

Sustainable Handpump Projects in Africa

Report on Fieldwork in Uganda

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UGANDA REPORT

Contents

Acknowledgements

Contents

Abbreviations	1
1. Introduction 3	
1.1 Research project	3
1.2 The field visit	4
1.3 Methodology	4
2. Handpump provision and maintenance in Uganda 5	
2.1 Policy and institutional issues	5
2.1.1 <i>Overview of the water and sanitation sector</i>	5
2.1.2 <i>Water and Sanitation Sector Review</i>	6
2.1.3 <i>Rural water and sanitation operational plan</i>	7
2.1.4 <i>External support agencies</i>	8
2.1.5 <i>Local Government</i>	8
2.1.6 <i>Non-Governmental Organisations</i>	9
2.1.7 <i>Churches and religious organisations</i>	10
2.1.8 <i>The private sector</i>	10
2.1.9 <i>Community based organisations</i>	12
2.2 Funding	12
2.2.1 <i>Costs</i>	12
2.2.2 <i>Donor support</i>	13
2.2.3 <i>Future funding mechanisms</i>	14
2.2.4 <i>Government funding</i>	14
2.2.5 <i>Community financing</i>	15
2.3 Project implementation	15
2.3.1 <i>Past approaches</i>	15
2.3.2 <i>Current approach</i>	16
2.4 Technical issues	18
2.4.1 <i>Groundwater issues</i>	18
2.4.2 <i>Technology choice</i>	19
2.4.3 <i>Handpump standardisation</i>	19
2.4.4 <i>Local manufacturing</i>	20
2.4.5 <i>Existing handpump models</i>	21
2.5 Community and social issues	23
2.5.1 <i>Ownership and responsibility</i>	23
2.5.2 <i>Community management of O&M</i>	24
2.5.3 <i>Financial issues</i>	25
2.6 Operation and maintenance	25
2.6.1 <i>Handpump mechanics</i>	25

2.6.2	<i>Preventative maintenance</i>	26
2.6.3	<i>Institutional support</i>	26
2.7	Spare parts provision	27
2.7.1	<i>Supply network</i>	27
2.7.2	<i>Cost of spares</i>	28
2.7.3	<i>Commercial viability</i>	28
2.7.4	<i>Quality control</i>	29
3.	Conclusions	30
3.1	Institutional and policy issues	30
3.2	Financial and economic aspects	32
3.3	Community and social factors	33
3.4	Technical and environmental issues	33
3.5	Research issues	35
	References	37
	Appendix 1: Field visit diary	39
	Appendix 2: Persons met	40
	Appendix 3: Field checklists	41
	Appendix 4: Community baseline survey results	47

Abbreviations

ABS	Acrylonitrile-Butadiene-Styrene
CBMS	Community-Based Maintenance System
CBSO	Community-Based Services Officer
CWO	County Water Officer
DANIDA	Danish International Development Agency
DFID	Department for International Development (UK Government)
DP	Development Partners
DWD	Directorate of Water Development
DWSDG	District Water and Sanitation Development Grant
DWO	District Water Office
ESA	External Support Agency
GOU	The Government of the Republic of Uganda
HPM	Handpump Mechanic
IFF	International Financing Facility
IMF	International Monetary Fund
KaR	Knowledge and Research
MULTIDEV	Multi-Development and Technical Services, Jinja
MWLE	Ministry of Water, Lands and Environment
NAO	National Audit Office, UK Government
NGO	Non-Governmental Organisation
PEAP	Poverty Eradication Action Plan
PAF	Poverty Alleviation Fund
PMV	Preventative Maintenance Visit

UGANDA REPORT

RUWASA	Rural Water and Sanitation East Uganda Project (supported by DANIDA)
RWSS	Rural Water Supply and Sanitation
SIDA	Swedish International Development Agency
SWAP	Sector-Wide Approach to Planning
TDS	Total Dissolved Solids
UNBS	Uganda National Bureau of Standards
uPVC	unplasticised Polyvinylchloride
UWASNET	Uganda Water and Sanitation NGO Network
WEDC	Water, Engineering and Development Centre

1. Introduction

1.1 Research project

This report has been produced as part of the second phase of a KaR (Knowledge and Research) project (R7817) entitled *Guidelines for Sustainable Handpump projects in Africa*. This research is funded by the UK Department for International Development (DFID) and is being carried out by the Water, Engineering and Development Centre (WEDC) at Loughborough University, UK.

For many years, handpumps have been considered an appropriate water supply option for low-income communities, but in many cases, particularly in Africa, they have fallen into disuse shortly after installation. The project aims to collect data from successful handpump projects and synthesise it into a set of guidelines that can be used by planners, implementers and decision-makers to prepare future handpump projects that have an improved chance of long-term sustainability.

The stated purpose of the project is:

Improved benefits from communal handpumps in Africa through an increased application of factors affecting sustainability in new projects

For the purposes of the research a sustainable handpump project is defined as one in which *the water sources are not over-exploited but naturally replenished, facilities are maintained in a condition which ensures a reliable and adequate water supply, the benefits of the supply continue to be realised by all users over a prolonged period of time, and the project process demonstrates a cost-effective use of resources that can be replicated.*

Full details of the research project and the outputs produced so far can be accessed on the projects web site at

<http://www.wedc.ac.uk/projects/shp/index.htm>

The outputs so far include:

- A literature review
- Draft guidelines for field evaluation of handpump projects
- A report on a half-day workshop on handpump sustainability
- A report on an electronic conference on handpump sustainability
- Report on fieldwork in Zambia
- Report on fieldwork in Ghana
- Interim report

This is one of four reports on fieldwork carried out in different countries in Africa. Zambia was the first country to be visited for fieldwork during April and May 2002 where the 'Draft guidelines for field evaluation of handpump projects' were first trailed (Harvey and Skinner, 2002). Ghana was visited during May and June 2002 where the main focus was on policy and institutional issues (Harvey et al., 2002); and Kenya was visited during

January and February 2003 where the primary focus was on socio-economic and technical aspects (Harvey et al., 2003).

1.2 The field visit

The field visit to Uganda took place between 10th and 14th February 2003. The primary purpose of this visit was to learn from successful handpump projects by assessing which factors and structures contribute to project sustainability. The main focus of the visit was to investigate and assess the effect on sustainability of institutional, operation and maintenance issues. However, social and technical issues were also investigated.

The field trip was planned in collaboration with The Busoga Trust, Jinja, Uganda.

1.3 Methodology

The visit to Uganda was of only short duration and focused on the Busoga Trust project in Jinja; details of other projects in Eastern Uganda are also included, however, and many of the findings are more widely applicable. A number of interviews were conducted with key stakeholders including project staff, local government personnel, handpump repairers and private companies. A small number of 'snapshot' visits to communities were also undertaken.

A visit diary is presented in Appendix 1 and a list of persons met provided in Appendix 2. A series of checklists was used to guide interviews and discussions with stakeholders, these are presented in Appendix 3.

The opinions expressed within this report are solely those of the author and are based predominantly on observations made and information collected during the visit.

2. Handpump provision and maintenance in Uganda

2.1 Policy and institutional issues

2.1.1 Overview of the water and sanitation sector

By June 2002 about 55% of people in rural areas of Uganda had access to safe water, with a wide variation in coverage between districts ranging from 25% to 75% (see Figure 1, DWD, 2002a). These statistics put Ugandans among the least served in the world. In addition, it is estimated that over 30% of existing rural water supply systems are currently non-functional.

