

Maintenance of rural water supplies in Zimbabwe

by Frances Cleaver

User participation in Zimbabwe through Waterpoint Committees promotes handpump sustainability.

THE ZIMBABWEAN rural Water Supply Programme is based largely on the provision of handpumps for communal use. Developments in technology over several decades have helped to ensure that these handpumps are durable and reliable. An effective and efficient system of maintenance is essential, however, if the benefits of the water programme are to be sustained.

For the past few years the participation of users in the maintenance of rural water supplies has been policy in Zimbabwe. It was hoped that this involvement would increase health benefits through the enhanced use of the water source, and would heighten the sense of user responsibility for the water supply. Theoretically this means that through careful, regulated use, breakdowns are minimized and, when they do occur, repairs are performed quickly.

There is, however, some uncertainty about both the community capability in maintenance, and the factors which promote or inhibit it. A recent study undertaken in Zimbabwe which looked at 480 waterpoints and undertook detailed case studies in eight districts attempted to answer some of these questions.

The Zimbabwean system for organizing the maintenance of rural water supplies is a three-tiered one, corresponding to village, ward and district levels. The first tier involves the users in Waterpoint Committees at the local level, usually consisting of four members of whom one or two are designated 'caretakers'. The function of the committee is to ensure the general cleanliness and good use of the pump, to undertake minor preventive maintenance (such as bolt tightening and greasing), and to report breakdowns when they occur. The second tier

consists of a roving Pump Minder, usually equipped with a bicycle and some tools, who provides more technical inputs to up to 50 waterpoints. He is backed up by the District Maintenance Team who have specialist skills, transport and heavy equipment.

Breakdowns

The breakdown history of 480 pumps in the twelve months preceding the study was studied in order to determine the scale of the maintenance task. Case studies of selected pumps provided more details about the factors affecting maintenance. Of the pumps sampled, 53 per cent had broken down at least once in the previous twelve months. At the time of the study 83 per cent of the pumps were deemed to be in working order, but of these about 32 per cent were nevertheless in need of some repair. The higher technology Bush Pumps had experienced more breakdowns than the lower technology Bucket and Blair Pumps.

Pumps which appeared to have a



Heavy use may account for the greater number of breakdowns of Bush Pumps.

high level of usage seemed to break down more frequently than those with lower usage levels. In particular, pumps used for watering livestock and those which served 'multiple' users such as schools, clinics and business centres, broke down the most often.

Perhaps surprisingly, the relationship between the age of a pump and the number of breakdowns was found to be a complex one. Several of the younger pumps had experienced multiple breakdowns while the rate evened out amongst the 'middle-aged' pumps, and only increased substantially among the very old pumps (over 25 years). There are a number of possible explanations for this. One is that in the early 1980s the standards of manufacture and installation may not have been very high, so causing problems in the pumps which were installed then.

There are indications, however, that the level of common purpose and agreement amongst the community may be as important as

technical factors in determining the good functioning of a pump. There is also evidence that community maintenance may improve over time as the people adjust to the technology and learn through experience how to prevent breakdowns from occurring. This could have significant implications for the maintenance system, as there is a delicate balance between giving technical and institutional support to a pump and its users in the first few years after implementation without creating an attitude of dependency.

Community involvement

While communities were found to be participating in manual, technical, organizational, and regulatory tasks, they were rarely involved in any wider decision-making activities relating to the maintenance system and the distribution of water supplies as a whole.

Minor manual and organizational tasks were found to be the predomi-

nant activities of Waterpoint Committees. Manual tasks were related to the implementation, construction and maintenance of headworks, and included providing assistance to the Pump Minder or District Maintenance Team. Organizational tasks included the drawing up of rotas for the cleaning and sweeping of pump surrounds, and the reporting of faults or breakdowns. Waterpoint Committees were more efficient at reporting breakdowns than local people, and received a faster response from the other tiers of the system.

