

Improving Community Based Management of Boreholes:

A Case Study from Malawi

Joseph DeGabriele



B A S I S

■ Broadening Access and Strengthening Input Market Systems

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University of Wisconsin-Madison

Tel: (608) 262-3657

Fax: (608) 262-2141

Email: basis-me@facstaff.wisc.edu

<http://www.wisc.edu/lc/basis.html>

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1. INTRODUCTION

It has become a conventional wisdom in policy circles that it is inappropriate to simply respond to people's need for easy access to safe water without considering consequences to sustainability and improved health. A simple "supply driven approach" is able to meet the needs of the rural masses in a speedy manner, but the users lack a sense of responsibility for the management of the water points. The challenge, therefore, is to develop ways to provide sustainable access to water.

The focus of this paper is to examine ways in which the rate of hand-pump sustainability may be improved. The main conclusion is that sustainability is more likely through using good quality products, and by assuring reliable management services are provided by the users. The latter should be backed up by a reliable spares supply chain as well as by locally available mechanics trained in advanced repairs. A hand pump is more valued when the users accept that health and economic benefits result from improved water and sanitation and hygiene education. These factors may contribute significantly towards sustainability, but they are not a guarantee for it. There are several unknowns, such as responsibility, commitment, good-will, how the intervention of water point affects relationships within a "community", and the effect of key individuals on management. The last two points especially needs attention. Organisations providing water-points can bear only so much responsibility for the failure (or success!) of a programme; the users must shoulder their part of the bargain.

The analysis and suggestions presented here are a result of the author's experience with hundreds of user groups for over five years in Malawi¹. As information on the specific implementation activities of other programmes is limited, comparisons are made with general trends in the country that tend to be better reported and documented. Although the discussion is specific to Malawi, it is likely that the situation is common throughout the Southern African region and that the findings and conclusions may be applicable elsewhere.

2. DEVELOPMENTS IN COMMUNITY BASED WATER POINT MANAGEMENT

This section starts with the hopes spelled out at the beginning of the Water Decade (1980) with a review of the lessons learned after ten years. After a brief discussion of the Situation Analysis (UNICEF) and the Malawi Joint Sector Review (2001), we describe the achievements of a Water and Sanitation Programme (Kalembo Groundwater Project) that was implemented in 1995 in order to respond to some of the concerns raised about water. Also described is a programme started in 1999 (the NE Mangochi Rural Water Supply and Sanitation Programme). Although these two programmes have their own shortcomings, the lessons learned in their implementation form the basis for this paper's suggestions for improving people's lives in a sustainable way.

¹ The author wishes to thank the Ministry of Water Development, KfW and GITEC for their encouragement in writing this paper and for permission to use unpublished material.

2.1 International developments since the Water Decade

“In Africa today, over half of the population is without safe drinking water and two-thirds lack a sanitary means of excreta disposal. During the International Drinking Water and Sanitation Decade, 1981-1990, sub-Saharan Africa experienced an increase in water supply coverage from 32% to 46%, while sanitation coverage increased from 28% to 36%. Since then, however, progress has stagnated, and more people are without adequate services in Africa today than in 1990.”²

The World Health Organization declared the 1980's to be the international water and sanitation decade, and set the goal to provide access to facilities for urban and rural masses. A subsequent review of the decade's experience by WHO suggested two main shortcomings. The first was that, despite the concentration of resources on water supply, access to water was barely coping with population growth. Secondly, the intended improvements in health, especially reductions in diarrhoeal diseases, were not realised.

However, there were significant developments and important lessons were learned. First of all, water supply and the need to protect water sources have been given the prominence they deserve. The failure of maintenance (as reflected in the large proportion of broken-down hand pumps) led to attempts to refine the concept of Community Based Management, and VLOM (village level operation and maintenance). VLOM hand-pumps (such as the Afridev) were also developed. Secondly, more attention was addressed to the conclusion that, unless sufficient resources were invested in sanitation and hygiene education, the intended improvements in health would not be realised.

2.2 DRILL, DRILL, DRILL

Although there has been considerable improvement in the rural water supply sector in Malawi over the last decade, the improvement made does not reflect the investments made in capital costs. A common estimate of the total number of boreholes drilled in the country is 20,000. An accurate figure cannot be given because the Ministry of Water Development has been unable to regulate borehole drilling, especially since the 1980's when drilling regulations were temporarily lifted in order to respond to needs created by the Mozambican refugee crisis. Since then, possibly 10,000 new boreholes have been constructed and thousands of others rehabilitated, but this effort has not been matched by a proportional improvement in water supply, and more specifically an improvement in health.³

In part, this is attributed to the huge proportion of boreholes that are non-operational, many of them breaking down within a few months of construction.⁴ The problem has been put into

² AFRICA 2000 Initiative for Water Supply and Sanitation. WHO Web Site: Publication Date: Tue Oct 10 10:10:45 2000.

³ Government of Malawi—UNICEF Country Programme of Cooperation (2002-2006) Water and sanitation Programme Plan of Operations. Draft, Version 3, July 2001.

⁴ In a newspaper article appearing in The Nation of 18-20 August 2001, Ministry and District officials report that an average of 30% of boreholes are broken down, with some Districts claiming as much as 70% of officially known boreholes not functioning.

perspective by the Ministry of Water Development's own community-based management coordinator:⁵

“When communities have been properly mobilised and trained, they are able to operate and maintain their own facilities—indicator: 90% operational and down time is limited to 1-4 days—this contrasts with communities operated by centralised maintenance where only 40-60% (are) operational and down time takes 1 week to one month... There is a huge backlog of training—over 7000 communities (and caretaker teams) have not received training in VL0M (village level operation and maintenance)”⁶

In part, the reason for this scenario is that some policy makers still assume that the solution to water supply problems is to drill more and more boreholes. Provision of other services, such as training, are seen to be a waste of time and resources that could be better put into yet more drilling. There is also the perception amongst implementers that there is much more money to be made in drilling than in training services.

Experience shows that although proper mobilisation and training are essential components to successful management of a borehole, other components are also important. Secondary stakeholders are now more willing to talk about problems within water supply and include poor training in maintenance for water users as well as poor supervision of the contractors as part of the problem.⁷ In addition, there is the realisation that other technologies apart from boreholes and hand-pumps need to be explored. This change in mindset is manifested by the change in emphasis from being “supply driven” to adopting a more “demand driven approach”, as well as the greater importance placed on rural sanitation.⁸

2.3 Situation analysis and national policies

The UNICEF Country Programme highlights both developments and constraints in the water and sanitation sector⁹: The developments include the decentralisation process currently taking place; greater “unity and convergence” within the United Nations system that provides complementary efforts ; stronger partnerships among the government, donors, agencies and NGOs; and a unified approach to sector investment planning. Furthermore, the document states that unless these problems are addressed soon, then future development will continue to be constrained.

⁵ The National Water Development Project also acknowledges that non-functioning boreholes constitute a problem that “greatly reduces” access to safe water. (cf. “Rural Water Supply and Sanitation” (January 1997) and “Community Based Rural Water Supply, Sanitation and Hygiene Education Implementation Manual” (MoWD January 1999).

⁶ CBM Approach to Rural Water Supply. F. Kwaule, CBM Coordinator, MoWD. Paper presented to Multi-sectoral CBM Workshop, 2/8/2000, organised by MoWD.

⁷ The Nation of 18-20 August 2001

⁸ Terms of Reference for Joint Sector Review of the Water Supply and Sanitation Sector in Malawi, Draft, UNICEF, October 2001

⁹ Government of Malawi—UNICEF Country Programme of Cooperation (2002-2006) Water and sanitation Programme Plan of Operations. Draft, Version 3, July 2001. P. 4

According to a broad consensus among government, external support agencies and NGOs, the key constraints are:

- a) Weak water policy; an incoherent sanitation policy; outdated sector development guidelines; ineffective regulations and enforcement.
- b) Low profile of hygiene education, sanitation and life skills development.
- c) Poor hygiene at household level (which is the primary duty bearer).
- d) Low access to safe water and inadequate sanitation in communities, at schools, and health centres.
- e) Poor participation, gender inequity and disparity, no sense of “ownership” of water points and weak capacity of communities to operate and manage them (CBM).
- f) Weak planning, slow implementation rates, ineffective coordination, and weak monitoring and evaluation.
- g) Rapid population growth, inadequate environmental management and unsafe disposal of solid and liquid wastes, and water contamination.
- h) Inadequate and ineffective training of extension workers, communities and families for improved hygiene and WES services promotion.

2.4 Joint water and sanitation sector review

A Malawi Joint Water and Sanitation Sector Review was held in November 2001. During the review key issues and recommendations were proposed. Amongst the issues are:

- a) *Sanitation and hygiene promotion.* Concern was expressed that sanitation and hygiene promotion lags far behind the emphasis placed on water supply. The result is that safe sanitation coverage is less than 10%, and that even areas with good water supply do not experience a reduction in diarrhoeal diseases. It is proposed that a sanitation and hygiene policy be developed with clear strategies for implementation and well-defined schedules and targets.
- b) *Stakeholder coordination.* Lack of coordination and inconsistent procedures and policies cause confusion amongst the user groups. It is recommended that the Ministry of Water Development should ensure and enforce adherence to agreed implementation guidelines.
- c) *Management information systems.* A great deal of valuable information generated by various stakeholders is not easily accessible. This leads to duplication of efforts and wasted resources. The Ministry should coordinate all data relating to water and sanitation.
- d) *Capacity building.* In view of the changing nature of the Ministry from implementer to coordinator, there is need to build up skills required for the new role.
- e) *CBM and ensuring the sustainability of water facilities.* It is recommended that all water supply programmes must implement a CBM component. Furthermore, the spares supply chain must be improved and a system of carrying out advanced repairs must be put in place.

- f) *Institutional arrangements.* In view of the decentralisation now in process with emphasis of resources being controlled at the local level, the roles of the various institutions must be analysed, to consider the appropriate entry point in a community.
- g) *Standards, procedures and costs.* The different standards and procedures used should be reviewed so that uniform standards can be achieved.