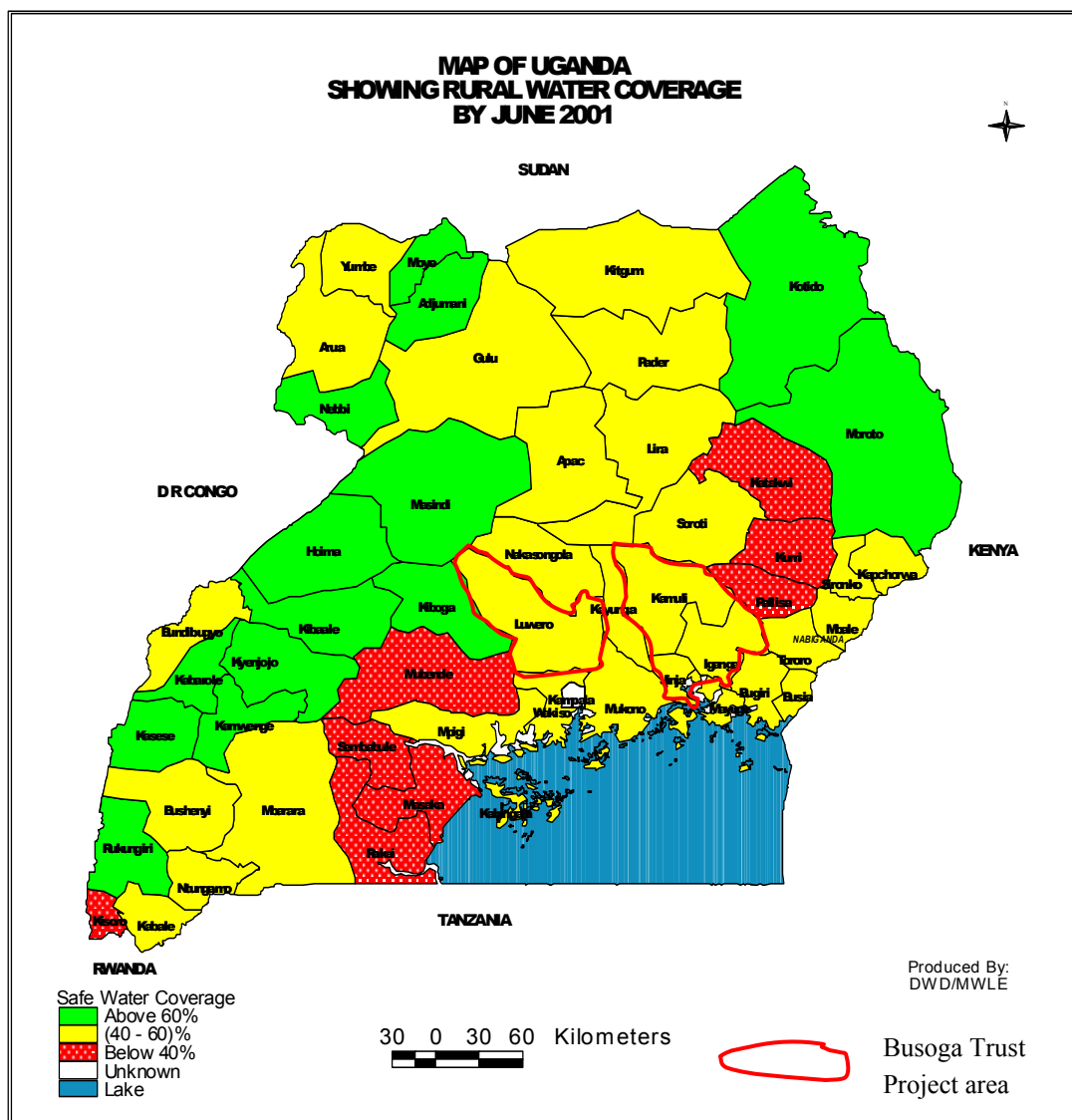


Figure 1: Map of rural water coverage in Uganda

The Government strategy for rural water supply in the past relied heavily on NGO or bilateral water projects. Projects were funded directly by individual donors and agency approaches tended to vary. Government influence and involvement was limited, except where bilateral projects aimed to strengthen and promote the use of local Government structures for implementation.

Due to low levels of coverage and sustainability the Government of the Republic of Uganda (GOU) decided in 1997 to reform the water sector to ensure that water services are provided and managed with increased performance and cost effectiveness, and to decrease the Government's burden while maintaining its commitment to sustainability and equitable development. The rural sector reform study was completed in 2000, this study identified district coverage and demand, and set targets.

A rural water supply and sanitation (RWSS) strategy was developed which proposed that local government become responsible for implementation and that funds be channelled as District Water and Sanitation Development Grants (DWSDG) under the GOU Poverty Alleviation fund (PAF), for RWSS provision and services. All funds, both for Government and Development Partners (DP) should now be routed through the PAF system and earmarked for RWSS.

The Sector-Wide Approach to Planning (SWAP), is a mechanism whereby GOU and DP agree on a strategy to achieve improvement in sector performance and more effective use of resources through programmes rather than projects. There is no fixed formula for developing SWAP but it is always a highly consultative process to ensure that all stakeholders participate in the development of the approach. One of the key features of SWAP is to improve the sustainability of services (DWD, 2002a).

2.1.2 Water and Sanitation Sector Review

The Government of the Republic of Uganda (GOU) and its Development Partners (DP) undertook a joint review of the water and sanitation sector in September 2001. The joint review was in line with the partnership principles of the Poverty Eradication Action Plan (PEAP) which includes water as one of Uganda's four priorities in achieving poverty targets. The review was designed to deepen the understanding and partnership between GOU and the DP sector to increase the effectiveness of external support, through the development of a memorandum of understanding. There was a broad consensus that a new programmatic approach was needed without losing the positive features of projects, such as the development of demand driven approaches to empower communities and consumers.

The review identified that the sustainability of rural water supply and sanitation (RWSS) facilities is a major issue and that 'the reasons for high failure rates need to be reviewed. Particular attention will be given to ways of strengthening community involvement and ownership.' Interestingly, this

statement appears contradictory since it asserts that the reasons for low sustainability need to be reviewed and yet implies that lack of community ownership and involvement is the underlying reason.

The second joint GOU/Donor review in the water and sanitation sector took place in September 2002 and resulted in the formulation of the following objectives (DWD, 2002b):

- Increase access to RWSS facilities (increase in source construction);
- Increase in equity of access to RWSS facilities (management information system, gender mainstreaming);
- Increase in functionality and use of RWSS facilities (performance and monitoring indicators, operation and maintenance, supply chain support, community mobilisation);
- Improvement in quality of RWSS facilities and services (materials, workmanship, quality assurance, standards followed by Districts);
- Improvement in cost efficiency of RWSS investments (value for money study, unit costs too high);
- Improved quality of RWSS sector support services (NGO's insufficiently involved - guidelines needed for involvement and capacity building).

2.1.3 Rural water and sanitation operational plan

A five year Rural Water and Sanitation Operation Plan: 2002-2007 (DWD, 2002c) was finalised in 2002 and presents an investment plan for increasing sustainable and equitable coverage towards the targets set by PEAP and the Sector Investment Plan (2000-2015). Key aspects of this plan are:

- capacity building and sector reform;
- a demand responsive approach;
- a decentralised approach;
- community based maintenance systems to ensure sustainability;
- co-ordination and collaboration of major actors;
- private sector participation; and
- monitoring sector performance.

The main foundation of sustainability in the five year operational plan is the Community Based Maintenance System (CBMS). The foundations behind CBMS are:

- users are responsible for O&M;
- the private sector provides all technical services including the provision and distribution of spare parts;
- the role of Government is mainly to monitor, regulate and facilitate the performance of stakeholders in O&M;
- Government will support major rehabilitation expenses in the interim, in the long-term it is expected that communities will also take over these expenses.

Economic liberalisation, privatisation and decentralisation are the key approaches in the implementation of all Government programmes, including those in the water sector. The basis for the new model of service delivery is

therefore for local (district-level) Government to contract out technical and support services to the private sector.

2.1.4 External support agencies

There are a significant number of external support agencies (ESAs) involved in the rural water supply sector in Uganda including Swedish International Development Agency (SIDA), Danish International Development Agency (DANIDA), Japanese International Co-operation Agency (JICA) and DFID.

Many ESAs have been instrumental in influencing Government policy and institutional reforms in the water sector, and have worked closely with the Directorate of Water Development to facilitate these. The Poverty Eradication Action Plan (PEAP), which is the cornerstone of Government planning in the water sector, was prepared by the Ugandan government through a participatory process involving ESAs and in particular the World Bank and the International Monetary Fund (IMF).

Previously, many bilateral ESAs worked with regional and district level Government institutions to implement bilateral water projects. An example of this was the Rural Water and Sanitation East Uganda Project (RUWASA) funded by DANIDA. Other ESAs such as DFID funded NGO water projects such as those of Busoga Trust. Since 2000/01 under the Rural Water Supply and Sanitation Strategy, ESAs now contribute funds for rural water supply through budget support to central Government, from which grants are then allocated to districts; rather than fund specific projects directly.

2.1.5 Local Government

There are several levels to local Government which are involved in rural water supply projects. Each level is known as a Local Council (LC) and has a Chairman elected on a four yearly basis. The respective levels are as follows:

- LC1 Village level;
- LC2 Parish level;
- LC3 Sub-County level;
- LC4 County level; and
- LC5 District level.

Within this hierarchy LC1 and LC3 are perhaps the most important for pre-implementation consultation, while LC5 is responsible for awarding contracts. The County Council (LC4) in reality has little power or influence.

The District Water Office (DWO) has overall responsibility for co-ordination of water supply activities in the district, for both new and existing water supplies. The main day-to-day activities comprising supervision, monitoring, procurement and the awarding of contracts. Each county should also have a County Water Officer (CWO), who works beneath the DWO.



Figure 2: District water office

The CWO is responsible for quarterly monitoring of all water supplies in the county, which should be conducted with the local Community-Based Services Officer (CBSO). Monitoring should assess the functionality status of the pump (operation, mechanism, bearings etc.), the condition of the pump apron, the fencing around the apron and water quality (pH, bacteriological, TDS, conductivity, turbidity). Some communities visited during the field visit reported that CWOs had visited twice during the past two years. CWOs also conduct some pump repairs and rehabilitation work.

Many counties do not have their own CWO and often a single CWO must take responsibility for more than one county. The lack of local Government capacity, in terms of both human and financial resources, is a key constraint influencing the efficiency of decentralised regulation, co-ordination and monitoring. DWD staff in Kampala complain that monitoring data from DWOs/CWOs are often inaccurate, which may be partly due to this limited capacity. Alleged corruption, insufficient transparency and political interference also hinder local Government effectiveness.

