Self-help Initiatives to Improve Water Supplies in Eastern and Central Uganda, with an emphasis on shallow groundwater

A Case Study of the RWSN Self-Supply Flagship

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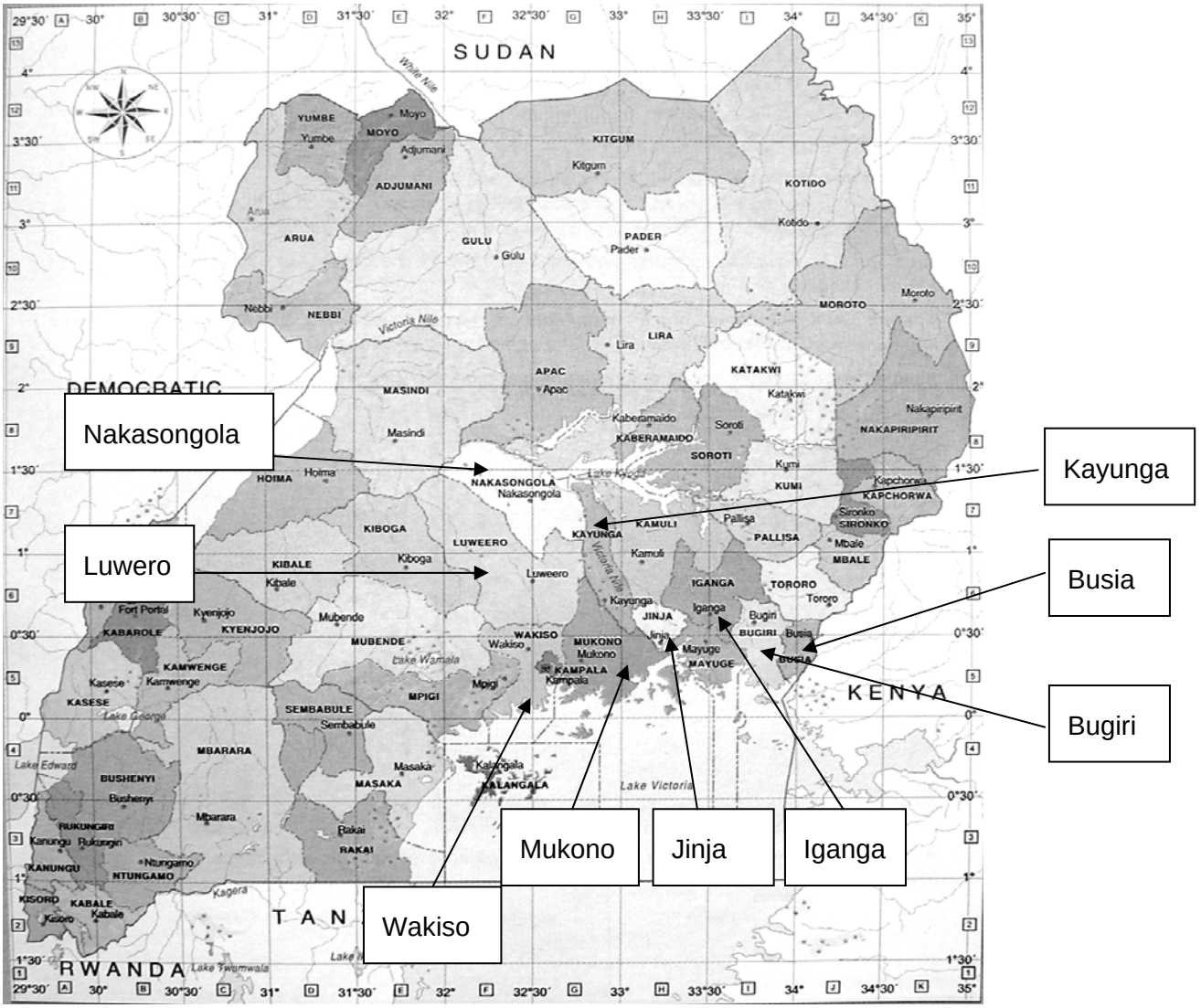
Government statistics at the time of writing estimate that just over 58% of Uganda's rural population has access to "safe water". Although this figure may be an over-estimate, for the purposes of this report the official figure is accepted. The implications of this are that at least 42% of the rural population currently obtain their domestic water from "unsafe" sources. The findings of this study suggest that the vast majority of these (serving about 32% of Uganda's rural population) are shallow scoops or water holes, with rudimentary protection (earth bunds, logs, stones, vegetation and live fencing), maintained entirely by the water users (type 1 and type 2 sources in this report). A further 5% of the rural population may be served by shallow wells and boreholes (type 3 and 4 sources) constructed on the initiative of private individuals, and another 5% are using rainwater for part or all of their needs. Consequently self-supply is of great importance in Uganda, and ripe for support and upgrading in a sensitive and step-by-step manner.