2.5 KGP and NE Mangochi Rural Water Supply and Sanitation programmes¹⁰

Although it is acknowledged that there are problems in the water and sanitation sector, it is also acknowledged that there are “successful” programmes from which lessons may be drawn; one such programme is the Kalembo Groundwater Project. The “success” of KGP Groundwater Project can be judged by standardised, objectively verifiable indicators. More than 4 years after handing over the pumps to the users:¹¹

- a) 100% of boreholes have committees trained in community-based management, and 100% of these water point committees are still active.
- b) 100% of boreholes have mechanics trained in village level operation and maintenance.
- c) 97% of pumps monitored are in good operational condition at the time of monitoring.
- d) 3% of pumps had experienced breakdowns in the last 3 months; and the average down time is two days.
- e) 5% of water point committees purchased spares during the quarter. The average amount spent for preventative maintenance was K240 / borehole, and average amount spent on spares for repairing a hand pump was K78 / borehole. The maximum amount spent on maintenance is K1200.00. (K70 = US\$1).

¹⁰ The implementation of Rural Water Supply and Sanitation in Malawi, with bilateral co-operation between the governments of Malawi and Germany funded through the German Bank for Reconstruction (KfW) commenced in mid-1995 with the Kalembo Groundwater Project. Some 375 boreholes with AFRIDEV handpumps were installed. The project ended in mid-1998. The implementing agency for the programme is the Ministry of Water Development. It has employed GITEC Consult of Düsseldorf in Germany to design and supervise the programmes. Monitoring of the Kalembo Groundwater Project started in the third quarter of 1997, and is continuing with each of the 375 water points being visited quarterly.

The first phase of a second programme in the North East of Mangochi District started in February 1999 and aims to provide water and sanitation facilities and health education to more than 16,000 households. Construction of 270 boreholes will be completed in February 2002. A second phase in two adjacent areas will commence late 2001 to serve almost 25,000 households and involve the construction of around 400 boreholes to be completed early 2005.

The total financing by KfW totals some US\$14 million, to serve a population of over 320,000 with 1050 boreholes, health education and improved sanitation for 75% of households.

¹¹ GITEC Consult: Quarterly Monitoring Reports, 2nd Quarter 2001; Kalembo Groundwater Project Health Impact Report, 2001.

- f) 99% of water point committees have a spares fund in hand, averaging K200 / borehole. 99% of water point committees also keep spares at hand.
- g) The mean water consumption for households is 32 litres per person per day.
- h) More than 50% of households have access to safe sanitation.
- i) As users' claim that there has been a dramatic reduction in diarrhoeal diseases as well as in some types of skin and eye infections, this has resulted in the claim that they now value their boreholes more highly. (Claims of improved health need to be verified by using other methods).

In light of this “successful” record, the weaknesses of many water programmes can be attributed to focusing activities on the provision of water supply (i.e., supply driven), without any serious efforts to involve and support the users in the maintenance of the hand-pumps. In addition, the expected health benefits have probably not been realised because of lack of investment in sanitation and effective health education. This is a result of a lack of conviction of the importance of integrating water with sanitation and health education on the part of stakeholders within Government and NGOs, as well as the users themselves.

Although by these indicators Kalembo Groundwater Project can be termed a success there are also shortcomings and these have provided important lessons that have been incorporated into the NE Mangochi Programme. The main issues are:

1. In Kalembo Groundwater Project, sanitation was an “add on”. In the NE Mangochi Programme, water supply, sanitation and health education are more integrated. Health education runs throughout the programme, and sanitation is implemented at least one full year before borehole construction.
2. In many ways, Kalembo Groundwater Project was “supply driven”. In the NE Mangochi programme, the users (primary stakeholders) participate to a much greater extent. This includes their contribution of money, time and expertise, as well as their involvement in borehole siting, sanitation promotion, and construction supervision.

2.6 What is a successful programme?

The questions to be asked are: “What is a successful programme?”, “What is better management?”, and “For what time period does a programme remain under scrutiny?”

In the previous section, Kalembo Groundwater Project was measured under objectively verifiable indicators. Namely, this means that x% of boreholes are still functioning after y years, with downtime of z days. (As noted above, in KGP, these figures were 97% after 4 years with a downtime of 2 days). Diarrhoeal rates should decrease by a significant amount.

It is assumed that if the principles of community participation are employed and the mechanisms of willingness to pay, ability to pay, and the demand response approach are employed, then sustainability is assured. Perhaps, more apt is to claim that sustainability and impact are more likely to be achieved.

In practice, the difference between a supply driven approach and a demand driven approach is not as clearly delineated as is assumed. While many in the sector acknowledge the many failures of a supply driven approach, only rarely are all the ideal pieces in place for a strict

demand response approach. Furthermore, we do not fully understand the wide spectrum of understanding by the stakeholders of the various tools we employ. Take the example of the financial contributions that users make; some groups understand that they have “bought” a borehole, other groups think that the contribution is the sum total of their input and long-term sustainability should be in the hands of the government, while others see it as a way of showing their intention to assume responsibility. Other groups will readily say and do whatever the programme wishes in order to get the facilities they want, without any deep conviction. The very word “stakeholders” makes an assumption that may not be valid, as people may not necessarily agree that they have a stake in the outcome of an intervention.

The gray area between supply and demand-driven approaches is more apparent when it comes to sanitation and health education. This is because considerably fewer people consider them useful as compared with a water point.

“Success” is not always as objectively verifiable as we would like to believe. First of all, how do we know that we are measuring the right indicators, and giving each indicator appropriate weight. Secondly, there are some factors that may be crucial to the sustainable management of a borehole that we are not aware of or do not fully understand. How do we measure goodwill, conviction and long-term commitment during implementation? What is the role of “the key” individual or individuals who hold everything together? It also has to be borne in mind that changes in the factors that have been holding everything together to make the programme a success for some years may cause a breakdown in the activities. This may be due to a sudden unavailability of spares, a large increase in the price of spares, the removal of a monitor, a rift amongst the users, or the construction of another new water point nearby.

Despite all these limitations, we have to proceed with confidence, providing services to the best of our ability, and allowing the users to manage the boreholes in their own way, bearing the consequences of their decisions.

The next section outlines those areas that may contribute to better community-based management of boreholes.

3. SOCIAL FACTORS THAT CAN CONTRIBUTE TO BETTER COMMUNITY BASED MANAGEMENT OF A BOREHOLE: A MALAWIAN CASE STUDY

The focus of this paper is to examine those factors that can contribute to the better management of a borehole. As such, the discussion is limited to borehole technology, and excludes other technology choices such as hand dug wells, rain water catchment, piped schemes, and so on.

To date, the author has experience in mobilising, sensitising, training and working with over 625 user groups in Malawi. Of these, 375 user groups in Kalembo Groundwater Project have managed their boreholes for more than 4 years, while 100 user groups (in NE Mangochi) have managed their boreholes for about one year. In addition, the project team has shared information with other people working in the water supply sector, a practice that has been part of our learning experience. This experience has been valuable in designing the current phase in Mangochi. The following pointers appear critical.

1. There should be the involvement of the users at every stage, as far as possible. Of necessity, this should include a long lead in time before construction begins.

2. There should be adequate supervision of the drilling contractors to ensure quality construction.
3. The hand pump installed should be of certified quality, in order to avoid frequent and expensive repairs.
4. Spare parts for the hand-pump should be available.

It can be noticed from this list that the responsibility for ensuring a successful programme lies both with those entrusted with the “hardware” (technology) and with those entrusted with the “software” (institutional and social organization) of the programme. An important aspect of both KGP and NE Mangochi has been that technical staff (the water engineers) and those involved with the users (the Community participation and health education staff) have made an effort to understand each other’s’ role in the programme. In NE Mangochi, this integration has reached the point where both departments consult each other on most issues.

This section discusses the social factors, while the next section looks briefly at the technical issues.

3.1 Involvement of the user groups

There should be involvement of the users (the primary stakeholders¹²) at every stage, as far as possible. Generally, this “involvement” should follow the principle of subsidiarity. The users should assume as much responsibility as possible during the implementation and for the subsequent management of the water point. In brief, nothing should be done for the users that they can and should do themselves. In particular the users should be equipped for this responsibility by being trained in management of the water point as well as in repairing the pump. In the long term, improvement in health status and health education can also contribute to better management.

3.1.1 Target actual users

Although the Ministry’s Implementation Manual stresses the “need to use existing institutions and organisations at community, district, regional and national levels”, the reality is that some of these structures are weak. For example, the District Assembly has shown little interest in Programme activities ever since feasibility studies began in 1997. Of the 90 Village Health and Water Committees formed in TA Jalasi, less than 50% are still in existence, and most of these are involved in Under-5 Clinics.

In many cases, training is not provided to users at a local level because most of the funds are used by personnel at the national and district levels (i.e., secondary stakeholders). Although these people are involved in policy, they are not involved in day-to-day management.

One of the observations made during the Joint Sector Review was that “it is important to consider the appropriate entry point for organisations into a rural community so as to avoid duplication of services”.

¹² As defined in the DFID Guidance Manual (1999), p. 4, the primary stakeholders are the intended users of facilities, while secondary stakeholders are government, NGOs, private sector, etc.

The practice of the programme has been to work with and strengthen the groups who are most likely to benefit from a functioning borehole, and who stand most to lose from a non-functioning one. These are the users, those individuals who make use of the borehole. In addition, the programme works with structures such as the Area Development Committee, the Village Development Committees, who include the Village Headmen, as well as the recently elected Ward Counsellors, but these are local people who are also borehole users.

Of course, the users need support, and this is where training local area mechanics provides an alternative to the (largely non-functioning) District Maintenance Team. In addition, the programme is involved at an informal level in trying to rationalise the spare parts supply system.