Technical tasks undertaken by the committees included some preventive and corrective maintenance. Although the Three Tier System should ensure that repairs are carried out as far as possible by local level maintainers, it was found that the District Maintenance Teams actually mended the majority of breakdowns. The lower technology pumps (Bucket and Blair) were more likely to be mended locally at village or ward level, but

books

Rural Water Supplies and Sanitation: A text from Zimbabwe's Blair Research Laboratory

Peter Morgan

Macmillan, London, 1990.

250pp. Illus. Pbk.

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Available from the IT Bookshop.

This manual provides detailed information on the technologies researched and developed by the Blair Research Laboratory and others working in the Zimbabwe Ministry of Health over more than fifteen years. Although dealing almost exclusively with technological options, the manual recognizes that well-motivated participants are essential for sustainability. This co-operation has been achieved by using techniques simple in concept and design, and by drawing on experience gained over many decades. The acknowledgements to the many people and organizations contributing to this work bears witness to the depth of support and co-operation for this practical approach.

The Government of Zimbabwe places considerable emphasis on rural development. It aims to provide a Blair latrine for every family and to distribute waterpoints so that each family has access to a protected water supply. This amounts to a total of some 750 000 latrines and 75 000 protected waterpoints by the end of the century.

The section on sanitation is about the Blair Latrine: how it works; how to upgrade the ordinary pit latrine; how to build-on a variety of developments. Some of the improvements covered are the multi-compartment version, school urinals, tank and soakaway versions, and how to add a flush toilet.

After an explanation of underground water, the section on rural water supplies details the building of an upgraded shallow well, (as described in issue 9/3 of *Waterlines*), and how to hand-drill tubewells using the Vonder Rig. Four handpumps are presented, with full descriptions and methods of installation and maintenance: the simple Bucket pump for hand-drilled wells, the two light-duty, PVC-bodied Blair and Nsimbi pumps, and the heavy-duty Bush pump. The latter was first developed in 1933 and is the most important and successful pump in Zimbabwe.

Gravity water supplies are described including protected springs,

wells delivering water by siphon or gravity, rainwater harvesting for domestic supplies, and the design of waterpoints including a simple washing slab. Finally, the water supply section deals with hygiene aspects, drinking-water quality and purification by filtration and chlorination.

As stated in the Introduction to the manual, it is possible that some of these techniques being used in Zimbabwe may have applications elsewhere, but Peter Morgan advises caution. As he says, it is generally far better to take a technology that is well-established in a country and develop it. Nevertheless this manual is an indispensable guide for planners and designers in other countries wanting to develop and adapt their own indigenous technologies, using basic concepts and available resources. The VIP latrine, first built by Blair in 1973 and later developed and refined there, has been adapted in many countries to suit local conditions. Such basic, simple, effective latrines and upgraded water supplies, are vital if the unserved are to be served.

This manual is well-presented and illustrated by excellent drawings taken from a series of Blair field manuals, and makes an important resource book for the library of any planner or fieldworker.

they were not mended any faster than those pumps mended by the District Maintenance Team. In a few cases, communities were found which were taking on substantial maintenance, including the making and fitting of their own spare parts. Significantly, these examples occurred mostly amongst communities in very dry parts of the country where dependence on the protected water supply was great, and where many of the pumps have been in use for several decades. These were also areas which have received few government development inputs in recent years. These communities were undertaking a substantial amount of maintenance on the higher technology Bush Pumps.

Regulatory activities in the form of rules and regulations about the use of the pump were found everywhere. These rules were mostly unwritten but were well-known in the community. They generally divided into three categories. First, there were the rules designed to preserve a limited supply of water, such as the bans on filling drums at the pump, on using narrow-necked water containers, or on watering livestock from the pump when other water sources were still available. Second, there were those rules intended to preserve the good condition of the pump. Examples were the banning of children from using the pump or specific guidelines about how to avoid causing damage through incorrect pumping. Third, there were numerous regulations relating to cleanliness and hygiene. These ranged from the requirement of all users to clean up the site, to a ban on clothes- and body-washing at the waterpoint.

