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Targeting individuals: away from the concept of community involvement
The success of household sand filtration

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Despite numerous constraints, community participation remains a central element in most water projects. In fact, the concept is so fundamental that hardly any donor will consider funding a project if no active involvement of an organized group of community members is evident. This article describes the success of a project that actively avoided working with groups, but specifically targeted individuals with the introduction of a simple but effective form of household level sand filtration.

Background

In 1998 the author became involved in a project responding to floods in southern Somalia. In order to avoid the outbreak of water borne disease, part of the project was aimed at the construction of large but simple village level sand filter units, able to produce clean water from contaminated surface water.
Some 6 units were eventually built within a short time, but conflicts over ownership by various clans, theft of taps, refusal of the community to pay for guards and unwillingness to carry out very simple maintenance ensured that all filters were out of order within months of installation.

Before construction on the village units started, a simple sand filter, made from a plastic 100 liter drum had been installed near the river to test the quality of locally available river sand. A number of local militia men with a duty to guard some boats, were asked to continuously pour water in the drum, for testing purposes. Naturally, they quickly 'adopted' the filter as their own once they saw that dirty water poured in the top came out clean and fresh from a pipe in the side.
When the author wanted to leave the area, frustrated by the projects' failure to unite a violent and historically split community for the purpose of a 'community' sand filter, one of the guards proposed to buy from him the little filter at the river bank, in order to put it in his nearby hut. The deal was sealed for 10 USD – a substantial amount in that context - and the wife of the guard quickly established a small business selling clean water to her neighbors. Within hours many more requests for small filters were made, but no more plastic drums were available.
This incident inspired the design of a project aimed at introducing small filters to individual households – without involving community groups – with the objective of full integration and financial and technical sustainability within one year.

Machakos District is a semi-arid area in Kenya's Eastern Province. In this region live many poor subsistence farmers. The area is classified as semi-arid and a prolonged drought led to a severe famine when most crops failed. To combat the effects of drought, a rapidly increasing number of farmers build small dams on their plots in order to catch run-off rainwater. This water is used for both simple irrigation and for drinking. Naturally, the water thus collected becomes stagnant and after a short while is fully contaminated.[2] People without access to dams collect their water from numerous seasonal streams and small springs. Overpopulation and charcoal burning have caused a scarcity of firewood and drinking water is usually not boiled. This practice leads to a high incidence of water borne disease. It is estimated that 50-70% of all disease in the area is water borne.

Remnant of failed projects

During the last decennia, the District has seen the implementation of numerous water projects. Many required a very high initial investment, are technically complex, need continued maintenance and were never 'owned' by the community. It is thus no wonder that most systems have failed to produce clean water for long and now the area is littered with the remnants of failed projects: derelict pipeline systems and treatment facilities, empty water kiosks, washed-away sand dams and pumps with no spare parts. In most cases, failure can

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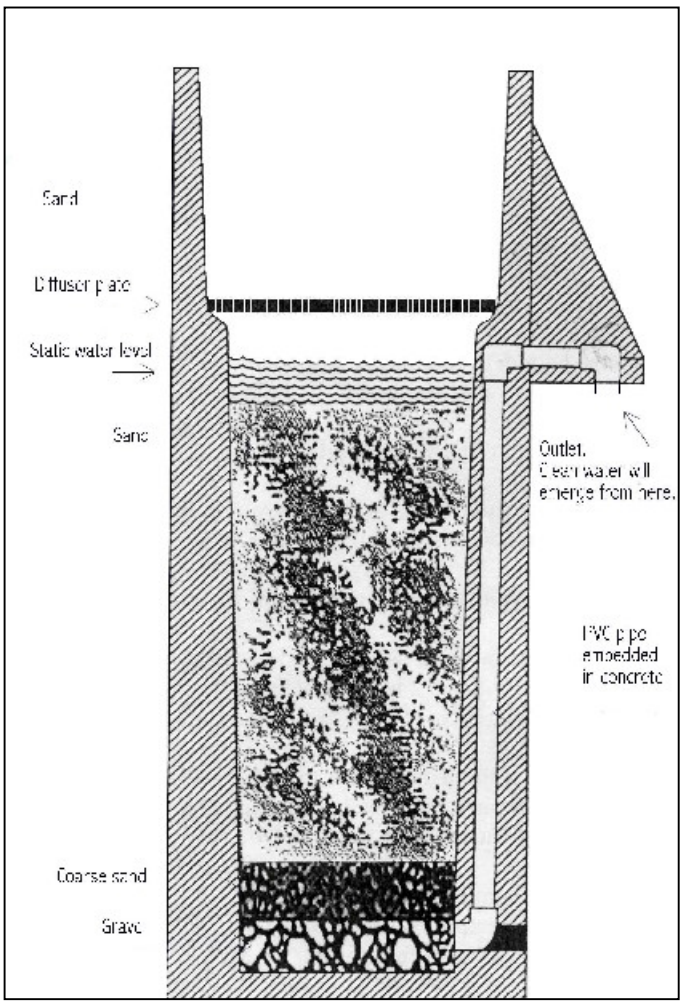
[2] Field tests have shown contamination levels of up to 10 thousand E-coli per 100 ml.

not be fully blamed on the traditional pitfall of introducing in-appropriate, expensive, complex technology or lack of community involvement. There have been instances that much effort *has* gone into dialogue, sensitization and participatory approaches, however it has been a wrong assumption that thus sustainability was automatically ensured.

Individual agenda

Despite the fact that in Africa social relationships are more important than in the West, a high proportion of people has a much higher motivation to look after their own interests than that of the community. A term, incidentally, that implies homogeneity, but in fact often describes no more than a group of widely diverse individuals, each with his own very personal agenda. This often leads to corruption and financial mismanagement of water committees. Individual interests highly complicate any community based approach and often lead to failure in terms of true sustainability.
The sand filter project that the Swiss NGO MEDAIR implemented in Machakos district recognized this fact and, rather than struggling to form community support, made individual benefit the cornerstone of project design.