2.1.6 Non-Governmental Organisations

There are more than 170 NGOs registered with the Uganda Water and Sanitation NGO Network (UWASNET), including many local NGOs as well as International NGOs such as WaterAid. NGO approaches vary but in the past most have implemented discrete water supply projects, where the NGO is responsible for planning, community mobilisation, implementation and support for O&M. While some NGOs, particularly church-based organisations, still undertake such activities, many have changed roles and emphasis due to Government policy and changes in funding.

The Busoga Trust, which is closely linked to the Church of Uganda, is a Christian organisation based in the UK and Uganda which exists to provide

clean water sources for rural people within Uganda, most particularly in the provinces of Busoga and Luwero. The main activity of the organisation is to implement rural water supplies using handpumps. It has worked in the project area since 1983.

Busoga Trust formerly received funding from DFID, the European Union and Comic Relief, as well as charitable contributions. DFID was by far the biggest donor contributing approximately £800,000 (US\$1.2 million) over three years. This funding has now been phased out in line with ESA/Government policy of budget support. Busoga Trust still receives a small amount of charitable contributions from churches and individuals to sustain overheads and for one-off projects. However, monitoring and support for O&M have been halted due to limited funds.

The role of NGOs in rural water supply is now unclear under SWAP and many NGOs are facing uncertainties over their future existence, or are looking for ways to diversify their activities.

2.1.7 Churches and religious organisations

The role and influence of churches and religious organisations in rural development, including water supply, should not be underestimated. Although Busoga Trust has its headquarters in the UK and is funded predominantly by European-based donors, it works only in Eastern Uganda and exists only because of the Church of Uganda. The previous Bishop, Cyprian Bamwose took a long-term view to development and instigated the 'Multi Sectoral Rural Development Programme' in Busoga Diocese, of which the Busoga Trust is effectively the 'Water Sector'. Without the church it is unlikely that the Trust would have been either viable or successful. The existence of this long-term organisation headed up by a suitable incumbent is extremely valuable.

The Church can be more effective than Governments in rural development in some cases, and the Busoga Diocese would seem to be an example of this. Bishop Cyprian survived several successive Governments and civil war, and was able to have far-reaching positive effect on development in the region.

2.1.8 The private sector

Some NGOs have recently reinvented themselves as private sector companies so that they are able to bid for district level contracts in rural water supply. An example of this is Busoga Trust which under the influence of the Church has formed a private company known as Multi-Development and Technical Services (MULTIDEV). MULTIDEV is in a position to bid for private contracts for borehole siting, drilling and handpump installation, for which Busoga Trust as an NGO would not be able to bid. Alleged bribes required to win contracts from some DWOs present a difficult moral dilemma for some organisations and staff. In addition, there are reports that some DWO staff

have set up their own companies to bid for DWO contracts, confusing the picture further.

There are approximately 20 drilling companies throughout Uganda, which bid for Government and private sector contracts. However, it appears that the vast majority of these companies do not actually own their own drilling rigs and hire rigs from DWD when required. Previously many companies were contracted out by central Government but now contracts are put out to tender at district level, generally for 5 to 20 boreholes. Many drilling companies also provide handpump installation services but do not have community mobilisation skills. Ugandrill Ltd. based in Iganga drills an average of 60 handpump boreholes per year using two company-owned rigs, with an average borehole depth of 50m.

In addition to drilling companies there are several private hydrogeologists who provide borehole siting services and supervise drilling. These are usually private individuals, often former Government employees, who work with a small team in the field. Geophysical equipment such as terrameters for resistivity surveys are usually hired from DWD in Kampala. Some companies such as MULTIDEV also have equipment and apply for siting contracts to be performed by external hydrogeologists on their behalf. DWO tender for siting separately to drilling and there are significant time constraints on contracts and penalty clauses for dry boreholes.

There are several private companies in Kampala that deal in handpumps and spare parts. Among these, Victoria Pumps Ltd. is the only company that manufactures handpumps in country while the others, such as Buyaya Technical Services Ltd., import handpumps (primarily from India). There are also a number of spare parts retailers in smaller towns.



Figure 3: HPM undertaking preventative maintenance

A key component of the private sector involved in rural water supply is made

up of Handpump Mechanics (HPMs). HPMs were generally trained by NGOs or bilateral programmes to maintain and repair particular handpump models. Each HPM is usually equipped with tools and a bicycle and is given guidance on how much to charge communities and where to obtain spare parts. The coverage by and effectiveness of HPMs is influenced greatly by the presence or absence of implementing agencies and the demand for handpump repair services in a given area (see Section 2.6).

2.1.9 Community based organisations

Most communities with a handpump have a water committee which has ultimate responsibility for the operation and maintenance of the handpump. Each committee is responsible for raising awareness among community members regarding ownership and responsibility for O&M. The committee should also mobilise the community to keep the water point and source clean, hold management meetings to ensure on-going O&M, and collect maintenance fees.

Each committee in the Busoga Trust project area consists of a chairman, vice chairman, secretary, treasurer, mobiliser of women, mobiliser of the youth, a member and the LC1 chairman. These positions are voluntary and members are usually elected by the community. Busoga Trust suggests that at least one third of committee members should be women.



Figure 4: Namalemba I water committee chairman with HPM

2.2 Funding

2.2.1 Costs

The cost of implementation of handpump projects in Uganda is high, with the typical cost of a 50m borehole being approximately KSh7.5 million

(US\$4000), based on US\$80 per metre. The cost of a U3 pump from Victoria Pumps Ltd. is approximately US\$950,000 (US\$500) and a U3-modified (U3M) with stainless steel rods and uPVC riser pipes is about US\$830,000 (US\$430). A Consallen pump imported from the UK is approximately US\$1.54 million (US\$800). In addition, the typical cost of a hydrogeological survey is about US\$1 million (US\$520).

This makes the total implementation cost of about US\$5,000 far beyond the means of most poor rural communities; and even where handpumps are installed on hand-dug wells the cost is restrictive. Additional costs include the cost of feasibility studies, community mobilisation and training. Many NGOs previously spent a large proportion of their budget on community mobilisation which local Government is currently unable to match.

The cost of appropriate preventative maintenance is approximately US\$12,000 (US\$6) per year per handpump, based on the Busoga Trust's preventative maintenance programme. Repair costs vary depending on the type of pump and no information is provided to communities on likely annual O&M costs.

At present there are no Government guidelines for private companies or communities to develop a tariff structure that both ensures adequate cost recovery on handpump-based water supplies and yet protects the rural poor.

2.2.2 Donor support

Uganda is a highly aid-dependent country with donors contributing nearly 50% of national expenditure. The water sector is no exception and relies almost wholly on external support, DANIDA and SIDA being by the far the biggest donors. Although DFID has supported the sector in the past it now plans to withdraw from direct involvement in the water sector since it believes its comparative strengths lie elsewhere and that the water sector is well-covered by the other donors (NAO, 2003).

Although it can be argued that budget support has contributed to improvements in poverty reduction, school attendance and lower incidence of HIV/AIDS; donors have significant concerns about its effect so far on the water sector. Water sector resources have tripled between 1997-1998 and 2000-01 but corresponding improvements in service provision have not been observed during this period, especially in rural areas. The following concerns were expressed in a recent DFID review (NAO, 2003):

- Significant concerns over the capacity of lower levels of Government, especially concerning the ability to mobilise communities to address O&M issues;
- Inequitable distribution of funds to urban areas although 92% of the population without access to safe drinking water live in rural areas;
- Outputs, in terms of additional water points and sanitation facilities, have not increased in line with increased resources; and
- Private sector capacity to provide services needs to be strengthened.

In response, ESAs, and in particular DANIDA, SIDA and DFID, aim to support the GOU reform process through the provision of technical assistance and capacity building and the development of SWAP.

2.2.3 Future funding mechanisms

The International Finance Facility (IFF) is a recent initiative of DFID which aims to help meet the internationally agreed Millennium Development Goals. The principle of the IFF is long-term, but conditional, funding guaranteed to the poorest countries by the richest countries (DFID, 2003). On the basis of long-term donor commitments, the Facility would generate immediate resources for aid by issuing bonds on the international capital markets. The Facility would be in place for around fifteen years and seek to raise aid from just over \$50 billion a year today to \$100 billion a year in the years to 2015. The IFF would provide a predictable and stable flow of untied aid, to replace the old approach of project-bound short-term bilateral funding. The conditions imposed on beneficiary countries would be the need to:

- pursue anti-corruption, pro-stability policies;
- commit to the Doha development agenda - a sequenced opening up of markets to global trade;
- improve the environment to encourage increased investment and private-sector-led growth; and
- agree clear and costed plans for building education, health and economic capacity, seeing development aid not as compensation for past failures but as investment for future success.

Such an initiative is in line with the existing poverty reduction strategies of many African countries, including Uganda, and supports the allocation of donor funds through Government structures. Should the IFF proposal become reality, Uganda is more than likely to receive funds through the Facility. However, the concerns over budget support would apply equally to such a system and increased funding will only result in improvements in rural water service provision and sustainability if such concerns are addressed.

2.2.4 Government funding

The Government currently provides a 95% subsidy to the rural water sector. As previously outlined, the provision of RWSS in Uganda is currently decentralised. The Constitution specifies that the transfer of funds from Central Government to Local Governments will be channelled as unconditional, conditional and equalisation grants. The unconditional grants cater for local government staff salaries and operational costs; the conditional grants are for the delivery of services mutually agreed between local government and the sector ministry (this includes funds available from PAF/HIPC); while the equalisation grants are for special provision for least developed districts (DWD, 2002a).