In Kalembo Groundwater Project the users were involved in a variety of processes and activities, from siting of the borehole, providing community based management and village level operation and maintenance services, as well as security during the drilling and construction operations. They also played an essential role in hygiene and sanitation activities by assisting in hygiene education and in the distribution of sanplats.

In the NE Mangochi Rural Water Supply and Sanitation Programme the users are required to be involved to a much greater extent (see the Water point level agreement form, Appendix A).

The process is as follows:

- a) After a period of mobilisation and informing people about the programme, potential users form themselves around a proposed site, in groups of approximately 60 households (250 people). As about 270 groups were involved, this took a considerable time—up to 12 months were needed to brief people properly.
- b) The user group elects a water point committee of 10 adults. Most groups do this within one month.
- c) The users hand over a contribution of K3000 (c. US\$40) and sign a contract with the Project. About 40% of the groups are able to hand over their contribution within 6 months, while another 50% make their contributions within a year. The remaining 10% take their time!
- d) The users are mobilised at household level in order to qualify for a sanplat¹³. Each household must have a properly constructed pit latrine, hand washing facilities, a bathroom, a clothesline, a rubbish pit, and a dish rack. Registration of households and distribution of sanplats is done by the water point committee members.
- e) Attending training sessions without being paid allowances.
- f) Clearing of borehole site and access road.
- g) Supervision of drilling and construction activities, as well as security of plant and materials.
- h) Preparation of water point and installation of the hand pump.

¹³ A sanplat is a precast, reinforced concrete slab, measuring 60cm x 60 cm, with a drop hole and cover, and can be retrofitted into either an existing or new pit latrine structure.

3.1.2 Involvement of the users from the beginning

The initial involvement of the primary stakeholders—that is those people who are likely to use the water—is essential if they are to use and manage the facilities properly.

The user group generally forms itself and is identified by a common willingness to work together to have a borehole constructed in their midst, as well as to contribute to its proper operation, management and maintenance. In general, user groups are more easily identified in rural settings away from public settings. When the user group is too big or too generally defined, there are problems in the proper operation and maintenance of the pump. When the hand pump belongs to an institution (for example a school, church, mosque, health centre or market), nobody “owns” the pump. The likelihood that someone will take on the responsibility for its management is poor. On the other hand when a pump is used by a well-defined group, the group usually denies access to outsiders either by locking the pump or else by providing a bucket and cup for outsiders to use, which reduces unnecessary pump wear.

A case study illustrates the point. In 1996 a borehole was constructed in Kalembo Groundwater Project, with a committee trained in CBM, In 1999 another borehole was constructed about 50m away to serve the needs of the day school; this borehole broke down after 2 days and has not been repaired as the breakdown is of a serious nature. The headmaster is unaware who constructed the borehole as he was not involved in any decision-making. The school has made an agreement with the water point committee of the “KGP” borehole to use the new borehole and to assist in its management and upkeep. Despite the very heavy use of the borehole, down time due to repairs and maintenance has been kept to a few hours. The lessons are: (a) responsibility for the borehole has to be clearly defined, agreed upon and shared; (b) strong leadership is required to negotiate with authority figures, in this case a headmaster.

3.1.3 Long lead in time

In Kalembo Groundwater Project, the consultant has maintained a presence in the area since 1995, and still maintains a low-level presence through the monitor. This presence is essential in building up a relationship with the different pump users. However, one of the weaknesses of the Kalembo project was that borehole construction activities started within weeks of the start of implementation, and sanitation activities started towards the end of the construction. Kalembo suffered a short lead in time.

In the NE Mangochi the programme was active in sensitising, mobilising and implementing the hygiene and sanitation component for over a year before the first boreholes were even drilled. As this programme is more demand driven and requires a financial contribution from the users, it was realised that trust needs to be built up with the people living in 100 or so villages and representing more than 270 potential user groups. It would not be accurate to say that the relationship with each group is good, but a relationship has been established to the extent that the programme team knows the “character” of each group. Outreach and training can then be modified to suit the needs of particular groups.

It takes a long time to build up trust, and although at first sight this trust is fragile, it can often endure difficulties. For example, as the programme demands so much input from the users, it is very vulnerable to other supply driven programmes that seem to give boreholes free of any input. During January 2001, a religious organisation drilled 20 boreholes near mosques in the

programme area. Each borehole was labelled as “a donation” by this organisation. It was expected that those groups living near these donated boreholes would lose interest in the programme. It was surprising however, that water point committees still handed in their contributions. Later on, people around these boreholes commented that by observing construction activities, they concluded that these boreholes were of poor quality and would not last. It is interesting to observe that users have a tendency to attribute borehole sustainability to quality of construction rather than to their own management activities.

The down side to a long lead in period is that both potential users and District personnel become impatient with the apparent lack of progress in borehole construction, if the perspective is supply based. Yet during the 12 months prior to construction the number of homes with safe sanitation¹⁴ went up from less than 2% to more than 60% and all households had been exposed to basic hygiene education.

3.1.4 Siting of boreholes

The rationale for a water supply programme is that as many people as possible have uninterrupted access to sufficient quantities of safe water for as many years as possible. In order to have a significant health impact the quantity of water people use may be even more important than the quality of water. To increase the quantity of water used, both distance and waiting time at the pump should be kept to suitable minimum levels. (International guidelines recommend a maximum population of 250 people per borehole and a maximum walking distance of 500 m.)

From people’s point of view, easy access to safe water is the number one priority. If the borehole is inconvenient for them they will not bother to use it, and people will not contribute towards its upkeep.

In KGP, a geological assessment of the overall area indicated that hydro-geological siting of individual sites was not essential. Therefore, the siting was done on purely demographic and environmental grounds. Briefly, after determining the number of boreholes required in a village, the village head and his representatives would be briefed on the required procedures and after wider consultations would provide their recommendations on suitable sites. The community participation and health education team then verified that wider consultations had actually taken place.

In NE Mangochi, the hydro-geological situation is more complex and it was assessed that borehole siting had to be done with a detailed hydro-geological study. In order to provide some level of choice for the population, as well as to have back-ups in the event of surveyed sites proving dry on drilling, about 480 sites were surveyed for a potential total of 230 new boreholes. Beacons were placed marking all 480 of these potential sites. After being informed on the programme goals and requirement, the people in the area were then asked to group themselves into 60 households around a suitable beacon in order to form a user group.

In general, this approach has worked well but there have been some problems. In marking out sites for hydro-geological surveying, it is very difficult to spread the sites out according to

¹⁴ Safe sanitation means the safe management of human faeces and in particular means the appropriate use of a pit latrine installed with a sanplat.

population densities. In a later phase, the approach will be modified, with a reversal of sequence. People will be asked to form themselves into user groups, and then the hydro-geological team will survey the site area with input from the users.

The exercise of borehole siting can put a lot of strain on the working relationship of the users, those involved in working with the user groups, and the technical team. The users obviously want the most convenient access, and although some groups accept hydro-geological limitations, some groups or individuals do not. In addition, groups may be divided on where they would like the borehole to be sited. The technical people have their own legitimate considerations: rock formation, drilling depth, probability of finding water, water quality. The software group not only have to negotiate these sometimes conflicting requirements, but they have to ensure that the rules of environmental sanitation are observed, and most importantly that consensus about the site has been reached in a fair way.

3.1.5 What is the demand for a borehole?

Of course, nearly all people in rural areas want a borehole, so that they can have convenient and easy access to safe water. Nevertheless, this does not necessarily mean that they are willing to confront problems of social organisation to obtain a borehole. The question is “how hard are people prepared to work to resolve their differences and overcome obstacles to achieving their aim of a borehole?” The answer to this question will determine if it is appropriate to introduce a demand response approach.

For example, in some villages people are so divided that they cannot put aside their differences and work together in order to initiate a borehole programme. Very often, these differences arise out of disputes over land or influence going back several years; sometimes these disputes have manifested themselves as witchcraft accusations. In other cases, people are afraid of confronting traditional leaders who refuse to allow boreholes to be drilled in their village. Village headmen have occasionally refused boreholes to be drilled in their village because they expected a bribe from the drillers (normally reported to be K10000). Another aspect to consider is the ownership of the land on which the borehole is to be drilled. Owners have refused to allow drilling because they don't want crops growing at the time to be destroyed. People may have different priorities. In one village, people refused to contribute towards a borehole fund, but contributed larger sums of money to hire a group of traditional healers to expose witches living amongst them.

In NE Mangochi people have worked hard in order to achieve their goal of having an accessible borehole and in most cases they have confronted and convinced those who have opposed them. The difficulties groups have encountered are usually reported during the training sessions for the water point committee.

3.1.5 Demand Response Approach

Although many organisations take the view that DRA is simply a case of organisations responding to communities' demands, the issue is complex and difficult. One presentation at Joint Sector Review highlighted the difficulty of gaining “a definitive definition of DRA and this is perhaps an indicator of the confusion that this subject causes globally”.¹⁵ In a survey of

¹⁵ Sugden, S. “The Community Based Rural Water, Sanitation and Hygiene Education Manual—Is it Working?” Paper presented at the Malawi Joint Sector Review, Lilongwe, 2001, p. 11.

eleven Government, NGOs and private sector organisations involved in the sector the author concluded that there seems to be “a consensus ...that if there is a high demand in a community for a water point then the likelihood that the water point will be maintained is increased.”¹⁶ Although there is an intuitive truism to this statement, “demand” has to be addressed, assessed or measured, despite the complexity.

