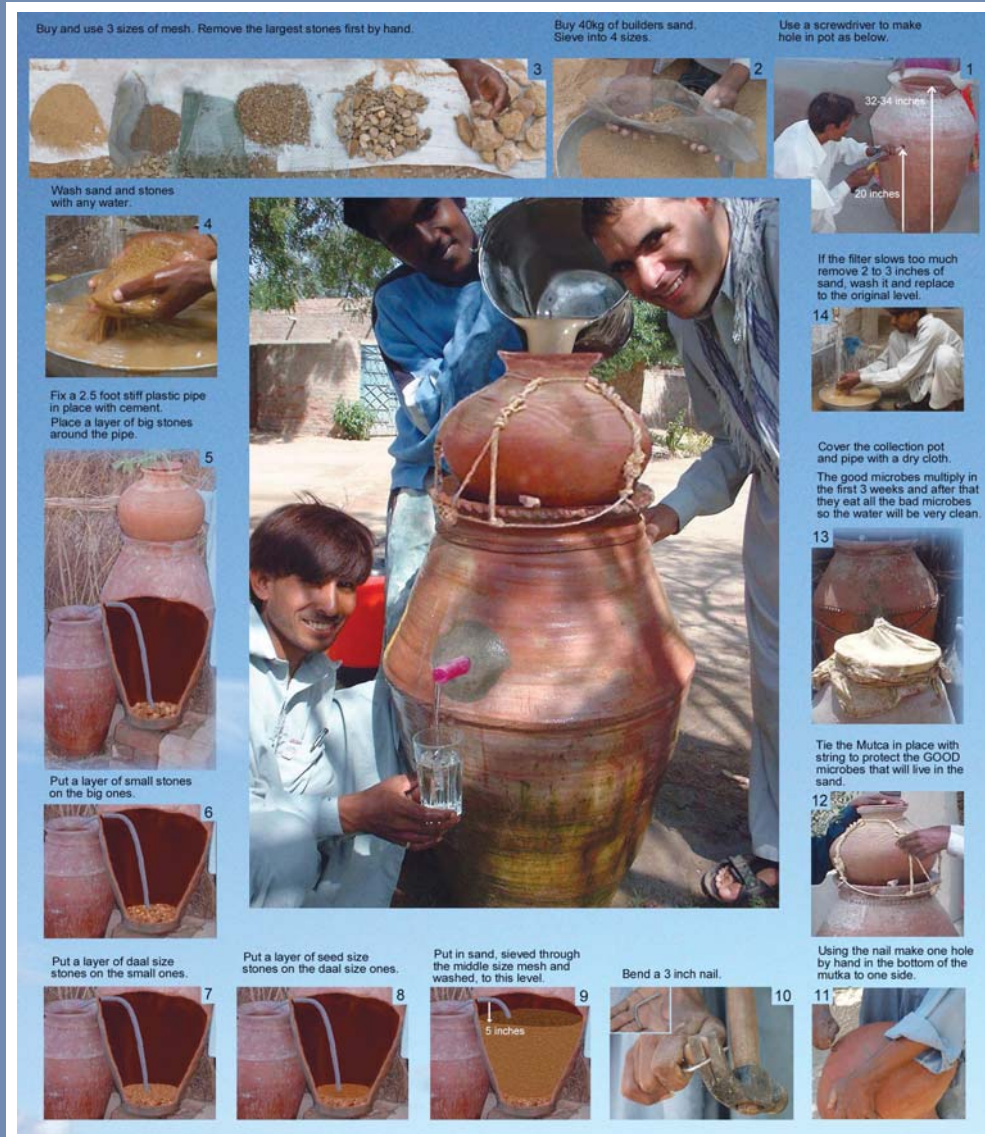


Rewarding Innovation at Local Level in Sindh, Pakistan

By Shaheen Ashraf Shah



Introduction to Coastal Communities in Rural Sindh

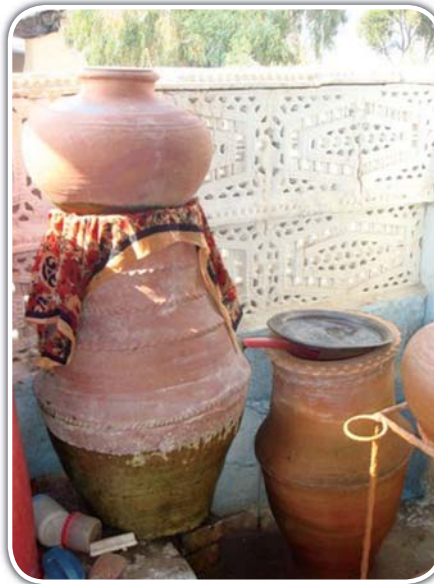
The Sindh Province of Pakistan has a coastline of approximately 350 kilometers, that comprised of east of Karachi and districts of Badin and Thatta. However both, Badin and Thatta are two hazard prone mainly rural districts of Sindh Province, lying

between Thar desert and coastal stretches of Arabian Sea. A chronology of disasters over the last five decades reveals that both of the aforesaid districts remained in the grip of uninterrupted cycle of disasters in one form or other. Cyclone, heavy rains and floods follow each other with short lived intervals.



