

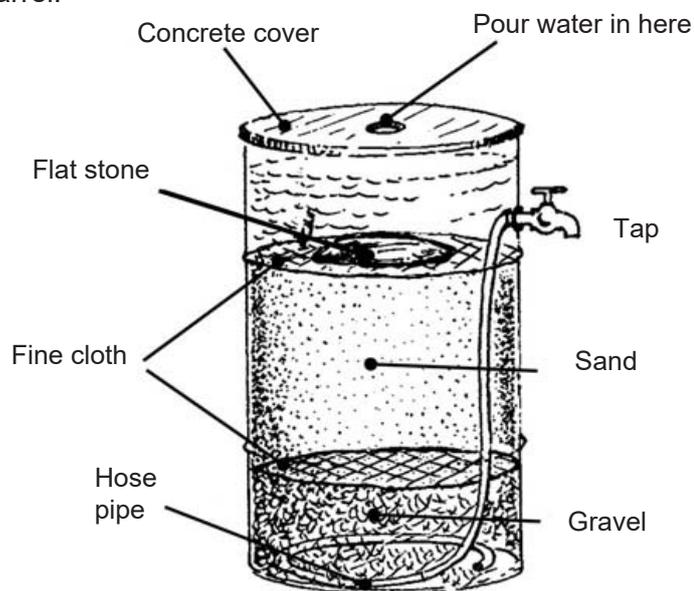
This Action Sheet is about larger water filters for household and community use. The two types of water filter described here can provide water that is almost as safe from germs as water that has been boiled, treated by solar disinfection, or treated with chlorine.

## Household slow sand filter

This is one of the safest, most effective, and cheapest ways to filter water for a household. This filter can treat at least 50 litres per day — enough for a small family.

Equipment to make a slow sand filter:

- A watertight container such as a 200 litre barrel, or a large brick or cement jar. Make sure the container did not contain toxic materials.
- A 20 millimetre hosepipe with many small holes cut in the first 35 centimetres. This part with holes will lay on the bottom of the barrel.
- A valve or tap.
- A small amount of gravel.
- Washed river sand.
- Fine cloth.



Making a household slow sand filter

1. Clean the container and disinfect it with bleaching powder.
2. Drill a hole  $\frac{1}{3}$  of the way down from the top of the container for the tap. The hole should be sized for the fitting on the tap — if the tap has a 12 millimetre fitting, the hole should be 12 millimetres wide.
3. Fit the tap to the hole and fix it in place with hard-setting putty. If a brick container is used, the valve can be cemented within the wall.
4. Prepare the water collecting hosepipe. To do this, drill or punch many small holes in the first 35 centimetres of the hosepipe, seal the end, and form it into a ring on the bottom of the container with the holes facing downward.
5. Connect the water collecting hosepipe to the tap. Seal the pipe fittings with hose clamps or wire.
6. Place a layer of gravel 7 centimetres deep on the bottom of the barrel, covering the water collecting pipe. Cover the gravel with fine cloth and fill the barrel with clean river sand to about 10 centimetres below the tap. Then cover the sand with a second fine cloth.
7. Make a cover for the container, with a hole in it to pour water through. Place a flat rock or dish under the hole to prevent disturbing the sand when water is poured in.
8. Flush the filter with water completely. Once the filter is cleaned, it is ready for daily use.

### To use and maintain a slow sand filter

After a few days of use a layer of green scum (bacteria and algae) will grow on top of the sand. This layer helps to treat the water. For this layer to work the sand must always be covered with water. Fill the filter daily and remove water only in small quantities. If the filter is drained completely it will lose its effectiveness, and should be cleaned and refilled.

Every few weeks when water flow from the tap slows down, clean the filter. Let any water out of the filter and remove the green layer and about 1 centimetre of sand from the top. After many cleanings, when more than half of the sand has been removed, replace all the sand and gravel with new cleaned sand and gravel and start over. This may be necessary 1 or 2 times a year.

### Improvements to a slow sand filter

Allowing solids to settle out of the water before filtering it will reduce maintenance of the filter because water will be cleaner when it enters. Letting water flow like a waterfall will add air into the water and make it taste better.

A filter has been invented that uses iron nails to filter out arsenic (the arsenic binds to the iron).

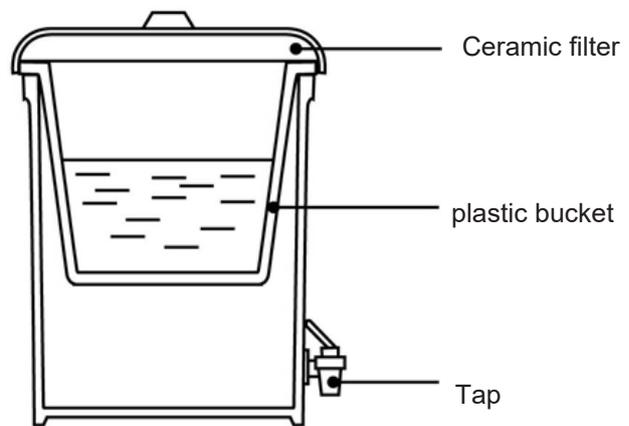
### Ceramic and biochar filters

A small and effective water filter can be made from fired clay coated with colloidal silver (a substance that kills germs). With basic training, a village potter can easily make these filters. Similar and easier to make, is a biochar filter - illustrated in the Biochar Action sheet.

### Community slow sand filter

Larger filters can be made that connect to surface water sources or piped water systems to supply safe water to a whole

village or neighborhood. Where surface water is the only available source, a community slow sand filter is a good way to treat large amounts of water with little work. These filters require an engineer to build and install properly, so we do not describe them here. (To learn more about community slow sand filters, contact the International Water and Sanitation Centre or one of the other organisations listed below).



Ceramic filter used inside a plastic bucket.

In the Rift Valley of East Africa, the groundwater is naturally high in fluoride. This causes loss of teeth and bone (dental and skeletal fluorosis) in people who drink the water. A special type of filter using bone char is needed. As water filters through, the fluoride is left on the surface of the burnt bones. Find out more from the contact listed below.

(Source: Excessive fluoride a bane of Rift Valley residents by Wangulu Eliezer, March 2001 issue of IRIS (Integrated Rural Information Service, Kenya)

## **Acknowledgements**

This Action Sheet is an edited excerpt from “Water for Life: Community Water Security”, created by the Hesperian Foundation for the UNDP, in cooperation with the Community Water Initiative partners, part of a larger book by the Hesperian Foundation.

## **More information**

IRC - International Water and Sanitation Centre [www.irc.nl](http://www.irc.nl)

Practical Action (formerly known as ITDG) [www.practicalaction.org](http://www.practicalaction.org)

WaterAid [www.wateraid.org](http://www.wateraid.org)

Excess fluoride filter – Catholic Diocese of Nakuru, Water Quality Programme, PO BOX 938, 20100 Nakuru, Kenya Tel. 037-211634

The authors have made every effort to ensure the accuracy and currency of the information in this document. The authors disclaim any liability, loss, injury, or damage incurred as a consequence, directly or indirectly, of the use and application of the contents of this document.

To learn more about PACE please view our website [www.paceproject.net](http://www.paceproject.net), e-mail [pace@tusk.org](mailto:pace@tusk.org) or write to PACE, Tusk Trust Ltd, 4 Cheapside House, High Street, Gillingham, Dorset, SP8 4AA, UK. Tusk Trust Limited is a Charity registered with the Charity Commission for England & Wales (charity number 1186533) and a Company registered in England and Wales (company number 11948023) | (Formerly Tusk Trust, charity no. 803118).