During the introduction of Demand Response Approach and the implementation of the NE Mangochi Programme, it was observed that DRA has the following elements:

- a) The basis of DRA is the acceptance by the users that it should take as much responsibility as possible for their own welfare. This includes decision-making, contribution of money, time, activities, and knowledge. “Response” in DRA should be concomitant with “demand”, (like freedom and responsibility).
- b) A contractual approach. There should be a solid, written agreement, with a response approach—you do this—then we do that.
- c) The users should be treated as adults; this means that they bear the positive and negative consequences of their decisions and actions.
- d) DRA is an empowering tool in itself—users are able to gain knowledge and experience in making decisions and being responsible for their own lives. DRA can be looked at as not only being instrumental but also transformational.
- e) The users themselves should be empowered / sensitised to identify those few individuals who are “negative” and to try to either bring them round or neutralise their influence. This can be one of the biggest challenges of a project.
- f) The realisation that people have different goals, motives, and ideas. In DRA it is better to treat people as user groups to whom one is promoting / selling a concept and services, rather than as a “community” with a unified goal and vision, as this is rarely the case.
- g) Development has to come at a cost to all parties concerned. There is no such thing as easy or painless development. This means that a project has to be able to learn from its mistakes as pointed out by the users, and the users have to accept a share of the responsibility.
- h) Interactive approach between the participating parties: the restrictions under which a project works (e.g., financial, time frame, capacity, technology, terms of reference) and what people want, need, are prepared to work for etc.
- i) A distinction between what people want and what people need—and these don’t always coincide. The test is how much they are willing to put into something. Since the response to boreholes was 97%, to sanplats 75%, to health education 30%, the response is inversely proportional to the input! There is also a problem with perceptions, namely, that villagers judge that boreholes are more important than sanitation or education. Thus, demand also has to be created.
- j) DRA does not mean giving people what they want, but it means promoting / selling a concept and services to people. Sometimes the services have to be promoted in opposition

¹⁶ *ibid.*, p. 12.

to “free development”. The benefits of a project using DRA have to be obvious in comparison with these “free projects”. Our experience shows that people do make these distinctions.

- k) Confidence that the people want the services offered to them—i.e., that the concept is good, with good quality services, etc. Also confidence that people will pay a price for these services. This confidence has to be bound in reality: e.g., a solid feasibility study, good personnel, on going monitoring and evaluation, continuous supervision, continuous dialogue with users.
- l) Confidence by the programme in the abilities and potential of the users to participate and make use of the services provided.
- m) Honesty—people should not be forced or bribed into participating with a project. If they choose not to participate, this should be accepted by the project. A programme can still continue to sensitise; i.e., to promote its services.
- n) DRA comes in stages: From the author’s experience in Jalasi, approximately 20% respond immediately, 50% respond mid term, and 25% are latecomers—once they see the services being implemented, they are afraid to miss out! Less than 5% will not respond and probably won’t sustain a borehole anyway because of internal wrangling, etc.
- o) Contributions in kind are insufficient to measure demand. Financial contributions have the added advantages of (a) testing the cohesiveness of the group (b) their willingness and ability to contribute towards the maintenance of the pump. For this reason, the contributions have to be well spread out between participating families and not a handful of households. The contribution should be presented before commencement of construction.
- p) DRA makes the programme accountable to the users from an early stage. Many user groups put pressure on programme staff when their expectations were not fulfilled, for example drilling of dry holes, rehabilitation of existing boreholes, low yielding wells, turbidity in the water. In some cases the driller had to go back to redevelop the borehole to acceptable standards.

Although some form of demand is essential in order to increase the likelihood of sustainability, there should be other mechanisms that can ensure that the user group have the material and human resources to manage and maintain a borehole.

3.1.7 Is there the capacity to sustain the borehole?

One aspect, which is often overlooked, is the *social cohesion* of the group. Some level of cohesion, that is social solidarity or sense of common interest, is important for the day-to-day management, operation and maintenance of a borehole. Not only are people (mostly, women) required to wait in an orderly fashion at the pump, they often have formal and informal regulations about expected behaviour and expected contribution of labour and money. In general, the maintenance of social cohesion is stronger when there are no outsider users, for instance, from institutions such as schools and health centres.

It should not be taken for granted that a group of people has the internal resources, common interest, or sense of solidarity to either initiate action or sustain the management of a facility. Sometimes a group can reveal its lack of cohesion from the planning stage, and this does not

bode well for the long-term life of a borehole. Allowing the groups to form themselves means that there is more likelihood that it is a cohesive unit, as people who are deeply estranged or have nothing in common are unlikely to form a group in the first place.

It is also important to ensure that the users, as a group, have sufficient financial resources to purchase the necessary spares; it can cost about K3000 to repair a major breakdown.¹⁷From the outset, the potential user group should be made aware of the costs of operating and maintaining a borehole. In this way, they can make an informed decision about the technology that is appropriate for them. However, it can also help them to decide which water supply activities should be restricted: brick moulding, tobacco nurseries, etc.

The question has to be asked: if a group is unable to afford the up keep of a hand pump, should they be given one, knowing that it will remain un-repaired at the first breakdown?

It is not realistic to expect that 100% of the adults in the user group will participate in all activities. Experience teaches that what is important is that there is at least a small group of dedicated people (the key individuals) who continue working on the management of the water point despite lack of input by the other users. The most important role of the majority of users is to provide financial contributions to the maintenance and the daily care of the borehole.

In our experience of over 260 user groups in NE Mangochi, we have not come across any group which claimed not to be able to afford to make a contribution, but there have been questions of willingness to contribute. Most often, the focus stays on whether a group of users has sufficient funds, and while this is an important consideration, it is not the only one.

The financial contribution of K3000.00 (about US\$40) goes along way to identify the following:

1. The cohesiveness of the group.
2. Willingness and ability to overcome difficulties.
3. Their organisational ability.
4. Their basic trust.
5. Adequate financial resources to maintain the pump.
6. The group is more likely to reach a consensus on having the borehole.

For these reasons, we try to verify that the contributions have come from a sizeable cross section of the user group. In some cases, families present contributions on behalf of other families on the understanding that once the borehole is constructed, the money should be repaid, as well as a fine. The main reason that people are unwilling to pay their contribution is that they do not trust the programme to construct the borehole, or do not trust the WPC members collecting the money.

Despite the effort made in explaining the reasons behind the financial contribution, there have been other interpretations, including:

¹⁷ The K3000 contribution is based on the estimated annual cost for the long-term maintenance of an Afridev handpump. The MoWD Implementation Manual, on the other hand stresses that the contribution should be 5% of the construction costs of a borehole.

1. The programme is corrupt because it is selling boreholes.
2. The contribution is a requirement in order to have a borehole that should have been provided free of charge in the first place.
3. Making a financial contribution is as much as the users would like to participate; thereafter maintenance should be carried out by the programme or by the government.
4. The group has bought the borehole for a bargain price (K3000 is about 1% of the construction costs).

One of the constraints of the programme is that people are sometimes unable to group themselves into 60 households or 250 people, because of demographic (scattered households) or social reasons (conflict or animosity). Constructing borehole facilities for very small groups is considered uneconomical and small groups may also be unable to afford to purchase the more expensive spare parts when they are required.

Some exceptional circumstances have been observed. Rural economies tend to be seasonal skewed, with money being available after harvest, while during the farming season money is scarce, as food stocks are low and all the spare money being invested in farm inputs (e.g., seeds, fertilizer, labour). In such cases, some user groups show a sign of their intention to participate by starting the contribution with a undertaking to complete it after harvest. Other groups take out loans from wealthier individuals in the community, again repaying after harvest. A careful study of such known transactions suggests that (unlike cases of direct contributions) the autonomy of these user groups is preserved, with the creditor claiming neither interest nor preferential treatment during borehole siting.

It should not be assumed that the initial contribution automatically guarantees the sustainability of the borehole in all circumstances. The users' ability and willingness to sustain a hand pump depends on many variables, and the contribution is only an indicator of ability and willingness. Breslin¹⁸ makes a valid and powerful point that one should not assume too much from the initial contribution, but he overstates his case in saying that it is not a meaningful indicator because he fails to make a sufficient analysis of the other variables, including the availability of spare parts. Indeed experience across the border, in Malawi, shows that there is a point (or threshold) where the contribution does become a meaningless indicator, but this has more to do with the degree of damage and the inability to absorb large costs. For example, if a pump rod breaks and is available, users are able to afford the purchase a replacement (cost about \$30), but if 10 rods are stolen, then \$300 is usually beyond the capacity of most rural user groups.

3.1.8 CBM—Community Based Management

CBM is the term in common usage that denotes a level of management, operation and maintenance of the facility by the users themselves.

The concept of CBM shares ideological roots with the *comunidad de base* of the 1970s Liberation Theology Movement in Latin America. The key words are a bottom up approach whereby theory is evolved by the praxis of the *base* (the community). It also has emerged out

¹⁸ Ned Breslin, Lessons from the Field. Update Series: Maua and Nipepe. WaterAid Mocambique, January 2002.

of the shift to participatory development since the late 1970s. The strength of this ideology is that it goes to the base. That is, the theory should be formed from observable practice. A weakness is that observable practice tends to be over generalised in order to construct models with which the theory can be formulated. The reality then has to fit in with the constructed model.

Practical experience shows that it is better to avoid the term “community” for several reasons. There is no equivalent term in the local languages, or any expression carrying the same nuances as in English (or Latin). The term community can have idealistic connotations that simply do not exist in real life situations. Village life often consists of a collection of individuals, households or families, who are not homogeneous, and often have very different ideas, aspirations and interests; they may also be on bad terms with each other. A serious consequence of this is that information is not passed on, because it is seen as a means of holding on to power (“knowledge is power”).

Although in most cases people can put differences aside in pursuit of common goals, this does not always happen. In a few cases, the owner of a plot of land on which a borehole has been designated has not been willing to give it up this land. It has been reported that some households have chosen not to participate in some or all activities involving a borehole. In two villages, the headman decreed that his family is to be exempt from borehole management duties such as contributing funds and routine sweeping.

By the time these problems are reported to the programme, they either have been solved or have reached a point where a solution by consensus is not possible. It is interesting to note that some traditional leaders will resort to issuing a decree (on the basis of “common good”) if attempts through dialogue have failed. However, given the current political dispensation, the authority of many traditional leaders is not as strong as it once was.