A recent DFID review of the water and sanitation sector in Uganda illustrated that increased levels of funding in the water sector through budget support do not necessarily result in a corresponding increase in improved access to services (NAO, 2003). The Ministry of Finance recently undertook an audit of the water supply sector 'Is the Water Sector Performing' in which they asserted that the cost of a single water point had increased by three to four times since the introduction of budget support in 2000/01. DWD fiercely rejected the findings of this report, however, claiming that the data were not reliable, and that there was no urban/rural breakdown considered in the analysis. A Value for Money / Technical Audit had been conducted but the concept of 'value' had not defined within this document, partly negating the results.

Since the sector is undergoing a process of change as SWAP is implemented a reduction in efficiency should be expected, at least in the short-term. This is particularly the case where decentralised Government structures and resources require strengthening. However, allegations of corruption at district level suggest that long-term efficiency and effectiveness are also threatened.

The District Water Officers (DWOs) visited in Busoga Province complained of a stark lack of financial resources at district and sub-county level, which limits the number of new water points that can be constructed per year (commonly less than 5), as well as monitoring and rehabilitation activities.

2.2.5 Community financing

Communities are expected to contribute to the initial implementation costs of any new water point. DWOs demand a community contribution of USh200,000 (US\$100) for a borehole or USh100,000 (US\$50) for a shallow well or spring; this is collected into a DWO community contribution account.

In the communities visited, with water points installed by both Busoga Trust and RUWASA, communities had contributed labour, sand, gravel and bricks rather than cash. Communities are also expected to finance all operation and maintenance costs and at the time of installation are encouraged to raise USh100-300 per household per month to be paid into a community maintenance fund. Due to bank charges imposed on bank accounts most maintenance funds are kept by the water committee treasurer. At present, communities are not expected to finance rehabilitation or replacement costs.

2.3 Project implementation

2.3.1 Past approaches

Up until recently most rural water supply projects have been implemented by NGOs or through bilateral aid. These projects were, on the whole, demand responsive whereby a community would make an application to the project for an improved water supply. In the case of Busoga Trust, this would

sometimes go through the Reverend of the local church and consultation would commence with the LC3 Chairman, LC1 Chairman and community as a whole. A range of technology choices were usually presented to the communities, depending on water resources in the vicinity.

Such projects have been typified by a phase of intensive community mobilisation to instil a sense of ownership of handpumps and emphasise the importance of maintenance and that this is the responsibility of the community. Water-user committees were set up following appropriate training and handpump mechanics were selected, trained and provided with the necessary tools.

Financial autonomy meant that many NGOs could implement their own O&M models in which they were able to provide ongoing support to communities. An example of this is the Busoga Trust 'Circuit Rider' model (see Section 2.6).

2.3.2 Current approach

Since the 2000-01 fiscal year local Government has had primary responsibility for rural water supply implementation. The demand responsive approach has been maintained and communities are expected to approach their local council or DWO if they desire an improved water supply. The DWO then assesses the relative needs of the applicant communities in terms of existing water source quality and accessibility. Some DWOs report that political interference by Members of Parliament who want to please particular communities complicates this process.

Rural water supply coverage is still relatively low in most districts, for example the district of Iganga has about 900 boreholes which represent about 55% coverage at present. The National Investment Plan to increase coverage to 100% by the year 2015 means that local Government approaches are largely facility driven to increase the coverage of improved water sources. Coverage is defined as at least one water point per 300 people within a 1.5Km radius. Some communities report that some handpumps serve more than 1,000 people, covering areas of several square kilometres, resulting in huge pressures on individual pumps.



Figure 5: Queuing for water

DWOs invite tenders for several new water points at once, usually by advertising in the local press. For example, if it is decided that 5 boreholes need to be drilled and equipped with handpumps, tenders will be invited for borehole siting, and separate tenders for drilling. Borehole siting is usually conducted by private hydrogeologists who are paid in instalments depending on the success of drilling; DWO contracts normally contain a penalty clause whereby part payment is withheld if the success rate is less than 85%. The hydrogeologist also supervises drilling and test pumping under such contracts.

No permit is required for drilling but the drilling company must be registered with DWD. Drillers are paid per metre drilled, as agreed in the awarded contract. The borehole yield is usually estimated using a bucket/bailer test, known as the 'jolly jumper'. If the yield is less than 300 litres per hour the borehole is usually abandoned; if the yield is greater than 300 l/h the drillers should conduct a constant rate pumping test over an 18 hour period. The required yield is usually specified in the contract.

Since this new approach has been adopted community mobilisation activities have reduced significantly since private contractors are not obliged to undertake mobilisation, NGOs can no longer afford to pay mobilisers and local Government does not have sufficient capacity. There is currently only one community mobiliser in each district due to a stated lack of funds. There should also be health assistants at sub-County level, usually with a background in public health, who are supposed to work with CBSO to sensitise and mobilise communities. However, it is not certain how often this happens or how many communities are targeted by such activities. Communities are expected to pay their capital contribution to the DWO as well as to contribute labour and materials.

Although the new approach is largely facility driven many districts claim that they are not receiving adequate funds to implement many new facilities. For example, in Iganga district only 5 boreholes and 12 shallow wells have been completed in the last two years. The lack of attention to social aspects and operation and maintenance issues is also a worrying trend.

Rehabilitation of boreholes and handpumps relies largely on PAF funds which are allocated to districts when available. DWOs also invite tenders for rehabilitation contracts such as borehole de-silting and handpump replacement. Such contracts are generally few in number.

2.4 Technical issues

2.4.1 Groundwater issues

The hydrogeology of South Eastern Uganda is dominated by basement complexes and most accessible groundwater is found in the weathered zone above the basement rock. Static water levels vary greatly but in many areas are less than 10m, making handpumps on hand-dug wells the most common technology option. However, there are many localised hydrogeological variations and although most boreholes in Eastern Uganda are successful, in some other areas average success rates is as low as 50%.

Aggressive groundwater is a problem in many areas of the country and water quality results from Kamuli indicate a common pH range of 5.9 – 6.5. This has led to many problems with corrosion of riser pipes and rods with the U2 and U3 handpumps and resulted in the development of the U3M pump, which uses uPVC riser pipes and stainless steel (SS) connecting rods. The Consallen pump uses Acrylonitrile-Butadiene-Styrene (ABS) plastic or polyethylene rising mains and SS rods, and so is corrosion resistant.

There are some reports of boreholes drying-up but more common are problems with siltation resulting in the need for rehabilitation by de-silting. It is expected that de-silting will become much more difficult in the future since DWD has reduced the standard borehole diameter from 6" (150mm) to 4" (100mm) to reduce drilling costs from US\$100 per metre (6") to US\$80 per metre (4").

District Water Offices have no facilities for borehole siting or drilling but do have water quality testing equipment for physical parameters. Compressors for borehole de-silting are not available widely but can be hired by contractors from DWD. RUWASA had a hydrofracturing rig but there was not much demand for this and it was sold to a private company after project completion.

2.4.2 Technology choice

It appears that the handpump is often viewed as the sole technology choice in many parts of Uganda. While this may be the case where deep groundwater predominates, there are many other areas of shallow groundwater where alternative technologies such as the bucket and windlass could be considered. Despite the wide promotion of the demand responsive approach many communities are not offered a choice of technology in the project planning stage.

2.4.3 Handpump standardisation

The Consallen handpump was introduced to Uganda by UNICEF in 1983 when their Country Representative encouraged the Ugandan Government to use it as the 'Standard Pump'. The County Representative had moved to Uganda from Liberia, where she had observed many years of satisfactory performance of the Consallen under similar conditions of groundwater and usage. Although no formal standardisation policy was put in place, as a result of this advice the procurement and installation of Consallen pumps in the country was promoted.

At a later date, UNICEF decided that they would adopt the India Mk II as the preferred handpump model for Uganda (and elsewhere). This appears to have been decided for predominantly bureaucratic reasons in Head Office New York, as an administratively convenient policy backed up by low cost purchases from India. There seems to have been little regard to how effective the pump was in any particular circumstances or to the existing situation in Uganda.

Under UNICEF influence the Directorate of Water Development (DWD) under the Ministry of Water, Land and Environment (MWLE) introduced a handpump standardisation policy in 1995 which was eventually adopted in 1999. This policy was designed to enhance sustainability by ensuring that only a small range of handpump models were used in the country for which spare parts and repair skills were widely available. The handpumps selected were the Uganda manufactured India Mark II (U2) and India Mark III (U3). The modified 'corrosion-resistant' version of the U3 (U3M) has not been formally standardised but is manufactured in country and is now used widely.

DWD has not chosen any alternative handpump models to 'standardise' in Uganda and has gone as far as to suggest that the existing 1000 Consallen pumps should be replaced with U3s, and yet has offered no funding to do this. This attitude makes it increasingly difficult to sustain existing water supplies in some parts of the country.

