

## **About Bio-sand filters**

Many new water treatment technologies have been evolved over a decade. . Majority of them struggle with one or another issue like cost intensive, availability issue, need of electricity, recurring costs, contaminant specific, skills etc. These technologies are mostly urban centric. Rural areas are less exposed to these technologies and follows traditional practise to treat water like boiling, keeping water for several hours for suspended particles to settle down, etc. These methods are not so effective to remove all contaminants.

CASWT (Center for Affordable Water and Sanitation Technology) and S M Seghal Foundation has started an innovative model of Bio-sand Filter, 'JalKalp' which overcomes the limitations of conventional bio-sand filter. JalKalp is sustainable and proven drinking water purification method. It is capable of removing suspended solids as well as biological contamination. . It works under the force of gravity without using of any form of energy or on line pressure. It has lightweight design strength, reliability, and durability of the filter. It is easy to transport to remote and hilly locations.

### **Working of bio-sand filter**

Biological and physical processes combine to filter and treat water. Water poured through a diffuser in the filter travels through sand and stne gravel.

Inside the filter, water trickles through tiny pores (spaces) between sand particles. Impurities, pathogens, and turbidity larger than the pores are trapped by the sand and removed. The treated water leaves the filter through a pipe spout. Upto 0.7 lires of water are filtered each minute.

**(A)** A Biosand filter remove pathogens through following processes:

- Adsorption – Microbes adhere to the surfaces of the specially prepared sand, which have a slight electrostatic charge, and some die there.
- Predation – The BioLayer that forms on top of the sand contains microbes; stronger ones kill weaker pathogens
- Mechanical Filtration – Fine-grain sand prevents the passage of bacteria, parasites, and worms, which are relatively large.
- Natural death – The lack of oxygen and light further down in the filter causes more microbes to die-off, and some pathogens die off for natural reasons.
- Germicidal coppber – Passage of filtered water through a copper foil at the base of the container acts as final safeguard against any escaped pathogens from above.
- Oxidation – To remove iron contamination
- Zero valent iron technology – To remove arsenic contamination.

As there is no moving part, Biosand filter does not require any replacements. With time the flow rate of filtered water may reduced. It happens due to accumulation of silt (came with water) over the sand top layer. When the flow rate slows down, the maintenance exercise to be conducted is: lift off the lid, pour water in the filter, take out the diffuser box, and do a “swirl and dump” which means gently swirling the water above sand top layer. The deposition

over the sands gets suspended in the water. Now remove the cloudy water above the sand. This may be repeated 3 or 4 times to “clean” the layer of accumulated silt.

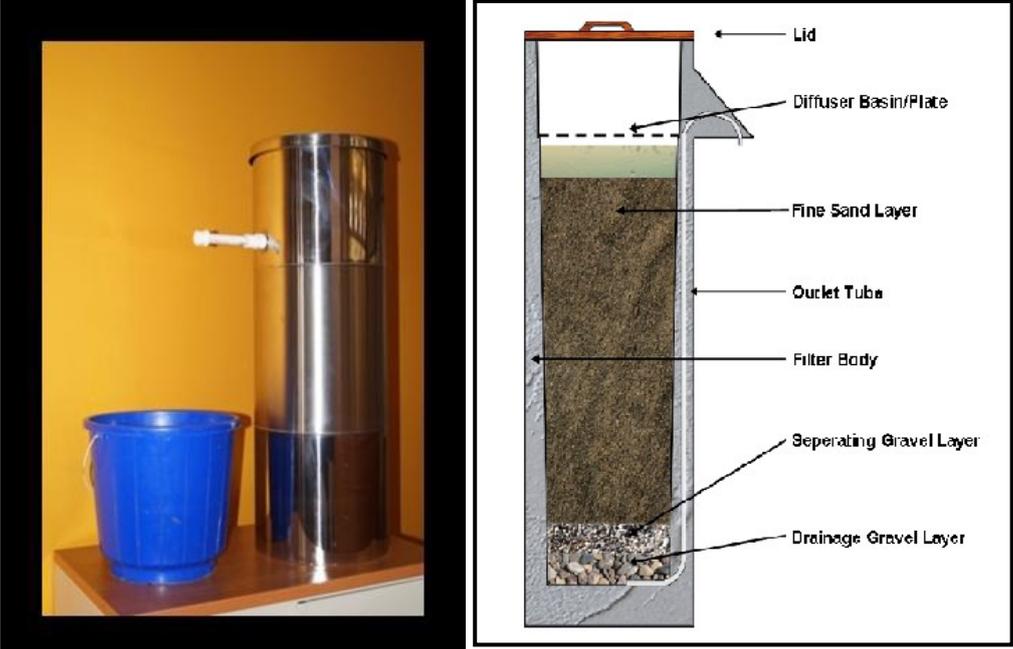


Fig 1: Bio-sand filter