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PEOPLE AND SYSTEMS FOR WATER, SANITATION AND HEALTH

Community-led improvements to rural water sources

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UP-GRADING OF traditional sources is complementary to high technology options, offering a chance for smaller communities to improve their supplies at much lower per capita cost. Such small changes over a wide area may offer the potential to have as significant an impact on rural people, as the larger steps (boreholes and handpumps) which tend to focus large subsidies on a small proportion of the rural population.

Background

Despite many years of rural water supply provision in Zambia, there are many people for whom a protected water source remains a dream and one unlikely to be fulfilled in the near future. Approximately four million people still obtain drinking water for part or all of the year from unprotected sources, and many of these are in communities which are too small or too poor to justify or sustain supplies such as handpumps on boreholes at present. These are the people who use scoopholes, unlined wells, springs and surface water such as lakes, streams and furrows. Approximately 40% use scoopholes, 40% use unlined wells, 10% use springs, and the remainder use surface water sources.

Research into improvement of traditional water sources (RITS), which is funded by DFID and facilitated by the Department of Water Affairs, has for three years been focusing on this situation. The research has particularly been looking at ways of improving access to safe and reliable supplies through such communities using more of their own capacity in terms of resources, motivation, knowledge and skills.

The research begun by conducting an inventory of existing traditional water sources in selected communities covering 44 rural health centers, in seven districts of four provinces of Zambia namely Northern, North-western, Western and Luapula. Over 1700 water points were covered as a result. This was aimed at giving better insight into existing water sources and the way in which they are used. The focus was on identifying where problems are greatest, what technologies have been most suitable in different physical environments, how many people were using a given source, the factors linked to the highest risks of contamination and least reliability and finally basic environmental sanitation conditions. Qualitative surveys were also conducted to track changes in practices and impacts these had on health and well being of the community, and also to look in more depth at cultural practices and beliefs which affect hygiene behaviour and water use.

The last stage was piloting a range of improvements to existing water sources including different methods of well lining, water lifting devices and also exploration of how best to enable communities with limited resources to improve and increase their supplies. This also led to the development of loan and barter system for payment in kind and the use of seasonal calendars and community mapping, to plan the accumulation of resources for purchasing materials. In piloting, the focus was mainly on testing and promotion of local solutions indicated from demands and initiatives discovered during the inventory and baseline surveys. Along side the technological options, water quality monitoring at source and household level was conducted during the study period aimed at establishing the situation before and after a given source was improved and the main possible sources of contamination. Whilst the pilot projects were, as far as possible, community-led, the establishment of demonstration systems did involve a slightly higher level of outside input, in order that people could see what was possible and could then judge for themselves whether it was something they were interested to do, seeking their own funds, either totally from within their own resources, or by sourcing funds from outside. The same applied to district administration, so that they were able to see whether they could assist interested communities, or felt it was an inappropriate development.

Experiences

Looking at the relative quality of water from different sources, it is apparent that protected sources which comprise lined wells with aprons, drainage, covers, and with communal buckets and windlasses offer, on average, no better quality water than do the scoopholes which many are designed to replace. The latter are shallow water sources with water within arm's length of the surface, but they tend to offer good quality water where run-off is excluded, and turn-over of water is high (often as a result of bailing out of stale water by users) (see Figure 1). In alluvial sands, lining the scoophole with one or two rings, improves the reliability, making the source almost three times less likely to dry up (over 60% reliability) and offering a small improvement in water quality which is already good (70% with less than 10FC/100ml, rising to 75%).

Lined wells do however, offer a significant improvement in water quality over unlined wells, and a slightly higher degree of reliability (12%).

Boreholes offer the best quality water, but there is still a major problem in the country to provide spare parts within

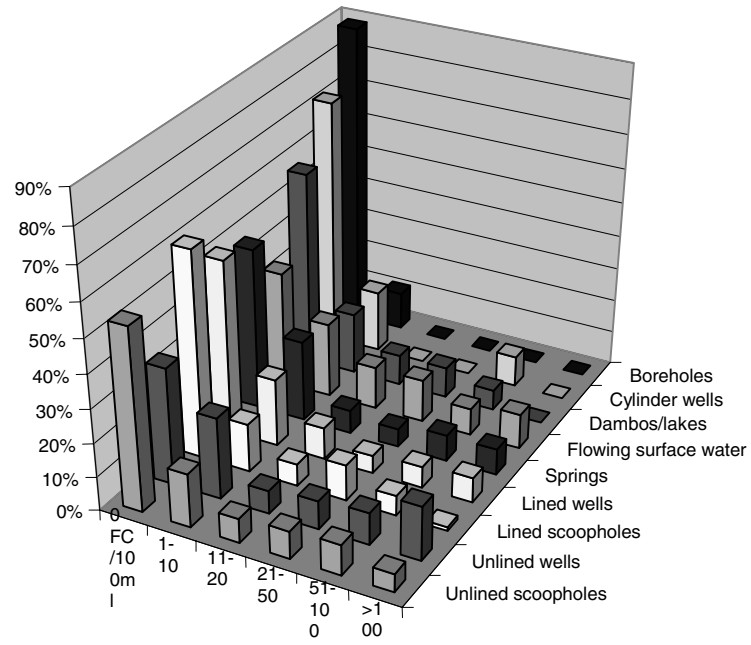

Figure 1. Water quality in different source types

a sustainable, non-project based system and also to provide wide coverage when funding is limited and rural population densities are low.