2.4.4 Local manufacturing

U2 and U3 pumps

Victoria Pumps Ltd. manufactures the U2, U3 and U3M in Kampala. Although in reality many of the pump components such as the riser pipes, rods and cylinders are still imported. The quality of these pumps is generally very good and the company received a Quality Award in 2002 from the Uganda National Bureau of Standards (UNBS). The annual sales of the company are about 2,000 handpumps per year although it is capable of manufacturing double this number. Although Victoria is the only company which is able to supply all components of the Ugandan standardised versions, there are several other companies which import the India Mark II and III pumps from India, which are available at lower prices than the U2 and U3 from Victoria, in part at least due to poorer quality. Due to the Government's policy of economic liberalisation there are no attempts to limit importation of such pumps which threaten the long-term security and sustainability of local manufacturing.

Some local artisans also manufacture the U2/3 pump-head, pedestal and handle, which are generally of poor quality. Although this is not authorised there appears to be no attempt by Government to control this.

Consallen pumps

Consallen decided in 1998/99 that as much as possible of the handpump should be made in Uganda. The best mechanism to achieve this would, they believed, be to let a franchise. They had good relations with a small company in Jinja, who had made a very satisfactory batch of 50 pumps under supervision in 1995. This was done using only the tools and equipment found in existing sub-contract workshops in Jinja, such as lathes, hand-presses and guillotines, and a few small tools brought from the UK. The exercise demonstrated the feasibility of making this very simple design locally with a tiny investment. The value of imported equipment was so low that it could be written off over only 50 pumps. Consallen were confident that local manufacture would enable them to compete with other pumps on quality, design effectiveness and price.

The Jinja Company agreed a Franchise, but wanted Consallen to 'standardise' their design. Research showed this could be done by placing it in the Public Domain and getting the Uganda National Bureau of Standards (UNBS) to issue an official Standard. A Standard was prepared in conjunction with UNBS and submitted for scrutiny and publication in East and South Africa. The franchisee observed the Standard's progress and eventually reported that the officer in charge at UNBS had been sacked. This meant, effectively, that the project had been killed off. The franchisee understood that direct Government interference was responsible, and that there was every intention of resisting the use of the Consallen handpump in Uganda by whatever

means. The franchisee, therefore, felt unable to invest time and money in the teeth of overt Government opposition and the venture was abandoned.

The Consallen design was placed in the public domain to overcome criticism that it was owned by a private company. In the end this achieved little because there seemed to be no intention of the Ugandan government, or the concerned officers, to allow any alternative designs into the country. Alleged Government interests in Victoria Pumps may have had something to do with this since 'standardisation' provides them with a convenient monopoly.

2.4.5 Existing handpump models

There is a limited range of handpump models in Uganda, with the U2 and U3 by far the most widespread. Figure 5 shows an 'India Mark I' pump reportedly installed in 1953, still operational fifty years later in 2003. The fact that the pump mechanic lives nearby and the pump is lifting water from only 3m have undoubtedly contributed to this long-term sustainability, nevertheless this is still quite a find!



Figure 6: India Mark I handpump

The U2 and U3 handpumps use Galvanised Iron (GI) riser pipes and rods and have experienced widespread corrosion problems due to aggressive groundwater. The U3M was later modified to use uPVC pipes and SS rods. Recent problems with breaking plastic foot-valves for the U3M led to the introduction of some brass foot-valves. Due to the different versions of the U-series pumps there is now some degree of non-uniformity and uncertainties over spare part supply. However, the widespread familiarity with these models and in-country availability of spares are positive developments.

The Consallen handpump was introduced by the Busoga Trust project in 1983, and there are more than 1000 Consallen pumps installed in the project area. This pump is manufactured by Consallen pumps in the UK and despite

being predominantly used as a shallow-well pump it can be easily adapted for deeper applications (up to 60m). The Consallen is a proven highly durable pump, and even DWOs which promote the use of the U2/3 report that the Consallen is more reliable. In Namalembe I village a pump installed in 1990 was still working when visited thirteen years later in February 2003 and there had been no reported breakdowns during this period. Although this pump was drawing water from a shallow depth of about 10m, this durability is still impressive.



Figure 7: U2 handpump

When installing the Consallen handpump Busoga Trust give a 2-year guarantee that any breakdown within this period will be repaired free-of-charge by the NGO. They have never had to undertake this. Due to this reliability Busoga Trust continues to install the Consallen pump for donor-funded water supply projects despite Government resistance, but installs the U2/3 under local Government contracts (currently installed just over 30). The Consallen pump and spares are slightly more expensive than the U3 but it could be argued that the reliability and durability make up for this.

Despite the Government's hard line on alternative pumps such as the Consallen, there appears to be some inconsistency in this policy. For example, the Nira, Tara and Orbit pumps have all been recently trialed in the country with no apparent resistance from DWD.

At the time of the visit DWD was involved in the initial stages of a pilot study to evaluate the potential of the Rope and Washer pump for use in the country. This study, supported by SIDA, is in the early stages at present but the pump has much potential for shallow well application, particularly on household wells, as proven by experience in other countries such as Kenya (Harvey et al., 2003).



Figure 8: Thirteen-year-old Consallen handpump

2.5 Community and social issues

The aim of the field visit was not to investigate community and social issues in great detail and consequently only three communities were visited. A brief baseline survey was conducted in each village using the original version of the sustainability snapshot (Sugden, 2001). The results of these surveys are presented in Appendix 4. Based on the brief study undertaken and information provided by key stakeholders at community, NGO and Government levels the following key points were noted.

2.5.1 Ownership and responsibility

The community mobilisation conducted by previous implementers has aimed to respond to the needs and wishes of communities rather than impose supply-driven solutions upon them. One aim of this sensitisation/mobilisation approach has been to instil a sense of ownership of the pump among communities. It appears that such approaches have been moderately successful, in that communities generally accept that they own the pump. However, the common assumption that a sense of ‘ownership’ will automatically lead to a sense of ‘responsibility’ for O&M is not necessarily true. Some community members who express a sense of ownership, i.e. ‘the pump belongs to us’, still believe that O&M is the ultimate responsibility of the Government or the implementing agency.

The fact that DWOs and CWOs still offer repairs and rehabilitation free-of-charge in some areas complicates this situation further. Despite Government policy to the contrary, the reduction of community mobilisation with current approaches to service delivery also threatens to reduce the sense of both ownership and responsibility.

2.5.2 Community management of O&M

The Community Based Maintenance System (CBMS) using water committees is generally effective before and soon after the pump is installed, but its effectiveness commonly decreases over time due to a range of different factors, including:

- Committee members lose interest or move away;
- Some members contribute while others don't, resulting in resentment;
- Trying to collect maintenance fees becomes difficult/tiresome;
- Nothing goes wrong with the pump;
- Community members lose faith in the committee; or
- Handpump mechanics exploit the community.

There is a range of issues that may reduce the effectiveness of CBOs over time, no matter how effective the initial stage of community mobilisation. For this reason ongoing monitoring and support is essential, and it is this factor that is most often missing. The first joint water and sanitation sector review in 2001 emphasised the importance of strengthening community involvement and ownership to solve the problems of failed water supplies. It is not simply a case of improving mobilisation, however, it remains important to find out what the real demands are among communities, and what incentives will contribute to sustainable management.

The comments of community committee members and project practitioners suggest that management of O&M becomes markedly easier where the demand for water from the pump is higher, and therefore the community find a way to sustain the handpump no matter what it takes. The biggest single factor influencing demand is the perceived quality of and distance to alternative water sources.



Figure 9: Alternative water source

2.5.3 Financial issues

The lack of willingness to pay among community members is a key constraint to sustainability. In general, households may contribute to a maintenance fund when the pump is first installed but after some time will only contribute when the pump has actually broken down. Some water committees report that only 15 out of 40 households (38%) actually pay the maintenance fees requested, even shortly after receiving the pump. The concept of paying for preventative maintenance is not fully understood and people would rather wait for the pump to break than pay for something from which they see no obvious benefit.

Financial capability among communities changes at different times of the year depending on the need to pay school fees or on agricultural produce. This means that where maintenance and repair funds are not stored the downtime of the pump will depend greatly on when the pump breaks down.

2.6 Operation and maintenance

The recent National Audit Office's report on DFID's involvement in the water sector indicated that the sustainable impact of water projects is often not known, and that sustainability problems are often due to insufficient attention being paid to operation and maintenance (O&M) issues, a lack of local capacity and inadequate understanding of local circumstances (NAO, 2003).

2.6.1 Handpump mechanics

The common maintenance system adopted throughout Uganda uses handpump mechanics (HPMs). These HPMs are normally selected by the communities that they are to serve and many are chosen since they have technical backgrounds such as that of bicycle repairer. The HPM often lives in the community which they serve and has other means of earning their main income.

HPMs are trained by DWOs to operate at sub-County level but remain self-employed. The number of HPMs in each sub-County depends on the number of pumps, there usually being 25-35 pumps per mechanic. Each HPM is responsible for minor repairs and reports to DWO any need for major repairs (e.g. fishing out fallen pipes).

DWOs attempt to regulate mechanic charges and stipulate that HPMs should charge US\$5-15,000 (US\$2.50-7.50) for a minor service (tightening nuts, rods, replacing bearings, chain etc.) and US\$15-25,000 (US\$7.50-12.50) for a major service (pulling out pipes and cylinder). However, some HPMs abuse their position if they know that the community has nowhere else to go for repairs and may charge increased fees.