Many of these rules and regulations were ones which applied in some way to the use of traditional communal water supplies, which could help to explain their universality and villagers' familiarity with them. Few communities mentioned specific rules about the obligation of members to participate in water-related activities. It was clear that such an obligation was generally accepted however, as in several communities people were able to list the sanctions applicable to non-participants. Significantly, such sanctions did not involve the culturally unacceptable act of excluding the offender from the use of the water supply. They related rather to exclusion from other village benefits such as communal grazing or drought relief.

Communities were found to be undertaking a variety of tasks, although most activity involved manual labour and regulatory tasks. Users took little part in decision-making about the overall distribution of facilities and the functioning of the maintenance system, and this exclusion was resented, particularly by village leaders. As yet the collection of money for maintenance has not been introduced on a large scale, although some communities had spontaneously done this in the hope of improving the reliability of their water supplies.

Who participates?

The Three Tier System concentrates on the Waterpoint Committee as the focus for community-led activity, but evidence gathered in this study suggested that the form

of the committee is not as important as the existence of a dynamic local leader and a high degree of congruity of interest within the user community. While official policy emphasizes the dominant role of the Village Development Committees as the co-ordinators of all development activity at local level, in reality traditional leaders continue to play a prominent role in water-supply management. They were found to be responsible in many cases for organizing the reporting of a broken pump, for mobilizing people for water-related activities, and for providing material inputs for maintenance such as transport, wooden poles and wire. This is hardly surprising in view of their customary role in the management of communal resources. It does, however, suggest that policy recommendations for membership of committees



Bucket Pumps are simpler and are usually maintainable by the users.



Most communities have rules relating to the proper use of their pumps which are followed carefully.

may actually miss the point where the dynamics of community level activities are concerned.

National guidelines suggest that women should predominate on Waterpoint Committees and explicit provision is made in many districts for at least two women to be on each committee. Such prescriptions are adhered to only in form in many villages, however, and in several of the cases studied the woman was the official member of the committee but in fact her husband undertook all her duties. Men predominated not in numbers, but in terms of holding the posts of committee chairmen or caretakers.

Ownership

A common theory about community participation is that if the community is involved in the implementation of a water supply, they will identify with it and feel responsible for its maintenance. Participation in implementation is therefore thought to have a significant beneficial effect on the sustainability of the project, but the evidence gathered from the case studies suggested that this was not necessarily the case. Generally the users did not identify themselves as

the 'owners' of a pump. The implementing agency was perceived as the owner, and therefore the responsible maintenance agent. Many of those interviewed also expressed the feeling that their contribution to implementation, (usually involving manual labour and the provision of materials and hospitality), effectively paid off any debt they might owe to the provider of the facility. Generally, users felt under an obligation to use the pump properly, but as soon as it broke down it became the responsibility of the 'owner' (usually a government or an NGO). This helps to explain the prevalence of rules and regulations about pump use and the lack of substantial community inputs into corrective maintenance.

Motivation

The higher the level of institutional inputs (often in the form of intensive project activities) in a district, the more likely it seemed that the community would adopt an attitude of dependency and rely on others for even the most simple repairs. This attitude was reinforced where water users were in regular contact with government employees, including schoolteachers and health work-


ers. Young people in particular thought that they should be paid to participate, or at least rewarded in some very tangible way.

While policies aim to promote maintenance through a formal system of committees and levels of organization, these may be insufficient to ensure handpump sustainability. The evidence from this study suggests that among the prerequisites for effective participation of the community were:

- A strongly felt need for a protected water supply.
- A coherent and united user community.
- Expertise gained through the experience of living with the pump.
- A strong, well-motivated local leader.
- A knowledge that government will not provide significant maintenance support.
- The anticipation of some tangible reward.

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