“Bio sand water filter (nadi filter) technology was used in the project.”

Poverty is widespread throughout both districts, the communities living in coastal areas are trapped in a complex of vulnerabilities, for instance, the villages situated in close proximity of Arabian Sea are the most frequent subject to the periodical disasters. The structure and placement of houses, non availability of disaster resistant physical infrastructures and the remoteness comes into alliance to constitute the physical vulnerability of communities at large. Majority of population in costal area are engaged with their respective occupations (agriculture and fishing) since generations. But since last few decades, the water resources mismanagement at upland multiplies the miseries at downstream as both districts are situated in the tale end of Indus delta. Therefore, land under cultivation has become saline and degraded due to successive floods and sea erosion.



most disadvantaged and marginalised communities for the sustainability. AHD introduced Bio-Sand Water Filter (BSF) / Nadi Filter in 32 vulnerable villages in costal areas to improve the access of the poorest communities to safe drinking water. AHD's BSF Project is known as Nadi Filter (local name), Nadi (a mud pot, 32-34 inches tall) commonly used by local community in household for water storage purposes.

The project is initiated with major objective of using limited available resources, particularly commonly used mud pots for water storage (such as, Nadi) in rural household for filtration that could sustained itself without any external interventions. In support of this initiative, project by following participatory approach focuses on mobilisation of communities, formation of community groups, construction, installation & maintenance of filter and follow-up

Problem - Unsafe of Drinking Water in Coastal Areas

The safe water supply for human, animal and crop consumption is the critical issue for the costal communities. It also affects on their ability to own live stock, especially in the areas where there are severe problems of drinking water and fodder availability. Every documented beneficiary needs assessment mentions water supply as a major issue and most places a supply of drinking water as the first requirement for any project to tackle. Lack of water impacts on the productive use of human time (women spend all day fetching and carrying water), the health (dirty water means that a high proportion of the population, especially children, suffers from water-born disease), the distribution of the population (often along irrigation canals and drainage ditches) and the choice and productivity of crops. It can be fairly said that the failure of the water supply is the single most important constraint to any development in the coastal district.

Though there are various types of water sources available in coastal areas for drinking and domestic purposes, but majority of them are severely constrained in many ways. For instance, piped water supply mainly available for urban localities or near urban areas, remote and rural areas still deprived from this facility. Canal water is usually uncertain, irregular and polluted. Ground water, ponds and wells have become saline, due to continuous environmental degradation and water mismanagement since long. Therefore, the need for improved water is urgent but more importantly, it needs to be cost effective, simple and according to local conditions so that the poorest people of the region may effectively own it.

Solution - Nadi Filter Project By AHD

Association for Humanitarian Development (AHD) is a non governmental organisation established in December 2001, with the major objective to work for peace, justice, harmony, and equality through participation of the

trainings in the use of the filter, safe water practices and hygiene & sanitation. The Post installation also includes monitoring and support from project staff for communities as required. In all respects project seeks greater men's participation in project activities, as this proved to be more successful to promote filters and to gain greater access to women in communities. Nadi filters are financed by Misereor Germany, UNEP-APFED, ADP & OXFAM GB. Under the project AHD has already installed more than 2200 filters during the past 3 years, providing life-sustaining water to more than 15000 people, who are living in rural communities. AHD intends to install at least another 2000 filters during the next year, due to growing demand by coastal communities.

Features of Nadi Filter (Bio Sand Water Filter)

Bio-Sand Water Filter (BSF) is a technological adaptation of the centuries old slow sand filtration process. It is not a newly developed technology, several commercial and community-scale implementations exist in different countries. The largest use of BSF technology has been in the humanitarian arena. But in coastal areas of Sindh, it is first time to take such initiative at household level by AHD. Technology and method exist to bring improved water and sanitation practices to even the most remote areas. It's an affordable, sustainable household technology, proven to be very effective in improving the quality of water to make it safe for drinking, cooking, bathing, and cleaning.