The preferred term in the programme is not “community” but “user groups”, whether individuals or households. This term also happens to be one with which people identify themselves in matters referring to a borehole. Literal translations of these terms include “those who drink water from here” and “those who contribute money” (initial payment or maintenance fund). These terms are synonymous, as those who do not contribute are not allowed to use the borehole; access is controlled by prohibitions and locking of the hand-pump.

3.1.9 Training of users promotes better management of the water point

Evidence suggests that some borehole programmes invest no effort in training, while those that do invest in training often fail to target the actual users. An overview of 126 existing boreholes in three Traditional Authorities in NE Magochi in 1997 and of 89 boreholes in two Traditional Authorities in 2000 reveals that both management and sustainability are dependent upon (a) formation of committees and (b) the training of the user groups. From the results, it can be observed that of those water points where no committee has been formed or trained, only 10% of the boreholes are adequately cared for in terms of maintenance and environmental sanitation. When committees have been formed but not trained, the percentage of adequately maintained boreholes rises to 20%, but when a committee is formed and trained, it reaches 50%.

3.1.10 Water Point Committees

At the heart of the programme is the water point committee. This is a group of 10 adults, chosen from amongst the users to manage the water point. The typical ratio tends to be 6 women to 4 men. In practice, only a handful is very active, but this is enough. Training is one half-day orientation followed by two full days on water point management. Usually three committees participate in a training session. During the training they are able to share their experiences and expertise in problem solving.

The course outline includes the following topics:

- a) *Review of experience.* Members report their experience in informing their neighbours about the programme, mobilising them to contribute money for the borehole and to improve household level sanitation.
- b) *Problem solving.* Members report how they solved problems or give advice to other committees on how to solve problems.
- c) *Managing money.* How to mobilise people to contribute maintenance funds. How to save funds. How to purchase spares and account for expenses.
- d) *Operation and maintenance.* The correct method for operating a hand pump. An overview of village level operation and maintenance course (which 3 or 4 of the members of each committee will attend). The importance of routine maintenance.
- e) *Hygiene education.* The importance of hygiene in reduction of diseases. Basic personal, household level and environmental hygiene. This is a “training of trainers” course and the members are expected to give informal training to their family and neighbours.
- f) *Conducting meetings.* When to call a meeting. How to conduct a meeting.
- g) *Record keeping.* Keeping records of meetings, of pump breakdowns, spares purchased, funds spent.
- h) *Sanitation.* The importance of sanitation in reduction of diseases. How to promote household level sanitation through the provision of the sanplat and the construction of other facilities. Maintaining environmental sanitation at the water point.
- i) *Monitoring.* How to monitor activities and interventions.
- j) *Action planning and evaluation.* How to plan activities involving the users. Evaluating the impact of their activities on the management of the water-point and on sanitation.

In putting almost all its training resources and capacity building into the water point committee, the programme can be reasonably sure that the users will benefit directly.

However, a commonly reported problem is that there is a poor relationship between the committee and the users in general. Committee members complain that most users are reluctant to perform maintenance duties, while users are inclined to think that the committee should take sole responsibility for management.

3.1.11 VLOM—Village level operation and maintenance training

Three, sometimes four people chosen from amongst the water point committee are trained for 2 days as pump mechanics. In addition there is a follow-up over the duration of the

programme where their skills are assessed and they are supervised in doing maintenance and repair work. The two-day training session follows the following syllabus:

- a) The role of the caretakers in relation to the water point committee and the pump users.
- b) Identification of the components of the Afridev pump, especially at installation.
- c) Identification of the fast moving parts of the Afridev. To help in the purchase of spares. Sourcing of spares and pricing. Importance of buying from proper outlets.
- d) How the Afridev works. How pumping action causes lift of water. Use of transparent cylinder to visualise valve motion.
- e) Hygiene at the water point: during use and during maintenance.
- f) Common faults with the Afridev. This includes proper pumping action to avoid problems. Over use of the pump. Problems that are compounded due to neglect.
- g) Routine maintenance:
 - (a) Theory. Why routine maintenance is important—to save down time and money.
 - (b) Practice. How to do routine maintenance (without dismantling and with dismantling) and how to anticipate problems.
- h) Faultfinding.
- i) Repairing of faults. How to repair common faults. How to avoid poor repairs.
- j) When to call for the area mechanic. When the water point committee needs outside assistance; i.e., repairs beyond the scope of village level operation and maintenance.
- k) Record keeping. The importance of keeping records of routine maintenance, faults repair and purchases.

During the training, the water point committee is issued with the necessary hand tools and fishing tools required to undertake village level operation and maintenance.

This training is part of a process and is followed up by supervised routine maintenance during which the mechanics are required to dismantle and reassemble the hand pump in order to evaluate their competence and the effectiveness of the training.

3.1.12 Area mechanics

Although all water points have at least three people trained in VLOM, some pump repairs such as replacement of riser mains and the pulling out of dropped components are beyond the capacity of the pump mechanics.¹⁹

In order to increase sustainable pump operation and reduce down time, the programme developed the concept of the area mechanic.

In considering the provision of services for this level of support, it is important to consider affordability. Lack of funds for fuel or allowances means that the District Maintenance Teams are frequently delayed. Even if the maintenance teams are privatised on a cost recovery basis, rural users will not be able to afford their prices if vehicles are involved.

¹⁹ SKAT manual, section 14

In KGP, several local people identified as having above average aptitude in VL0M were trained during a one-week Area Mechanic course. These area mechanics receive no support from the programme but are trained on the understanding that they would set up their own small business and charge the users for their services, typically K100 (say \$1.50) for labour, and transport. After five years only two mechanics are in frequent demand, with one of them doing the vast majority of repairs, and this is enough to service the whole area.

Within the last four years, the area mechanic in KGP undertook major repairs at more than 20 boreholes. In addition, he has been called to repair boreholes in other Districts. In the same period, the District Maintenance Team did not undertake any repairs in KGP. This clearly shows both the importance of setting up a system for repairs that go beyond village level operation and maintenance, as well as planning for its sustainability.

Apart from hand pump faults, the other reason for the majority of breakdowns is the silting up of boreholes. In order to meet this need, the author is currently developing a hand-operated bailer that can be used to desilt a borehole. Once it is developed, borehole desilting may become part of the area mechanic's operations.

3.1.13 Health education

The health education programme focuses on personal hygiene and household level sanitation, as well as environmental sanitation. Points include knowledge of transmission routes for diarrhoeal diseases as well as for bilharzia (schistosomiasis), and worm infestation. Use of adequate quantities of borehole water (30 litres per person per day) is also emphasised, as well as hand washing after using the toilet and before handling food. Safe disposal of faeces by using pit latrines installed with sanplats forms a major part of the programme. The programme aims to facilitate the process of people taking responsibility for their own health and welfare through the simultaneous provision of basic information and facilities.

The process of education takes place in three phases. During mobilisation, the emphasis is on people taking responsibility for their own health. One way of accepting this responsibility is by participating in the programme and presenting a contribution.

During the second phase the emphasis is on the need to improve sanitation at household level in order to reduce diarrhoeal diseases. Water point committee members are trained in water point level hygiene and provide the mobilising input. In this phase, the aim is to improve the infrastructure - that is those household facilities that can promote a change in behaviour. The programme provides a good quality sanplats to those households with a pit latrine, a bath shelter, hand-washing facilities, a clothes-drying line, a dish rack and a rubbish pit.

After the hand pump is installed (the third phase) there are several health education sessions conducted at water point level. During these sessions the importance of the link between convenient access to safe water, safe sanitation and health education is re-emphasised. However, the programme is at a stage in which it can draw upon people's direct experience.

The rationale for this part of the process is an outcome of a study carried out in January 2001 assessing the health impact of the KGP. All of the focus groups reported that it has taken several years for people to experience the health benefits of a fully functioning borehole, as well as the sanplat and health education. This positive experience is one of the motivations of the users for putting effort into the maintenance of a borehole.

In NE Mangochi, people are aware of the importance of drinking safe water in order to control diarrhoeal diseases, but the low level of knowledge of the importance of other behaviour such as hand washing at critical times and safe disposal of faeces are challenges taken up by health education.

It should be stressed that health education is not a simple matter of passing on information, as people's attitudes have to be considered. A certain tact is required to avoid resentment, as some people feel that behind health education there is an implicit criticism that they are somehow inferior. This feeling has roots from the colonial era, as well as the time of one party rule when attempts were made to enforce behaviour change (notably latrine construction) by the imposition of fines.

3.1.14 Health impact

One of the main reasons for investing in water and sanitation programmes is to reduce the incidence of water-related diseases, especially diarrhoea, and skin and eye diseases.

The mechanisms for interrupting disease transmission and improving people's health can be summarised as:²⁰

- a) Provision of safe water.
- b) Increasing water consumption.
- c) Improving domestic hygiene practices.
- d) Safe disposal of human faeces.

Although this is well accepted, problems remain in quantifying or assessing the health impact due to the intervention of a programme. The usual methods are health statistics and proxy indicators.

Health statistics (generated at Health Centre level) are not easy to interpret.

Most recent literature²¹ recommends that health impact studies and health indicators are an unpredictable tool for the assessment of the health impact of a water and sanitation programme. As health is a function of many different variables, not always related to water, sanitation and hygiene practices, it is sometimes impossible to isolate the effects of individual variables. Furthermore, health impact studies are unable to offer any guidance on how an ongoing programme may be improved.

Proxy indicators are commonly used to measure those facilities that are assumed to improve health, such as access to water and sanitation facilities. The limitations of these proxy indicators are that access to facilities does not guarantee their (proper) use.

²⁰ (Esrey, et al, WASH Technical report No. 661990)

²¹ e.g., Almedom, AM, Blumenthal UJ, Manderson L. (1997) *Hygiene Evaluation Procedures: Approaches and Methods for Assessing water and Sanitation related Hygiene Practices*. London: Intermediate Technology Publications. Cairncross, S. (1999) Measuring the health impact of water and sanitation. WELL Technical Brief 10.