Some communities refuse to pay mechanics who consequently become very demoralised. In other cases trained HPMs concentrate on other business activities due to inadequate demand for their services, or move away from their project area. Many HPMs were trained by DWO under the RUWASA project or by NGOs such as Busoga Trust. With the cessation of such projects there is increased concern over the future coverage by HPMs. There is currently no provision for follow-up training or replacement of mechanics, replacement or provision of bicycles or replenishment of tools.

2.6.2 Preventative maintenance

Busoga Trust has developed what is known as the 'Circuit Rider' model. This involves a preventative maintenance agreement between the community and the HPM, which is facilitated and overseen by Busoga Trust. Under this agreement the HPM should undertake a preventative maintenance visit (PMV) to each pump on his list at 4-month intervals, commencing 1 year after installation. The water committee pays USh4-6,000 (US\$2-3) for each visit by the HPM.

During the PMV the HPM checks that the pump is working and the function and condition of the components. If he discovers that a spare is shortly to be required, he informs the committee that this is the case. It is then their responsibility to buy spares before the next PMV, during which the HPM will fit these parts at no extra cost to the committee. In an emergency, i.e. if the pump breaks down, the HPM is available just a short bike ride away to do repairs or maintenance between regular scheduled visits.

This preventative maintenance model is no longer working in the project areas visited since many communities don't want the HPM to tamper with the pump if it is working, and there is a general lack of understanding of need for and purpose of preventative maintenance.

2.6.3 Institutional support

The role of the water committee is very important in ensuring successful operation and maintenance. Where there is a good relationship between the committee and the HPM and a good understanding of maintenance issues there is an increased chance of enhanced sustainability.

The role of external institutions, whether Government or NGO, in supporting O&M is essential. Busoga Trust used to have a maintenance supervisor to monitor the performance of mechanics and distribute spare parts to them but is unable to sustain this arrangement due to reduced funding. There is a real need for DWOs and CWOs to take over this monitoring and support role, including follow-up training and support for HPMs, and community liaison and mobilisation.

2.7 Spare parts provision

A recent study on ‘Supply Chains for Rural Water Supply in Uganda’ was conducted by HTN (Baumann et al., 2002), and for this reason the issue of spare parts was not investigated in great detail during the visit. Some of the key findings in relation to spare parts provision arising from the HTN study were:

- Four major and two smaller suppliers of handpumps are established in the country; Victoria Pumps Ltd. is the only manufacturer, the others dealing in imported pumps;
- All suppliers stock spare parts but only Victoria can supply all components for standardised pumps;
- Imported pumps and spares come into the country without any inspection or quality control;
- Spare parts dealers (SPDs) are established in 13 towns and keep very little stock of questionable quality;
- Many SPDs complain that profits from the sale of spare parts are insufficient to make a living; and
- The numbers of non-standard handpumps in the country have proliferated due to the lack of any effective mechanism to enforce adherence to standardisation policies.

Some additional findings from this field visit are summarised below.

2.7.1 Supply network

Although Victoria Pumps in Kampala manufactures spare parts as well as complete pumps the company has no interest in the distribution of spares, primarily due to low profit margins. Importers such as Buyaya Technical Services Ltd. deal in a wide range of products of which handpumps and their components are only a minor element. Where dealers are based in Kampala demand is sufficient to maintain involvement.

In district towns such as Kamuli and Iganga there are hardware stores that act as SPDs and purchase spares from dealers in Kampala and sell locally. Sky Cargo Ltd. in Iganga deals mainly in water supply components but is also a building contractor and therefore not reliant on handpumps alone to make profits. Most such stockists keep a small stock of mainly U2 parts such as riser pipes, rods, pump heads and fast moving spares such as seals. Sky Cargo buys imported parts from Buyaya since these are cheaper and easier to buy than from Victoria Pumps. RUWASA is reported to have helped publicise spare parts agents down to sub-County level, although the companies visited claim that they set up of their own accord and did not receive any subsidy.

Spare parts for the Consallen handpump are only available at the Busoga Trust offices in Jinja, which acts as a Consallen stockist. These are purchased directly from the manufacturer in the UK and sold to cover the cost of freight and changes in exchange rates, not for profit. There are three ways that a

water committee can obtain spares:

- Visit the Consallen stockist in Jinja and obtain the spare.
- Order the spare by Mail Order from the stockist using the illustrated price list carried by the HPM to see a picture and the price of each spare. Payment can be made by Giro obtained from the nearest Post Office, and the HPM has Order Forms that can be helpful.
- Request that the HPM obtain any required spares at the costs shown in the Price List plus the stated Fixed Fee for the HPM also shown in the Price List.

2.7.2 Cost of spares

The quoted costs of spares by Victoria Pumps Ltd. and Buyaya Technical Services Ltd. were very similar despite the fact that Victoria spares are manufactured locally and Buyaya spares are imported. However, Buyaya is reportedly more open to negotiation and less bureaucratic in selling spares which encourages customers. It is also claimed that Victoria sometimes imports spares themselves to boost local supply, though this has not been confirmed by the company.

The cost of spare parts to communities is not a major constraint in terms of affordability, at least for the faster-moving spares. However, in more remote areas the location of spare parts is often only known to handpump mechanics who can therefore overcharge communities if they choose to.

In general, communities give Consallen pumps a high approval rating because they are reliable and do not breakdown for prolonged periods of time. Despite this, however, they complain of the cost of spare parts in relation to those of the U2/3. When compared like for like Consallen spares are more expensive than those for the U3, for example the cost of a piston seal is about USh15,000 (US\$7.50) for Consallen as opposed to USh5,000 (US\$2.50) for U3. However, calculations based on a selection of pumps in Iganga district indicate that the average annual O&M cost to communities is actually lower for the Consallen when compared to a U2 pump in a similar setting. Even though this is understood by many communities it does not stop some from complaining. One HPM reported that 3 out of 18 Consallen handpumps were not operating in his area because the communities were unwilling to pay for minor spares such as seals and bearings due to the cost of these.

Busoga Trust imported Consallen handpumps and spares via DFID in the past which meant that import duty was waived. Now air freight charges and import duty are imposed on spares, however, making affordability an even greater problem.

2.7.3 Commercial viability

Although at present the provision of spares is commercially viable for retailers in Kampala that deal in a range of products, for lower-level retailers

in the districts the viability is highly questionable. If spares are to be made more widely available it may be necessary to find alternative distribution networks rather than relying on the informal private sector. Even for Victoria Pumps Ltd. the provision of spares is not a priority but simply a back-up to selling pumps.

Busoga Trust is providing Consallen spares as a charitable service rather than for commercial gain. If the organisation were to cease existence as an NGO the provision of spares would be greatly threatened. MULTIDEV could be used to maintain Consallen spares supply by selling these on a commercial basis, but this would push up the cost of the spares which are already considered by many communities to be too expensive.

2.7.4 Quality control

There is no external quality control of local or imported pumps and spares. Although those from Victoria Pumps are of generally good quality there are many other components to be found in the country which are of very poor quality. There appears to be no appropriate legislation or mechanism in place to eliminate or reduce the widespread presence of sub-standard parts, which are likely to result in reduced lifespan and increased pump breakdowns. One advantage of the sole provision of Consallen pumps and spares directly from the manufacturer to Busoga Trust is that spares are consistently of high quality; however this is down to the manufacturer alone, not due to any external quality control.

3. Conclusions

The field visit was of only short duration and consequently relied on information from a limited number of sources and stakeholders. As a result, it has not been possible to investigate some sustainability aspects in as much detail as others. Much of the information collected is relevant specifically to the Busoga Trust whilst other findings are more widely applicable.

The level of sustainability in the Busoga Trust handpump projects has been relatively high up until recently due to the ongoing commitment and support of the organisation. Likewise, the RUWASA project has developed a relatively strong institutional framework for sustained O&M over several years. However, due to recent major changes in National policy the sustainability of these and similar projects may be threatened. Whilst it is too early to assess whether these policies will successfully lead to enhanced sustainability levels in the long-term, it is important to note some potential threats and opportunities.

3.1 Institutional and policy issues

Government policy

Up until 2000/01 Government policy for the rural water supply sector was based on a service delivery model where NGOs and bilateral projects were the main implementers of rural water projects. This policy has now been replaced with a decentralised, privatised model whereby central Government allocates funds for rural water supply to districts, and district-level Government contracts out implementation to the private sector, whilst promoting the Community-Based Maintenance System (CBMS).

It is too soon to evaluate the effectiveness of the Government's sector reform process and rural water and sanitation strategy but early indications suggest that these are unlikely to result in higher levels of sustainability because:

- the strategy gives responsibility for management of O&M to communities but does not recognise their need for institutional support;
- private sector and local Government capacity are currently woefully inadequate for successful implementation, and efficiency is low; and
- spare parts supply depends on the assumption that this can be commercially driven by the private sector alone.

Although the new strategy reduces dependency on NGOs it fails to recognise their resource and experience base as a valuable asset which can contribute to capacity building and policy implementation.

One of the key objectives of the Sector-Wide Approach to Planning (SWAP) and the five year Rural Water and Sanitation Operation Plan is to improve the

CONCLUSIONS

sustainability of services. Many of the Government policies and strategies in place present a framework which aims to increase levels of sustainability, but the effect of these remains to be seen. Unless private sector and local Government capacities increase significantly current Government policies will not be implemented successfully, let alone have the positive effect desired.