The average cost of a Nadi filter, which normally serves a household of 8-10 people is only PKR 1000-1500/= that includes the cost of material, installation, transportation, the cost of training on the filter operation/maintenance and important health and hygiene education. BioSand Filters remove 95.0 to 99.0% of organic contaminants, including bacteria, viruses, protozoa, worms, and particles. Safe water produced by the filters is free of discoloration, odor, and unpleasant taste.

How Does Nadi Filter Work?

The Nadi Filter is an adaptation of the natural process of slow sand filtration.

Different sizes of gravel and sand are layered inside the filter/Nadi, with a PVC collection pipe situated at the base of the filter. Water from rain, surface, or ground sources is poured through the Mutka (a mud pot, smaller in size and different in shape than Nadi), placed at the top of the filter having small hole at the bottom. The filtered water flows out of the pipe and is collected in a safe storage container to prevent post-treatment contamination.

The top few centimeters of the sand trap the bulk of micro-organisms, which accumulate and develop into a highly active food chain, called the Biological Layer. The biological layer, which must remain partially wet, traps and feeds on the micro-organisms and contaminants in the water. Further filtration occurs in the lower layers of sand and gravels, which removes contaminants that cause odour, cloudiness, and taste. The organisms in this layer comprise of an intensely active, complex food chain - digesting organic matter and disease-causing parasites, bacteria and viruses, including eliminate 100% of worms, parasites, and particulate matter. This dramatically reduces the incidence of infection and disease from contaminated water.

As the filter is used, the biological layer matures and thickens, causing the flow of water through the filter to slow. Recipients of filters are trained to watch for decreased flow and can renew the filter simply by skimming off any debris from the top of the sand, and by gently stirring the sand to break-up the biological layer. The quality of source water will determine how often this process is necessary. Nadi Filter can last for many years with only basic maintenance by its owners. They are developed on-site from local materials, and have no electrical or mechanical parts to wear out. The combination of factors makes the Nadi Filter an extremely sustainable solution that is well-suited for remote areas. AHD has also established its own laboratory with major support provided by OXFAM to test the water purification level once filter is installed at household level.

Results - Outcomes of the Nadi Filter

The benefits to quality of life provided by the filters are substantial:

- ▶ Filters improve health of families especially women and children, who showed greater satisfaction on installation of filters in their houses. It enables them to escape the vicious cycle of poverty that hampers economic and social development for individuals, communities and entire nation.
- ▶ Work productivity and school attendance increase due to fewer sick days and improved health. Studies have shown that the filter can reduce diarrheal illnesses by up to 40% including skin diseases, which has a tremendous impact on the overall health and productivity of a family and community.



▶ It increases poor people's access to safe drinking water, resulting in major economic and social benefits. Communities do not spend their meager incomes on medicines. The environmental outlook of communities also improves especially where filters are used and trainings provided by project staff related to health and hygiene.

▶ During field visit to villages, where Nadi Filter is installed, following was shared by women beneficiaries: life is changed especially for us because of water filter, we don't have to walk anymore to find safe water or to buy it. We have felt the change in water we now drink. We cannot simply drink the water from canal/hand pump if we don't filter.

Key Points for Sharing Knowledge

- ▶ Nadi Filter has great potential to be introduced in other remote areas. Its scale up requires collaboration in local, multi-national, national and international organisations.
- ▶ Experience shows once communities are use to of drinking filtered water, avoid consuming contaminated water anymore.
- ▶ Mobilisation and awareness trainings play significant role in improving health and hygiene related practices.
- ▶ A real sense of ownership and participation by both local women and men can help in its extension and sustainability
- ▶ Due to use of mud pots water remain cool even in extremely hot weather conditions. If it is placed in appropriate place/under shadow, away from direct sun light.
- ▶ Nadi Filter are proved to be more effective at household level rather than community/community water supply schemes.
- ▶ It has multiple advantages like reducing diarrhea stomach aches, skin infections, urinary tract, infections, waterborne disease, removing turbidity color and ordour from water, requiring minimal maintenance and constructing from local material.
- ▶ The following limitations may not ignored:
 - Not 100% microbial removal
 - Limited transportation/mobility, due to weight
 - Mud pots can be broken, if not placed at appropriate height.

About the Author

Shaheen Ashraf Shah is a doctoral researcher at Warwick University UK and freelance gender and development consultant. She is working for gender & development since last several years and presenting internationally as research scholar on women and water management particularly in Pakistan. She has also served as visiting research fellow to University of Western Australia and Loughborough University UK under Endeavour Executive Award by Australian Government and Charles Wallace Visiting Fellowship by British Council respectively.

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