

LOW-COST WATER FILTERING SOLUTIONS IN INDIA BASED ON LOCAL RESOURCES

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According to the World Resources Institute, 54% of India's total area faces high to extremely high water stress and nearly 600 million people are at a higher risk of water supply disruption. Only 59 out of the 632 districts were found to have ground water safe enough to drink. Further, two consecutive droughts in India have aggravated the crisis and water resources are highly strained and groundwater table depleted.



While most people in cities can afford water purifiers, people living in rural areas do not have water-filtering facilities and they have no choice but to drink unclean water, which causes important diseases.

In this context, many actors in India are working in order to design interesting low-cost water filtering solutions, based on the use of local resources and having potential to solve the drinkable water problem in rural areas.

Solar water purifier using old saris

Anil Rajvanshi, an Indian scientist from Nimbkar Agricultural Research Institute (NARI) in Maharashtra, has brought back traditional water filtering methods in an effective and simple way to make a low-cost solar water purifier that is of immense benefit to the rural households. In most solar heaters available in the market, water only gets heated up but it is not purified, and in systems like RO (reverse osmosis), water only gets filtered but complete sterilization is still lacking. Rajvanshi has developed a two-stage water purification system which is low cost, does not require any electricity, and wastes no water like RO. In the first stage, impure water is filtered through a system consisting of four-layered cotton sari cloth. In the second stage, this water is filled in four vacuum filled tubes attached to a manifold. These tubes act as water heaters and can heat filtered water up to 60 degrees, which can kill all harmful bacteria.



Tests done with this system show that water heated to 60 degree C for 15 minutes or 45 C for 3 hours inactivates all water-borne bacteria. The cotton filter, typically an old sari, is washed to ensure there's no clogging. This technology avoids the use of wood smoke for heating, does not waste water unlike RO purification and there is no issue of periodic replacements of candles. Dr. Rajvanshi and his team are exploring possibilities of scaling up this technology for village level application so that 30,000 to 40,000 liters of water can



be made potable daily. He has not patented the technology and the technical know-how is made available free of cost at NARI Institute.

Water purification using hair

Nikhilesh Das, a physics and Debanjan Mukherjee, an electrical engineer, both Assam-based scientists, have discovered that oil pollutants can be removed with the help of hair. Staying at Guwahati and seeing the pitiable condition of the river Brahmaputra behind the Numaligarh refinery, they thought of helping the environment in an *inexpensive and easy way*. Not only Guwahati but throughout the country tons of oils are thrown directly into the water bodies, thereby, destroying the ecosystem and its balance. So, they experimented with a beaker of oil and water and succeeded in removing the oil with the help of hair. Then they improved their model by adding bird feathers and wood saw dust and tested the efficacy of these ingredients in curbing oil pollution. This simple low-cost and eco-friendly idea (since one waste is being used to clean another waste) can be used economically in oil refineries where oil slush needs to be cleaned. The scientist have patented their findings and received a national award from the National Innovation Foundation in 2011.



Bio-adsorbent using corncobs

Sripada Srisai Lalita Prasida, a student from Delhi Public School Damonjodi in Koraput, Odisha, has created a method for purifying water, using corncobs. Through his experiments, she found that waste corncobs are able to absorb the contaminants by the principle of adsorption. Corncobs were taken in five separate used plastic bottles of two-liter capacity each containing 400gm of dried longitudinal corncob section, pieces of corncob, powdered corncobs, and activated charcoal layered one above the other.



She conducted chemical tests for various contaminants and confirmed the efficacy of this materials. Further investigation confirmed that the rate of adsorption was directly proportional to the surface area of the adsorbents. In addition, calcium and magnesium salts, detergents, gasoline wastes, colored dyes, suspended solid particles were found to be captured in the filtrate. One of the advantages of this low-cost technique is that it can be scaled up and used to clean up ponds, tanks, lakes etc. It will thus enable to open up a new market value of the corncobs that are currently considered as waste. Lalita Prasida won the Community Impact Award at the prestigious Google Science Fair in 2015 that was held at California, USA.



To know more

[Qz.com website](http://www.qz.com)

<http://www.indiawatertool.in/>

[Low cost bio-absorbent](#)

<https://www.google-science-fair.com>



<http://www.thebetterindia.com>

<http://nif.org.in/innovation>

<http://www.thebetterindia.com>

<http://wri-india.org/>

<http://www.wri.org/blog/2015/02/3-maps-explain-india%E2%80%99s-growing-water-risks>