Unlined wells exist in large numbers, especially in the three northern-most provinces of the country. They provide a convenient supply to small groups of houses, but one which does not always provide a good supply of drinking water. They are more likely to be contaminated than other source types, with some 16% with more than 100 FC/ 100ml in Northern and North-western Provinces. However in Luapula, which tends to be the source of most cholera epidemics, more than 50% of unlined wells were found to be badly contaminated. Despite this problem, they are popular, and allow people to generate income from their supply through brick-making, brewing and vegetable cultivation. Proximity to the house also means the burden of water collection is much reduced. These advantages mean that users are prepared to make a considerable investment in them, paying as much as $300 for their excavation, and being interested to develop them as a more safe and reliable supply.

Pilot projects looking at partial and full lining of such wells suggest that even a small parapet and apron, which keep out run-off and wind-blown dirt reduce contamination by more than an order of magnitude (from 100 or 200 FC/ 100ml to less than 10, and mostly to zero). This requires only one or two pockets of cement. In Zimbabwe, the lining of family wells is now an established alternative, which several thousand families a year are adopting, using bricks. This is not always so suitable within Zambia, but modifications of the system seem both relevant and are regarded favourably by users.

For all sources, the main risk factors were found to be those which were not perhaps the most expected ones. The most influential one was the amount of water in the source. The greater the volume of water, the greater the chance it would be contaminated, apparently because of organic materials in the well which allow bacteria to multiply, rather than die off. Sources which a fast turn-over of water tend to be of better quality, those with slow inflow being less good, as any bacteria on buckets are not quickly diluted. Run-off entering the well is a significant factor, but use of communal buckets, or covering the raised opening of the well appears not to cause a significant reduction in risk of contamination. Lack of handwashing before drawing water appears to be important and is being investigated further.

Pilot projects have therefore looked at small changes to sources, including the lining of scoopholes, use of glass fibre and brick lining of shallow wells, and improved water lifting, using locally made windlasses and low cost pumps.

In summary pilot projects and surveys suggest that the following can be expected from improving sources and increasing their number-:

Demand

Although there appear to be several advantages to improving and replicating existing sources, there were initially strong negative reactions to such an idea, especially among planners and politicians. It was felt that it was a step backwards, not a step-by-step move to progress. However as a) it has been shown to be an approach to fit alongside boreholes and handpumps, not to compete with them and b) it allows

Table 1.

Unlined wells	
Advantages of increasing them	• Convenience- shorter distance for carrying bulk water for washing etc • 'Private' supply, real benefit from own investment • Possibility for income generation from seedlings/veg crops • Improved environment, cool attractive surroundings to house • The first step of several to make a convenient, safe and usually reliable supply • Allows an individual to have control over his investment, and over management decisions
Advantages of improving them	• Improvement in quality so that they can also provide drinking water, user numbers increase • Greater safety, reducing risk of collapse or children falling in • Possibility of more permanent headworks, including windlass or low cost pump • May also improve reliability over time
Improvements which have most impact on quality (Q) and reliability (R)	• Lining (concrete or brick .. or wood) Q+R • Reduction in the water ponded around (having a drain) Q • Ability to abstract more water (windlass or pump) Q (R?)
Scoopholes	
Advantages in increasing numbers	• Reduce queuing • May reduce distance • Allow greater control over use and management
Advantages in improving them	• Improves reliability • Provides cooler water, generally of better quality • Stops insects/small animals from dropping in • Strengthens management • Reduces need to dig and move to sources which are further away in the dry season
Most effective improvements	• Lining (Q+R) • Cover (Q) • Drain (Q) • Bailing

smaller communities to progress and achieve a safer and more reliable supply at minimum cost, and c) user response to demonstration systems has generally been very positive (and especially that of neighbouring communities), attitudes have begun to change. The demand for improvements, especially partial lining of unlined wells, and of scoopholes in sandy areas, has been high. Even with no funding available, some have bought their own cement and several have accumulated sand and crushed stone, or begun to make bricks in the hope that assistance may be available. A few have already organized funds and materials themselves and lined wells with technical assistance from extension workers (EHTs), and one has dug a new well as he has seen that the finished product can offer good water quality and, in his area, reliability. This is as a result of very few demonstration/pilot source improvements. A survey of 12 villages with traditional sources found that 65% of people preferred to improve their existing sources rather than look for a new lined well with windlass (20%) or a borehole (8%) or keep the same source (7%). This arose partly from the number of times they had been passed over for a borehole by programmes which were looking for larger communities which they felt were able to sustain handpump maintenance, and partly from the number of improvements already successfully carried out in the area.

Perhaps even more encouraging is the degree to which district administration has taken up the idea. Three previously defunct DWASHE committees which had no other donor support, have as a result of their involvement in the research, got going again and successfully made proposals and obtained support for source improvement programmes. A further eight have obtained support from donors who are already funding other activities in the sector. Several donors have now indicated a willingness to support such low cost initiatives alongside drilling and hand pump installation, and within government, the three major departments in the sector are all actively supporting the approach.

As a result, low cost improvements are planned to spread widely in the next couple of years. The result will be not just improvements in water quality and reliability, but encouragement to many to construct their own wells close to their houses. These well owners have now seen that, over time, through their own initiative and limited investment, possibly combined with a small subsidy from the district, they can have a very convenient supply which they can manage and improve according to their wishes and means. Other, more communal supplies (springs and scoopholes) can also be improved so that they offer a safer and more reliable supply, but may be more easily replaced by nearer, more reliable communal supplies when funds are available

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