.nl
- More information on water filters see www.practicafoundation.nl