Local Government capacity

Local Government capacity is in need of strengthening if the five year Rural Water and Sanitation Operation Plan is to be implemented successfully. Human and financial resources are currently inadequate, especially at district and county level. Whilst the technical aspects of implementation are contracted out to the private sector, less emphasis is placed on the social aspects for which responsibility is given to overstretched Government personnel. Many DWO and other Government staff have limited understanding of non-technical issues, such as community mobilisation and data collection and management, resulting in the need for human resource development and training.

Private sector capacity

Government strategy relies on the private sector to provide all technical services and yet there is limited capacity among private companies to do this. Of the twenty or so drilling companies in Uganda very few own their own drilling rig, meaning that all other companies must hire rigs from DWD which has a limited number of operational rigs. Similarly, most hydrogeologists tendering for borehole siting contracts do not own their own geophysical equipment but must hire terrameters from DWD. This situation undoubtedly creates inefficiency and hinders the drive to increase rural water supply coverage.

Support for O&M

Institutional support for O&M is an essential aspect of sustaining and supporting CBMS. Local Government cannot simply leave communities alone and expect them to sustain their water supplies by themselves. There is currently little or no provision for follow-up awareness raising, mobilisation and training. Monitoring of water supplies and handpump mechanics (HPMs) is also inadequate at present.

The number of HPMs in many rural areas is insufficient to cater for the number of pumps installed. There is no framework in place to ensure adequate coverage of rural areas by HPMs, including mechanisms for replacing HPMs, providing follow-up training and replenishing tools and equipment.

The role of NGOs

The role of NGOs under the new approach in the water sector remains uncertain and NGOs are in danger of becoming an untapped resource. The capacity and skills of NGO staff, especially in community-based work, are not being utilised. While some NGOs can reinvent themselves as private companies, the current framework limits them to predominantly technical involvement, i.e. ‘hardware’ aspects, and does not allow them to use their ‘software’ skills. As a result, some NGOs have been forced to downsize and reduce staff numbers.

The role of the Busoga Trust in the provision of Consallen spare parts in Busoga Province is essential for many water supplies to remain operational in the long-term.

3.2 Financial and economic aspects*Budget support*

The budget support approach taken by ESAs, under the Sector-Wide Approach to Planning (SWAP), has led to a significant increase in the cost of a single water point. Since the sector is currently in a transitional phase it is difficult to assess how long this trend will continue. However, even if cost-effectiveness for implementation can be increased, there remains no budget for O&M support and limited funds for rehabilitation under the Poverty Alleviation Fund (PAF).

Accountability

There are currently widespread allegations of corruption within local Government institutions and limited measures to ensure full transparency and accountability. The desire to increase levels of service provision will only be achieved if the efficiency and rate of implementation can be increased.

Community financing

The five year operational plan states that the under CBMS it is expected that communities will take over rehabilitation expenses in the long-term. This is clearly over-optimistic given the current problems experienced in community financing of basic maintenance and repairs. There appear to be no attempts by DWD to investigate willingness and ability to pay among communities in more detail.

3.3 Community and social factors

Community mobilisation

There is much talk in Government policy about the importance of community involvement and yet most local Government staff appear to have little idea of how to mobilise communities. Current approaches place the emphasis on the technical aspects of water supplies and focus on the facility rather than the process. There is little appreciation of the need for mechanisms for sustaining rural water services.

The need to instil a sense of ownership among community members is emphasised by both Government and NGO staff. The assumption that a sense of ‘ownership’ of the pump automatically translates into a sense of ‘responsibility’ and ‘willingness to maintain the pump’ is not borne out by findings in the field.

Maintenance

The concept of preventative maintenance is difficult to translate to many poor rural communities and even where it is understood communities are not convinced of its value. Concerted and ongoing institutional involvement is required for such preventative maintenance systems to be successful but the cost of this is unlikely to be balanced by actual gains. It is likely that preventative maintenance approaches will not be any more successful in future, due primarily to a lack of trust and interest among end-users.

3.4 Technical and environmental issues

Technology choice

The demand responsive concept is not always fully implemented in that although communities may demonstrate ‘demand’ by expressing their need for an improved water supply, they are often given neither a choice of technology nor estimated annual O&M costs for different options.

Standardisation

External support agencies often influence Government policies on handpump standardisation but the reasons behind pump selection may have more to do with the interests of the ESA than the desire for sustainable water supplies.

There is currently an inconsistent approach to new and alternative handpump models and a lack of consistent regulation of these. Self-interest among Government staff may lead to these inconsistencies and hinder overall sustainability. The Government’s policy of handpump standardisation needs to allow flexibility for improvements in technology and existing technologies in country, but should be enforced consistently.

It is important to note that even when handpumps are standardised this doesn't necessarily mean that standard spares are used. There is currently a lack of clear guidance for DWO and private sector staff (e.g. HPMs) regarding the different versions of the U-series pumps and components, and in particular the U3M. This often leads to confusion among practitioners.

Existing handpump models

Where existing 'non-standardised' handpump technologies are serving large populations it is not a viable option to simply replace these pumps. For example, there are approximately 1,000 Consallen pumps in Uganda serving an estimated population of 300,000 people (based on 300 people per pump). Government policy should allow flexibility to facilitate and support appropriate structures to ensure successful ongoing operation and maintenance of such pumps.

Reliability versus repair costs

While some handpump models may be more reliable than others this is not always appreciated by the users if individual repair costs are higher. Even where it is understood that long-term O&M costs are lower for one pump than another (e.g. Consallen versus U2/3) users complain about the higher cost of a single repair and comparable spare parts. This poses the question whether it is better to have a durable and reliable pump which rarely breaks down and costs more when it does, or a less reliable pump which breaks down more often but costs less to repair. Since there was no indication that functionality levels were significantly different for different handpump models it is impossible to answer this question from the limited study. However, it is important to note that among poor rural communities day-to-day costs are more easily understood and carry more importance than long-term savings.

Spare parts supply

The provision of handpump spare parts is not a natural business activity due to low turnover and profitability. It cannot be assumed that spare parts supply will be commercially viable at district and sub-county levels. Spares supply is most successful where accompanied by other (more profitable) commercial activities but where the retailer has a commitment to supplying spares.

Where spares are supplied through NGOs or church organisations this is only sustainable if the organisation itself is sustainable.

Quality control

There is currently no mechanism for quality control, especially for imported pumps and spare parts, leading to the availability of poor quality spares of decreased lifespan.

3.5 Research issues

There is a need to investigate factors contributing to willingness to pay among communities in more detail, and to investigate what aspects give communities a real sense of responsibility.

There also remains the need to assess the sustainability of alternative maintenance systems in projects that have been using such systems over a prolonged period of time.

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Appendix 1: Field visit diary

Date	Activities
Monday 10/02	P. Harvey travelled from Kampala to Jinja Meetings with Busoga Trust staff and DWO Kamuli
Tuesday 11/02	Meetings with DWO Iganga, spare parts dealer, and Ugandrill Ltd. Community visits to Namalembe I, Butongole and Butakamira Meetings with handpump mechanics and community water committees
Wednesday 12/02	Meetings with additional Busoga Trust staff and hydrogeologist
Thursday 13/02	Travel to Kampala Meetings with DFID, DWD, Victoria Pumps Ltd. and Buyaya Technical Services Ltd., Kampala
Friday 14/02	P. Harvey departed Entebbe to London

Appendix 2: Persons met

W. Bamwagale	U2/3 handpump Mechanic	Iganga District
Fred Bangu	Part-time Consultant	Busoga Trust, Jinja
Moses Gava	Asst. Commissioner Rural Water Supply	DWD, Kampala
Simon Kenny	Water Programme Manager	DFID, Kampala
Charles Kibumba	Consallen Handpump Mechanic	Iganga District
Mercy Kongo	Sen. Community Development Officer	Busoga Trust, Jinja
Muweebwa H. Lumu	Managing Director	Ugandrill Ltd., Iganga
Yahaya Makinabu	Maintenance Officer	DWO, Iganga
Wilberforce Mbtya	District Water Officer	DWO, Iganga
Stephen Mubiru	Hydrogeologist	Busoga Trust, Jinja
Tom Waiswa	County Water Officer	Budiope, Kamuli
Sue Yardley	Project Co-ordinator	Busoga Trust, Jinja
Johnson	Project Engineer	Busoga Trust, Jinja

Appendix 3: Field checklists

Checklist A: National and/or Regional Stakeholders

Key informants (names, positions):

Date of visit:

Location:

Evaluator:

Demographic or baseline data

- Data available for project area at Regional/National level?
- Plans to improve data on rural water supply?

Policy

- National Water Policy in place? What stage is it at?
- Does it cover standardisation, local manufacture, gender, cost recovery?
- Is the policy being implemented? What are the main constraints?
- Does it cover monitoring and evaluation?
- Are there assigned institutions for follow-up and back-up support?
- Is the ownership of the boreholes and handpumps clear?