Other indicators, which measure use of facilities and behaviour change, can be developed. Such indicators include per capita water consumption, sanplat installation, faecal smears in latrines, construction of additional household level sanitation facilities, etc.

Another tool, which does not quantify health impact, but assesses people's perception of their changed health status are participatory methods such as interviewing key informants and focus group discussions.

During the evaluation of the health impact of Kalembo Groundwater Project in January 2001, although it was possible to interpret the statistics either way, there was a triangulation between proxy indicators, behaviour change indicators, and the participatory methods. The consensus among users consulted was a dramatic reduction in incidence of diarrhoea in adults, a reduction in the incidence and severity of diarrhoeal bouts in school aged children, and a reduction in the severity of diarrhoea in under fives. Reports on the incidence and severity of other diseases such as bilharzia, scabies and trachoma were mixed.

During this evaluation, many respondents spoke about the new value placed on a borehole due to improved health. When challenged on emphasising the borehole, most of the respondents claimed that "sanitation and hygiene education would not have come without the borehole". It appears then, that perceived better health stimulates better management and use of facilities.

3.1.15 Economic impact

During the above-mentioned evaluation, some participants in the evaluation of health impact stated that another added value to the borehole was the impact on economic and social status. Economic impact was a result of improved health, as well as time saved in collecting water, and other activities such as brick moulding, tobacco seedlings, and vegetable gardens. The impact on social status was a result of appearing more confident due to better personal hygiene. The effect of this "added value" on borehole sustainability and community-based management needs more study.

3.1.16 Fieldworkers as trainers

Experience in KGP taught that using the services of Government employed extension workers is not very effective. Apart from having unrealistic financial expectations, the quality of work is often very poor, and their performance and availability for programme work very difficult to control.

Criticism is sometimes voiced that by not utilising the extension workers available on the ground, then activities will not be sustained when the programme terminates. This is not the case because, once the programme terminates, the extension workers will not engage in activities unless some organisation pays them allowances over and above their salaries. There is also the question of supervision. Instead, sustainability should be invested within the users and by controlling the quality of training provided by company employees this can be more readily attained.

All training activities in NE Mangochi Ground Water Programme are carried out by 12 fieldworkers who are directly employed by the programme. Recruitment is done locally and they speak the local (tribal) language. They are provided with on the job training and supervision is at the ratio of one staff member to three fieldworkers. During the last two years,

their performance has been very good and they have been exclusively available for programme activities.

3.1.17 Ongoing monitoring and evaluation

The training and education of the users is an ongoing process with different phases having different objectives. In addition, many of the different user groups have different abilities and different needs regarding water point management and household sanitation. Of particular concern is the low level of literacy amongst adults, particularly among women. This is taken into account during the training programmes that are conducted in their own homes in as informal way as possible. One of the challenges experienced by trainers is to encourage people to participate actively by sharing their own experiences with each other. Trainers are encouraged to monitor their own performance during training.

The programme conducts regular monitoring of all programme activities and outputs in order to evaluate the effectiveness of the various training activities. Various tools are used to conduct the monitoring. For example, by observing the problems users have and the ways that they deal with issues, we can evaluate our programme policy as well as the water point committee training. Mechanics are observed during repairs and routine maintenance to evaluate the village level operation and maintenance training. Household surveys are conducted to evaluate the effectiveness and impact of health education.

4. TECHNICAL ASPECTS THAT CAN PROMOTE THE BETTER MANAGEMENT OF A BOREHOLE

Although the emphasis of this paper is on those “software” aspects that can promote the better management of a borehole, feedback from the users strongly suggests that quality of construction and pump quality are essential aspects in promoting sustainability.

It can be argued that some programmes with no CBM component, and using non-VLOM pumps, such as the JICA water project in North Kawinga, are reported to have a very good rate of sustainability (in this case 84% reported as functioning after 10 years). However, this should be seen as the exception rather than the rule as some programmes with no CBM component are not so successful.

The aim of this section is not to go into technical details, but to argue the point that building up the capacity of the users without a good quality product is nonsense.

4.1 Good quality construction of borehole and head works

Given the large investment of time and money in constructing a borehole, as well as its importance in providing water to people, it is essential to construct it to proper specifications for it to withstand the use of many years. During training, the Water Point Committee is advised of the main factors that affect borehole quality, and the members are involved during the construction. The construction process is also supervised by professional staff.

In view of this experience the Ministry of Water Development is undergoing an exercise in building up the capacity of its Water Monitoring Assistants in order to supervise borehole construction activities on its behalf.

The importance of proper professional supervision cannot be overemphasised. The Ministry of Water Development has rightly complained that drilling companies sometimes omit writing the name of the company and the borehole number on the headworks. During an evaluation of 89 boreholes in 2 TAs, only in 8 was it possible to identify the drilling company.

4.1.1 Depth

A borehole of sufficient depth to reach the aquifer usually ensures that it is not subject to drying out due to seasonal variations, as is the case with surface water. It is our observation that people tend to abandon boreholes subject to seasonal drying more readily when they break down.

4.1.2 Construction

A properly constructed borehole of adequate depth, with a good gravel pack and a sanitary seal is not only more likely to last than a poorly constructed one, but the water is less likely to be contaminated with minerals or pathogens.

4.1.3 Pump testing

This determines the yield and recovery rate of a borehole and indicates if a borehole can meet the users' needs. Lines of women, or even more ominous, rows of buckets left unattended at a borehole usually indicate that the borehole does not produce water in sufficient quantities. This can jeopardise people's health, as they are in a situation where they resort to unprotected sources, apart from the wasted time represented by the long wait.

4.1.4 Development

A properly developed borehole ensures that the water is of good quality, and is largely free from sand and other sediments. Developing a borehole properly also ensures that it has a long life, as it is less likely to be clogged up by sediments. In addition, the pump down hole components are subject to less wear.

4.1.5 Testing for water quality

Although it is important to conduct bacteriological and chemical tests for all boreholes in order to determine the quality of the water for human consumption, water quality does affect the sustainability of a borehole.

Users usually judge water quality on the following criteria: taste, absence of sediments, suitability for bathing, cooking and doing laundry. It is nearly always assumed by users that borehole water is safe, and this can lead to a false sense of security. Firstly, bacteriological tests indicate a worrying proportion of boreholes contaminated by faecal matter.²² Secondly, many people assume that good hygiene and sanitation practices can be dispensed with, as long as one drinks borehole water.

When the borehole produces water of unacceptable taste, the borehole is often abandoned immediately. However there are exceptions, when users use the borehole water for personal and household hygiene and obtain their drinking water from another source. In such cases,

²² Article in The Nation, 19th April 2001.

some value is placed on the borehole and the users put some effort into its care and management.

The importance that users place on the sensory aspects of water quality can create some difficulties. People who draw clear, nice tasting water from an unprotected well proven to have high levels of faecal contamination, may be disinclined to accept the evidence and may even refuse chlorination as this spoils the taste of the water. It should not be assumed that incidences of diarrhoea are always related to a particular water source, especially as households frequently have access to multiple sources.

4.1.6 Head works

Strong head works contribute significantly to the sustained use of a hand pump. Sometimes the quality of construction is so poor that the pump head shakes in its foundation. In other cases, waste water drains back into the borehole, with the risk of introducing contaminants into the borehole.

4.2 Good quality hand-pump

Although it is quite normal for the components of a hand pump to require replacement at some point, there is quite a difference between good quality pumps and those that are not up to standard. In practice, users who are trained to do so, are prepared to put time and money into the upkeep of their pump. If the pump is subject to constant break down because of poor quality, then they may be unlikely to persevere, especially for the more expensive components.

Those involved with the users need to be aware of the qualities of the Afridev hand pump as it is the focus of management activities.

It should be pointed out that the pump recommended for shallow wells is the Malda Pump, which is also VLOM. There are also other good quality pumps which are not, however, VLOM. One such pump used to good effect by JICA is the Vergnet pump, with 84% still functioning after 10 years.²³

4.2.1 The AFRIDEV pump

In the interests of uniform technology, the Afridev hand pump is the hand pump recommended by the MoWD for deep well installation.

Afridev is a generic name with the design being public domain. Although most Afridev pumps imported to Malawi are manufactured in India, there are several companies manufacturing Afridev pumps, such as Ajay, Inalsa, Karnataka, etc. The large-scale manufacture of Afridev pumps in India means that they are able to produce them cheaply (fob price, c. US\$180). Very often, these “manufacturers” actually source out components. Some components have literally hundreds of small-scale informal suppliers, presenting a problem with both quality and quality control.

²³ JICA presentation during the 2001 National Joint Sector review. 164 boreholes in North Kawinga were installed with the French made Vergnet foot pump.

This means that not all Afridev pumps are of equal quality. In addition, we were told by one manufacturer that batches of pumps or components that have failed the quality assurance test of pre-shipment inspections sometimes find their way to countries or contractors that do not require such inspection services. Inspection ensures that pumps are manufactured to standards and tolerances as specified by SKAT.

4.2.2 Problems with the AFRIDEV pump

The Afridev is inherently designed to be a village level operation and maintenance pump. It is also designed to be easy and cheap to manufacture, considering its intended use. It is basically a very good design, and when the components are of good quality it can provide 2 or 3 years of service without the need for replacement parts (usually low cost items such as U seals, bobbins, plastic bush bearings, etc). Even then, after many years, major components do not need replacing.²⁴

It is said that the design life of the Afridev pump is 7 years²⁵, but experience shows that with good training, routine maintenance and the availability of parts, this is easily extended by many more years.

4.2.3 Riser mains

The plastic riser mains are an integral part of the Afridev pump. Although repairs to the riser mains are beyond the scope of village level operation and maintenance, problems associated with poor quality manufacture or installation can prevent the pump mechanics from conducting even routine maintenance, in which case a pump may have to be abandoned. If the riser mains have internal high spots, then it may be impossible to remove the plunger and foot valve without removing the entire riser mains this is a major operation. Another problem with riser mains can occur if the joints are not properly made during installation. In this case, the mains can break when an attempt is made to remove it for repairs.