Technical details

The project introduced slow sand filters, one of the oldest known ways of water purification, of an improved design, first developed at the University of Galgary. One essential design element is the spout near the top of the filter, that keeps the water level automatically two inches above the top of the sand. This creates the ideal environment for the growth of a biological layer (schmutzdecke) containing a variety of microorganisms that play an important role in destroying pathogenic bacteria. Although sand filtration combines a number of complicated physical, chemical and biological processes, this particular slow sand filter is easy to build (one hour work) while maintenance is a simple affair. It should occur when the flow rate drops and consists of removal of or washing of the top 2 inches of sand. River sand with a grain size between 0,2 and 3 millimeters is mostly used as filter material, however quarry sand, burnt rice husk or other media can also be acceptable. A properly working slow sand filter will trap most forms of parasites and solids, while in ideal conditions removing over 99% of pathogenic micro-organisms. Random testing of 110 installed filters showed an average e-coli removal rate of 93%. It has to be mentioned that this average was brought down by 6 samples with a count of less than 80%, caused by owners misusing the filter. Excluding these samples an average removal rate of 96% was established, while in all but 11 cases turbidity was reduced to less than 5 NTU. Except for 17 cases drinking water was produced with less than 10 e-coli per 100 ml – an acceptable standard for most of rural Africa.
Initially, filters were made out of locally available plastic drums. However, people preferred the concrete filters introduced at a later stage, for reasons of durability and because ‘sweating’ through the concrete had a cooling effect on the water.

A year after the first filters were sold and installed, an evaluation team found all units in perfect working condition: clean and very well maintained by the owners. Sometimes the flow rate had dwindled to no more than a trickle, but even this presented no problem to the people, as the daily production still covered their needs.

Introduction strategy

Initially, a few filters were given to the owners of 'hoteli's', local restaurants. This provided an opportunity to display the filters to a wide variety of people. After some time, the restaurant owners were asked to buy the filters, to which most agreed. Through advertising with signboards, public meetings and demonstrations to women/farmer groups additional knowledge of the filters was spread. This resulted in an increased demand, as more and more people placed an order. During the two months, the price for the filter was kept low (6 USD), but once demand grew the price was increased monthly to almost double the initial cost. The material cost of the unit is a little under 6 dollars, thus the sale of filters generated a profit which was used to fully pay for the salary of the so called 'jua-kali' technicians. The added advantage was that, as their income depended on the numbers of filters sold, these technicians spend more and more effort on finding new customers for their product. During periods of low demand (between planting and harvest), the technicians supplemented their income from filter construction by other activities.

No longer ashamed

During the one year that the project was supported by MEDAIR, 401 filters were sold, while another 101 were on order (e.g. deposits being made by customers, but payment not yet completed). This is a remarkable achievement when taking into account that the area was faced with the same drought that extended over most of the Horn of Africa, leading to increased poverty and food scarcity. The willingness of local people to pay for the filters during a period of financial stress is thus a clear indication of their enthusiasm for the units.

Besides the obvious positive effect on health (clearly recognized by most customers), many people had their own reasons for purchasing a filter. "Now I don't have to be ashamed anymore before my visitors, when they want to drink a glass of water", remarked one woman. "this filtered water is clean and doesn't look brown or dirty!" Another lady said that her reason for buying a filter was the fact that "the filtered water tastes better." At a later stage, having a filter became the fashion - one had to keep up with the neighbours – and filters were placed prominently in the sitting room rather than kitchen huts. In almost all cases the filters were kept clean and were very well maintained. The local technicians quickly learnt to use all these arguments for marketing the filters. From a project perspective it didn't matter whether people buy for social reasons or better taste – the health benefits of drinking clean water will be evident. In fact, most families commented during a project evaluation, that the incidence of water borne disease, especially children, had dropped remarkably since they bought a filter. Without exception all owners remained very positive about the units, and most mentioned they would have been willing to pay up to the equivalent of 20-25 USD.

Natural spread of technology

It is now evident that the sand filters have gained a permanent place in the villages. The demand is still present and the technical capacity remains available – what most customers are lacking at the moment is ready cash due to the drought. Thus it is only a matter of time (until after the next harvest) before sales will increase once more.

Meanwhile, the technology has started to spread naturally to villages beyond where the original project was implemented. One day a truck showed up at one of the filter workshops (nothing more than a big tree), and 8 filters were transported to the village of Kitangani, over 60 kilometers away. People there had heard about the filters from relatives, and, having become enthusiastic, were willing to pay for the filters *plus* transport cost. When this happened twice, two technicians put the metal filter mould on a bicycle and started a new workshop in Kitangani. Eventually 5 workshops were opened.

Enormous potential

The real challenge now is to facilitate the rapid spread of this simple technology to other parts of the country. The potential for household sand filtration is enormous in Kenya, let alone the rest of Africa. There are huge areas where no proper water supply exists and water borne disease is endemic. There are no technical hindrances (except in areas where chemical pollution exists). It is however possible that the challenge of raising awareness and interest among donors and NGOs for this technology will be greater than selling the actual filters to common Africans.

However, an encouraging precedent exists. Any new visitor to Kenya will quickly notice the widespread use of ‘jiko’s’, a small cooker made of recycled metal plate with an inner ceramic liner. A jiko uses much less charcoal than traditional cookers. Jiko’s are used throughout the country and seem to have been around forever. It is thus remarkable to discover that the cookers were only introduced less than 20 years ago as a simple, cheap and effective alternative. There is no reason why such future would not be possible for household sand filters.