Institutional arrangements

- Organogram of key stakeholders at national/regional level?
- Roles and responsibilities of stakeholders clearly defined?
- Communication and coordination between levels?
- Relationship with local level structures?
- Role of private sector with respect to handpumps?
- Role of NGOs in rural water supply projects?
- Are there phasing-out strategies for support agencies, what are they?
- Are there procedures to be followed if an institution does not perform as it should?

Funding and flow of funds

- How is funding arranged for rural water supply sector?
- How do funds flow to local level?
- How are recurrent costs paid for?
- What are the cost sharing arrangements for handpump projects?

Resources

- Are there adequate resources at national/regional level to fulfil roles?
- What areas are most lacking?

Capacity building

- Have staff at national/regional level received capacity building?
- Do they provide capacity building to local government or other partners?

Checklist B: Local Government and project partner stakeholders

Name of department/organisation: **Date of visit:**

Location: **Evaluator:**

Key informants (names, positions)

Policy

- Are staff aware of national policies? Are these relevant to handpump projects?
- Is there a national or regional policy on standardisation?
- Are staff trying to implement these policies? What are the constraints?
- Is someone monitoring performance?

Project process

- Are water supply activities based on data about coverage or scarcity?
- Is there a mechanism for communities to apply for a handpump?
- Are technologies other than handpumps offered to communities?
- Is a Memorandum of Understanding signed?
- What is the planning and implementation process for handpump installation?
- Who is responsible for siting and drilling boreholes?
- Who is responsible for quality control during construction?
- What do communities contribute towards cost of handpump and installation?
- Who owns the pump? And the borehole or well?
- Is there a formal handover of the handpump?
- What is done to monitor performance of handpumps once installed?

Institutional arrangements

- Organogram for rural water supply?
- Responsibility for mobilisation, installation and maintenance of handpumps?
- Where are handpumps and spares obtained? Where are they manufactured?
- What is the content and purpose of training and what has it achieved?
- How is training phased or linked with implementation?
- How are participants for training selected?
- Are there refresher courses at district or sub-district level?
- Responsibility for training and follow-up?
- Are roles and responsibilities clearly defined?
- What constraints are there to fulfilling roles?
- What is relationship like with national/regional level and communities?
- What is the role of the community in handpump maintenance?

Water supply issues

- What is the design criterion for number of users per pump?
- Is there a standard design for a handpump installation?
- What is the most significant aquifer in the region?
- What type of sources do people use if they do not have access to handpumps?
- What choices were people given regarding water supply technology choice?

- Typical depth of borehole or well?
- Who does the exploration and siting for boreholes? With what equipment?
- What is the success rate of drilling?
- Is there a problem with boreholes (e.g. drying up, siltation etc.)?
- Have any boreholes been rehabilitated?
- Is chemical composition of groundwater tested during drilling? Subsequently?
- Is bacteriological quality of water tested or monitored?

Maintenance

- What are the commonest causes of handpump failure?
- Is there is system in place for carrying out major pump repairs?
- Have communities been given toolkits for maintenance?
- Are they generally carrying out preventive maintenance?
- Do communities know how much it costs to maintain a handpump?
- Are they encouraged to regularly collect money for routine maintenance?
- Can communities afford the full cost of maintenance?
- Who pays for the cost of major repairs (e.g. dropped pipes, new rising main)?
- Are funds available for emergency breakdown (e.g. borehole collapse)?
- Where are spares available? Who buys them? Is there adequate supply?
- Is there a supply chain for spare parts? Could it be improved?

Community and social issues

- What mobilisation work is done with communities for handpump projects?
- Have staff been trained in participatory approaches?
- How is the community organized to operate and maintain the pump?
- Is implementation of water supply linked to hygiene education?
- How do communities communicate with local government and vice versa?

Checklist C: Community/Users

Name of village/location:

Date of visit:

Distance to district capital:

Evaluator:

Key informants (names, positions, number of adult males/females)

C1. Project process

- When and how did the community first get involved in the provision of a handpump?
- Were they offered, or did they consider, any alternative technologies (e.g. bucket and windlass)?
- Were they clear about what their responsibilities were throughout the project?
- Did they sign a Memorandum of Understanding? What does this say?
- To what extent did they participate during installation?
- Where they involved in the siting of the handpump and if so how?
- Did they contribute towards the cost of the handpump and installation?
- Are they happy with the quality of the work done?
- Who owns the pump? And the borehole or well?
- Was there a formal handover of the handpump? If so how was this done?
- Does the community report back to local government on pump performance?

C2. Institutional arrangements

- Is there a formal organization responsible for managing the pump?
- Who is on this committee or organization (gender)?
- Are roles and responsibilities of organization members clearly defined? What are they?
- What constraints are there to fulfilling roles?
- What training did they receive in relation to the pump?
- When was this training received (before or after installation)?
- Are they confident with the skills they gained from training?
- What is the procedure when the pump breaks down?
- Does everyone trust the organization?
- How much contact does the community have with the local water supply department?

C3. Water supply issues

- How many households/people use the handpump?
- How much water per day does a typical household use?
- What is the maximum distance users walk to the handpump?
- What is the typical distance?
- What is the handpump water used for?
- Is the taste of the water acceptable?
- Is the handpump the preferred source of drinking water?
- Is it acceptable for washing clothes (no discolouration)?
- What other sources are there nearby? Are these used and if so what for?
- What is the relative distance to alternative sources of water?
- Does the water quality vary at different times of the year?

- Is the quantity of water adequate for everyone or is it rationed?
- Does the quantity available vary at different times of the year?
- Is the pump used all year round? If not, why not?

C4. Maintenance

- How many handpumps are used by the community? How many are functioning at present?
- Are breakdowns frequent? When were the last three breakdowns?
- What is the typical downtime?
- What are the common breakdowns with the pump?
- Have there been any problems of vandalism?
- Who is responsible for repairing the pump? How far away do they live?
- Has the community got a toolkit for maintenance?
- Are they doing preventive maintenance? (Specify what and when)
- Do they have access to spare parts locally? How far do they have to travel?
- Who supplies spare parts?

Financing

- Can the community afford to buy spare parts?
- Do communities know how much it costs to maintain a handpump?
- Do they consider they can afford to maintain the pump?
- Are they regularly collecting money for routine maintenance? How?
- How much money do they have collected at present? How is this stored (bank account, treasurer, livestock, spares etc.)?
- Are there any problems with collection and storage of funds?
- If they are not regularly collecting money do they consider that they can quickly collect enough money whenever the pump breaks down?
- How much have they spent on maintenance in the past twelve months?
- Who would pay for a major repair (e.g. dropped pipes, new rising main)?

C5. Community and social issues

- Is the handpump used by a single community or more than one? Are there any specific groups within each community?
- Have they established any rules with regard to the pump? Is the pump lockable?
- Does everyone in the community have access to use the pump?
- Are there any local taboos or beliefs associated with water or the handpump?
- What has been the impact of the handpump on the community?
- Is the community satisfied with the handpump? Why?
- Have they had any training on hygiene education? Do they understand the link between poor quality water and disease?
- How do communities communicate with local government and vice versa?

Technical data

- Type of handpump (model, make, country of origin)
- Type of source (borehole, hand-dug well)
- Date of installation
- Depth to cylinder
- Riser pipe material
- Approximate yield (strokes/litre; litres/second)
- Number of strokes to arrival of water

- Observed pump faults
- General quality of construction/installation
- Condition of apron/drainage

Checklist D: Private sector stakeholders

Private pump mechanics

- Where and when did they receive training?
- How were they selected to be trained?
- What did the training comprise?
- How long have they been working as a pump mechanic?
- How many pumps do they work on now?
- Who pays them for work? How much?
- Where do they get spare parts from?
- Can they carry out all repairs? What do they do if it is beyond their capacity?
- Do they have other employment?

Pump or spare part suppliers

- What profit levels do suppliers make? Why do they sell pumps/spare parts?
- Which models of pump do they stock (or hold parts for)?
- How long have they been stocking pumps/parts?
- How long are they ever out of stock?
- How did they initially go into business (e.g. with support from project)?
- Is the business now making a profit without external support or subsidy?
- Do they supply the full range of parts? What parts do they supply and why?
- Where do they purchase these items? Do they purchase them on credit?
- Who are normally their customers for pumps/parts?
- Do they provide technical assistance?
- Do they provide warranties?
- What degree of marketing is used or is needed?
- How does regulation affect them?
- How could business be improved?

Water vendors

- How long have they been vending water?
- How much do they charge for water? What profit do they make?
- What type of people are their typical customers (trade, private, farmers)?
- Do they pay towards pump maintenance?
- What would they do, or do they do, when the pump breaks down?

Appendix 4: Community baseline survey results

Namalemba I

Factor	Statement	Score
Financial	Some funds available for maintenance when needed but not adequate for major break down.	2
Technical skills	Technical skills available for maintenance when needed.	3
Spare parts and equipment	Some spare parts and equipment available when needed.	2

Butongole

Factor	Statement	Score
Financial	No funds available for maintenance.	1
Technical skills	Technical skills available for maintenance when needed.	3
Spare parts and equipment	Some spare parts and equipment available when needed.	2

Butakamira

Factor	Statement	Score
Financial	Some funds available for maintenance when needed but not adequate for major break down.	2
Technical skills	Technical skills available for maintenance when needed.	3
Spare parts and equipment	Some spare parts and equipment available when needed.	2