Making repairs on the riser mains involves keeping the timing of the pump to the original setting. Repairs involving the removal of the riser mains are often referred to the District maintenance teams. However, as with many Government departments, these are not functioning effectively. In order to enable the users to be independent of Government services as far as possible, Area Mechanics are trained by the project to deal with all repairs affecting the riser mains.

4.3 Availability of pump spare parts

Even good quality hand pumps are subject to normal wear and tear, so spare parts should be reasonably available. Without the availability of spares, the Afridev can no longer be called a village level operation and maintenance pump. In addition, non-availability of parts can lead to the theft of pump components.

²⁴ P. Hankin's article, based on a study of 375 hand pumps operating over a period of 5 years (web site: <http://www.lboro.ac.uk/wedc/conferences/index.htm>), gives a comprehensive outline of some of the problems experienced with the Afridev pump, and suggests some solutions.

²⁵ Verbal communication from SKAT participants at HTN workshop, Hyderabad, India, March 2000.

Fast moving parts include “U” seals (K15 each, 186 sold in KGP over a 30 month period) and “O” rings (K15 each, 42 sold); bush bearings (K186 a set, 48 sold); rod centralisers (K40 each, 40 sold); as well as pump rods (K1600 each, 25 sold); fulcrum pins (K559 each, 12 sold); hangar pins (K468 each, 6 sold); and riser mains (K900 a length, 21 sold).

4.3.1 Unavailability of spares

A few years ago, a system was set up for the procurement, importation, and distribution of Afridev spares. Chipiku, a national wholesale chain with 90 outlets throughout the country, most of them in the rural areas, agreed to take on the distribution on a cost recovery basis. UNICEF made the initial procurement, handed the parts over to the MoWD, that, in turn, handed them over to Chipiku. The system was to operate as a revolving fund. Nevertheless, after only two years the system collapsed and there were no longer any fast moving spares in the Chipiku stores. Chipiku management²⁶ confirmed that they have the interest and the capacity to undertake spares distribution on a national level, so what went wrong?

Several assumptions and miscalculations were made:

- a) In the initial purchase, it appears that there was *no relationship made between the purchase order and those component parts that are in demand*. SKAT gives some guidelines on the life span of fast wearing parts as well as the required quantity of slow moving parts for a 5-year operation (SKAT manual, pages 68-69). In addition, there is now a database that can also be used so that some sort of relationship can be established (c.f. Hankin).
- b) It was assumed that *a revolving fund involving the government actually works*. In fact, it is well known that once a fund is paid into a government department it requires nothing short of a miracle to get it back. The system failed not because of a failure by the distributor, but because there was no subsequent procurement.
- c) It is assumed that *users are reluctant to pay for spares*. In fact, we have found out that users are willing to pay reasonable prices in order to have access to safe water. From October 1997 to March 2001, over 420 items of spare parts have been procured by the borehole users in KGP, with several purchases of over K2000 worth of spares.
- d) It is assumed that spares have to be *available within the shortest distance* possible. Indeed, some management within the public sector have expressed concern that the Chipiku distribution system is inadequate. In fact, given that parts for a particular hand pump are not required very frequently somebody is always prepared to travel a reasonable distance to purchase the spares. Many user groups are concerned that if spares are made available to small scale entrepreneurs (e.g., grocer stall, vendors, etc) then an illicit market in stolen parts would develop making their own hand pumps vulnerable to theft.

Attempts have been made to rectify the situation.²⁷

²⁶ Since October 2001 Chipiku is under new ownership.

²⁷ “Private Sector Involvement”, paper presented by K. Banda, UNICEF, at Malawi Joint Sector Review of the Water and sanitation Sector, November 2001.

- a) The Ministry of Water Development is to supply directly to Chipiku District depots. It is difficult to see the rationale behind greater public sector involvement in the distribution, given their poor performance to date.
- b) Local companies have started to manufacture some fast moving parts, such as the nylon bush bearings. The question has to be asked whether they can compete on cost, and whether other fast moving parts can be manufactured locally.
- c) Hardware and General Dealers (part of the Press Conglomerate) have decided to venture on a trial basis, ordering directly from the manufacturers. Success will depend on market demand. They have a smaller distribution network than Chipiku.
- d) The National Water Development Project has engaged two local companies for the supply of hand pump spares; this is on three-year renewable contracts. These suppliers would then have to find outlets.

Given the assumption that prices need to be kept low, Government controls the price of spares. If the profit margins are too low, then there is little incentive for private enterprise to become fully engaged. It is encouraging to see public-private partnerships. Since a spares supply chain may have to be subsidised in some form or other for some years to come, it will be interesting to see how Hardware and General Dealers' fully private venture will fair.

4.3.2 An interim solution

The author recognised that a sustainable spare parts distribution network was not yet well developed, so 10 years worth of spares were procured at the start of the programme. In KGP, one man is responsible for the sale of spares to the 375 user groups; he is also responsible for long term quarterly reporting.

If the initiatives discussed above do not result in a sustainable spares supply chain at a national level, contingencies will have to be set up. This may involve church based groups active in the area. Advantages may include a long term presence; non-profit oriented; ability to order directly from abroad; access to foreign exchange; and a desire to increase their profile in development activities. Two such groups have been identified and they have good accounting procedures and proven capacity to manage a rotating fund.

Incidentally, the spares are available at only two outlets, both near to existing Chipiku stores.

The weakness of this approach is that it depends on the presence of the author (or similar project manager) in the area.

Obviously, a long-term solution needs to be found which ensures that the required spare parts are readily available at prices that are affordable to the users.

5. FACTORS THAT MITIGATE AGAINST COMMUNITY BASED MANAGEMENT OF BOREHOLES

General concerns about the poor performance of the sector have been highlighted. There are enough examples of unsuccessful water supply programmes to draw some conclusions. These characteristics can be classified roughly into "attitudes" shaped by poor thinking, lack of information, or self interest, and "practice" which can be motivated by these attitudes, as well as a lack of commitment, or fear of upsetting powerful interest groups.

The Ministry of Water Development can play a crucial role in ensuring that the required standards are enforced.

1. *Ideological entrapment.* In trying to construct theoretical models, policy makers try to shape practice to fit theory, rather than the other way round. Too many assumptions are made and terminology is often used in an uncritical way, such as the use of overly general concepts such as community, participation, sustainability, ownership, cost recovery, demand driven, willingness to pay, etc. This can lead to lip service, with Donors, Government, NGOs and other service suppliers deploying the language for appearance rather than results.
2. *Politicisation of water issues.* There is a pattern of boreholes being used by political parties as vote winners, by NGOs to legitimise their existence, to solicit funds and raise their profile, and by religious groups as a means of proselytising²⁸. Decisions on sites for new boreholes are sometimes left in the hands of the local Member of Parliament or religious leaders without recourse to people's needs. Consequently, people's perception that water sources should be provided free of charge and subsequently maintained for them is reinforced. When boreholes are used as bait, the approach is more supply driven than demand driven. A frequent consequence is poor installation and poor maintenance. Another consequence is that there is little emphasis on sanitation and education. If the MoWD and the Districts are empowered in their coordinating role, there is the possibility to curb this abuse.
3. *Dispersal of funds.* Unfortunately, some donors and agencies are more concerned about end of year balances than impact. As boreholes are expensive, they are a quick way of dispersing funds.
4. *Little or no real importance attached to sanitation and health education.* As a result the impact on health is not as good as it could be, yet investments in sanitation and education are less capital intensive.
5. *Vested interests.* Public officers have direct or indirect interests in borehole drilling and construction companies.
6. *Poor quality drilling* (depth and construction), poor civil works, poor quality hand-pumps, Poor supervision during construction. Verification exercises that a borehole has been constructed to specified standards are not enforced and indicators to evaluate long-term impact are not developed.
7. Little or no meaningful *consultation* with the potential users.
8. No training or poor quality *training*. Although training in CBM is recommended, it is not enforced, and the standards are not monitored.
9. Unavailability of *spare parts*.
10. Centralisation of repairs. If the users are unable to repair their hand pump, they are referred to the District Maintenance team who often take a very long time to respond.

²⁸ For example, The Lamp, November - December 2001, page 22-23.

6. GUIDELINES TO BETTER COMMUNITY BASED MANAGEMENT OF BOREHOLES

Guidelines to a more successful approach are not merely the converse of unsuccessful approaches. Probably the most important aspect is a change in attitude of those formulating policy, allocating funds and implementing activities. Most of the improvements can be carried out at no cost, and considerable cost savings can probably be achieved as well. In addition to the considerations discussed in section 2, the following guidelines should be considered during the policy, design and implementation phases.

6.1 General guidelines

1. The importance of a positive attitude by Government, donors, NGOs and implementing agencies that is results oriented.
2. A pragmatic approach that puts people before ideologies (which often have dubious foundations). Experience shows that one cannot rely on just one strategy or single model to achieve the required objectives, but rather use a variety of tools and strategies in response to the realities on the ground. This requires an approach that is sensitive to the fact that people and groups of people are not homogeneous, and that the interaction between a society and a programme is very complex. Models can be drawn out of experience, but care should be taken in applying them.
3. Taking the broad picture and integrating human development (attitude change) with water provision, sanitation and health education. Water supply projects often fail because they are supply driven.
4. Radical decentralisation. Programmes implementing change should be allowed to follow the most direct paths to achieve an effective programme and the government institutions should support the work of a programme. In many instances, the attitudes and demands of civil servants and government institutions can negatively affect progress of work. Most of capacity building should be directed towards user groups.
5. In projecting implementation costs and estimating cost effectiveness, the final equation should be based on an estimate of the number of boreholes that are still operational after (say) ten years than the number of working boreholes handed over.
6. Enough time should be allocated to sensitise and mobilise potential user groups, to develop a relationship with them, and to do long term monitoring.
7. Confidence of the implementing agency in the importance and quality of the service it is offering. This is important in maintaining a consistent approach in the face of opposition from some stakeholders. This can be assisted by drawing up of contract between the implementing organisation and the different user groups—this leads to a more honest, transparent and consensual relationship.
8. Once the decision is made to implement a development programme (and not an aid programme), the human and material resources that the users can and should provide are to be taken very seriously. Long-term progress is based on this foundation of willingness and ability to pay. The role of financial contributions as a catalyst for change should be appreciated. This follows the principle of subsidiarity wherein activities should go to the

most basic level, that is, nothing should be done for the users what is within their ability. Although this is time consuming because of the prevalence of paternalism in development, it eventually gives the users a sense of responsibility and confidence in their own abilities.

9. Involve the users at all stages. Listen to the users and observe what they do. Training geared to the needs of adults and user groups. A dynamic and flexible approach—frequent monitoring, evaluation and change, as well as realising that user groups are not homogeneous.
10. A good quality product. This can best be achieved through the efforts of the technical staff. The integration of services and activities of the technical staff and those who work with the users is essential in providing a service that is sustainable. Water supply and sanitation is about people managing an infrastructure; both the infrastructure and their management have to be of the best possible quality. Vendors and provider of services should take a long-term look and realise that it is in their interest to provide a good quality all round service. The market for “software” services will probably increase in the future, and may even reach the value of “hardware” services.
11. Back up services which can carry out advanced repairs.
12. Availability of spares.
13. Ongoing monitoring of the performance of and by the trained user groups. Users who realise the health and economic benefits of the water points, sanitation facilities and behaviour change are more likely to sustain the causes of those benefits.

6.2 Problems encountered

Calling the paper “a more successful approach...” rather than “a successful approach...” is an attempt to introduce an element of humility to the discussion. I am aware that success is a relative term that depends on who makes the criteria; the indicators; as well as the time element—for how long is a water supply programme to remain under scrutiny? Therefore, success has to be put in relative terms.

It is this very relativity that provides the framework for many of the problems that our programme has encountered. Given the poor performance of the sector in general, it takes time for people to overcome their scepticism. The users ask: “Why should we put so much effort in for nothing at the end?” Civil servants may ask: “Why is the consultant taking so long to start drilling boreholes while other organisations can do it in days?” or else, “Why should we do our work when we do not get the kick backs other agencies can offer us?”

In trying to work with integrity, and without patronising the users, the programme exposes itself to a lot of opposition, some of which can be overcome in time with the building up of trust with the users and authorities alike. Over the years, people are beginning to recognise that our efforts do yield results and we are getting positive feedback and recognition.

With the strengthening of democratic institutions, even those powerful groups whose self-interest at present militates against success will need to be more accountable.

7. CONCLUSIONS: LESSONS FOR POLICY

In trying to formulate a policy that can lead to more success in the water supply sector than presently experienced, the following recommendations may be borne in mind:

1. The implementation of integrated water supply with sanitation and health education programmes should be a matter of policy. This integration should extend to the services provided by technical staff and those working directly with the users.
2. A framework that excludes the use of water supply as a short-term political tool, and the exclusion of companies that have a conflict of interest. In part this can be done through the sensitisation of the users that access to a sustainable water supply and good health are not favours but rights to which they have concomitant responsibilities. This can have a profound effect not only on development issues in other sectors, but on building up a more mature understanding of democracy and the rights and duties which can be agreed upon.²⁹
3. Some donors are more interested in providing funds and initiating water supply programmes without being too concerned about impact. In fact many donors by-pass the MoWD. A code of conduct can be developed to ensure that donors initiate, implement and assess programmes in accordance with the country's own legitimate goals. In some cases, pressure to use up grants has led some organisations (e.g., Malawi Social Action Fund) to drill new boreholes besides broken down existing ones.³⁰
4. The current debate on development issues as a human right can be useful here³¹. Although the inclusion of water supply and sanitation, or more broadly the right to health, is still under debate, the author promotes "the right to quality service". That is, once funds have been allocated for the provision of services, for reasons of human solidarity, political goals, religious proselytising, or because of human rights themselves, we believe that the users have the right to demand the best quality service commensurate with their participation.
5. There should be full involvement of the users, especially in water point management and pump repairs. Time frames should accommodate this.
6. The development of indicators is needed which can be used to evaluate the mid-term and final performance of programmes. These indicators can be used to evaluate economic viability and efficiency of different programmes in the long term.
7. The development of a spare parts procurement and distribution network.

²⁹ Government of Malawi—UNICEF Country Programme of Cooperation (2002-2006) Water and Sanitation Programme Plan of Operations. Draft, Version 3, July 2001, p. 6.

³⁰ Government of Malawi—UNICEF Country Programme of Cooperation (2002-2006) Water and Sanitation Programme Plan of Operations. Draft, Version 3, July 2001, p. 7.

³¹ The Economist, August 18th-24th 2001. Special report on Human Rights which argues the merits and practicalities of including economic and social rights as human rights.

APPENDIX A

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Annotated abbreviations

- Afridev: A hand pump evolving from other hand pumps, specifically designed for village level operation and maintenance, that is that they can be maintained using basic skill, a few hand tools, and easily available spare parts. In practice, this means the removal of down hole components such as foot valve and plunger without removal of riser mains.
- CBM: Community Based Management
- CPHE: Community Participation and Health Education
- DFID: British Department for International Development
- JICA: Japanese Development Agency
- KfW : German Bank for Reconstruction
- MoWD : Ministry of Water Development
- RWSS: Rural Water Supply and Sanitation
- Sanplat: a sanitation platform, made from reinforced concrete, with a smooth surface and a drop hole with a close fitting cover. Its size (60cm x 60cm) allows it to be retrofitted into an existing latrine.
- SKAT: Swiss Centre for Development Cooperation in Technology and Management
- TA: Traditional Authority
- UNICEF : United Nations Children's Fund
- VLOM: Village level operation and maintenance
- WHO: the World Health Organisation

APPENDIX B: USER—PROGRAMME AGREEMENT FORM

**MANGOCHI RURAL WATER SUPPLY AND SANITATION
PROGRAMME**

MINISTRY OF WATER DEVELOPMENT

BOREHOLE USERS - PROJECT AGREEMENT

We,Village Headman, andPump Committee Chairman of..... Village, on behalf of the BOREHOLE USERS, have discussed with the community the information provided by MWD and the Programme and that they understand the conditions for applying for a new borehole or the rehabilitation of an old borehole. The people understand that this is a community-based the Programme and that it will take the lead in all decision making. In order to ensure an adequate supply of water and the economical operation of the hand pump, the number of households making the application is We understand that this application does not guarantee a borehole.

We certify that these households have applied for:

- construction of a new borehole, or the rehabilitation of an existing borehole
- improvement of household sanitation.
- improvement of health education.

We agree to the following:

1. Form a democratically elected and gender balanced Pump Committee (attached list of members).
2. Contribute K3000 to show commitment in participating in the project, before the borehole is sited. Once handed over, this contribution cannot be refunded.
3. Participate actively and provide leadership in all phases of programme implementation.
4. Participate in the improvement of sanitation facilities at each household by constructing a pit latrine with sanplat, hand-washing, bath shelter, clothes line, rubbish pit, dish rack.
5. Participate in improving the health status of the people by learning about relevant disease transmission routes and how to prevent diseases.
6. Help select and clear the site for the borehole, and clear access roads.
7. Provide security for the plant and equipment during construction.

8. Supervise borehole drilling and civil works contractors.
9. Construction of a soak away pit according to the Programme specifications, including the provision of materials to construct a fence, and the supply of banana saplings.
10. Take full responsibility of management and maintenance of the hand pump and the surrounds
11. Participate in community mobilisation and training events without expecting allowances from the Programme.
12. Assume ownership and full responsibility of management and maintenance of the hand pump and the surrounds.

The Programme shall provide the following:

1. Technical expertise to suggest the most promising site, taking into account the population distribution, other adjacent boreholes, and issues which can affect sanitation.
2. Construct or rehabilitate the borehole, build the apron, drain and washing slab.
3. Expertise, skilled labour and materials for the construction or rehabilitation of the borehole, apron, pump stand, and wash slab.
4. Afridev hand pump.
5. Training in organisation, leadership, financial management, hygiene education; hand pump operation and maintenance.
6. A sanplat to qualifying households.

On behalf of Pump Users

Signed.....(VH)

On behalf of the Project

Signed.....

Designation.....

Signed

(Chairman of Pump Committee)

Date.....

APPENDIX C: REVIEW OF OLD BOREHOLES

Source: GITEC Consult, Study of TA Jalasi, Katuli and Mbwana Nyambi of Existing Boreholes (1997 & 2000)

	Borehole number	Condition of pump during 1997 survey	Condition of pump during 2000 survey
1	FD 86	good	Good
2	SM 367	good, poor yield	Non functioning
3	FD 259	good	non functioning
4	SM 260	good	Good
5	SM 445	good	Good
6	FD 82	good	non functioning
7	SCF 84,	good	non functioning
8	SM 256	good, poor yield	Poor
9	GK 32	good	non functioning
10	FD 84	good	non functioning
11	SM 337	good	Good
12	GK 33	good	Good
13	X 15	good, poor yield	non functioning
14	FD 77	good	Poor, low yield
15	SM 344	good	Good
16	CG 211	good	non functioning
17	FD 103	good	non functioning
18	FD 240	good	Good
19	SM 354	good	non functioning
20	PM 512	good, poor yield	non functioning
21	SM 338	non functioning	non functioning
22	SM 439	good	Good
23	CG 210,	good	non functioning
24	SM 353	good, poor yield	Poor, low yield
25	FD 258	good	Good
26	SM 259	good	non functioning
27	(BN31)	good	non functioning

Note: (1) Only pump condition is reported as most of the civil works remain of poor quality and in poor condition. (2) 27 out of 36 pumps surveyed in 1997 were revisited in 2000. (3) Only 33% of the pumps surveyed in 1997 are still working properly, with 67% either non functioning or poor working order.