Map of Uganda Showing Districts Visited



Acknowledgments

The study was managed by WaterAid Uganda, and steered by a committee chaired by Assistant Commissioner Rural Water, Aaron Kabirizi, of the Directorate of Water Development (DWD). The Steering Committee membership comprised DWD, the Uganda Water and Sanitation (NGO) Network, UWASNET, and the World Bank Water and Sanitation Programme, WSP. The study was an activity of the Rural Water Supply Network, RWSN. The efforts of all those who initiated, steered and managed the study are gratefully acknowledged, as are the many inputs from key informants and community members.

Acronyms, abbreviations and terms

ADWO	Assistant District Water Officer
DWD	Directorate of Water Development (Ministry of Water, Lands and Environment)
DWO	District Water Office/Officer
GoU	Government of Uganda
HIPC	Highly Indebted Poor Countries initiative
LC (1,2,3,4,5)	Local Council (level 1 village, 2 parish, 3 sub-county, 4 county, 5 district)
O&M	Operation and Maintenance
OP5	GoU 5 year Operational Plan for the Water Sector, 2002-2007
PAF	Poverty Alleviation Fund[1]
PEAP	Poverty Eradication Action Plan (Uganda's Poverty Reduction Strategy Paper)
RUWASA	Rural Water and Sanitation East Uganda[2]
RWSN	Rural Water Supply Network (WSP)
SC	Sub-county
SIP15	GoU Strategic Investment Plan for the Water Sector, 2000-2015
TSU	(DWD) Technical Support Unit (8 in total covering Uganda)
U2/U3	Uganda handpump model 2, model 3 (based on India Mark II/III)
UMURDA	Uganda Muslim Rural Development Association (Bugiri district NGO)
URWA	Uganda Rainwater Association
UWASNET	Uganda Water and Sanitation NGO Network
VAD	Voluntary Action for Development (Wakiso district NGO)
WES	Water and Environmental Sanitation programme[3]
WSP	(World Bank) Water and Sanitation Programme

GFS	Gravity flow water supply scheme
Shadoof	In eastern Uganda, a shallow well with rope and bucket water abstraction
Shallow well	A groundwater source, hand-dug or hand- or machine-drilled, up to 30m depth
Borehole	A drilled small diameter groundwater source, up to 70-80m deep.

Approximate exchange rates

US$1 = USh1700

£1 = USh3080

Fuel costs

Petrol: USh1990/litre

Diesel: USh1650/litre

[1] National funds for water and sanitation, education and health, in support of the PEAP.
[2] DANIDA, 1991-2001 in two phases, covering 10 districts.
[3] UNICEF, 1995-2001, covering 34 districts.

Executive Summary

This report describes a small study into rural water self-supply (locally initiated improvements to domestic water services), with an emphasis on shallow groundwater, in central and eastern Uganda, carried out in mid-2005.

The rural water sector context in Uganda is one in which decentralised authorities (District Water Offices) contract out construction of new water sources for identified communities which are expected to contribute financially and in kind, and take responsibility for operation and maintenance. With the exception of contracting out, most water sector NGOs operate in a similar fashion. Sustainability of O&M has been a challenge, and this is being addressed at present through a published national framework and capacity-building of districts. Accepted "improved" safe water technologies include protected springs, gravity flow schemes, boreholes and shallow wells with handpumps, and communal and institutional rainwater harvesting.

The relevant literature for this study points to steady progress and continuing challenges in raising rural water supply coverage using "conventional" community based approaches in a decentralised and 'privatised' environment. The increasing focus on technologies such as rainwater harvesting and shallow groundwater, which especially lend themselves to self-supply initiatives and possible targeted external support, makes this study especially timely in Uganda.

The first two stages of the study, reported in this document, consisted of a reconnaissance field trip to 9 districts in eastern and central Uganda, followed by more detailed fieldwork in a selection of locations in some of the original districts. A total of 67 water sources were visited, and interviews held on site with around 120 water users, individually or in groups. In addition about 70 key informant interviews were also held with individuals and groups in Government, NGOs and the private sector. The report also reflects the content of the self-supply study workshop held in Kampala on 16th August, 2005.

The following are the main **findings** of the field work:

1. **The notion of self-supply is difficult** for many organisations and individuals who are used to implementing "conventional" approaches to community water supply. There is a strong tendency to divide water sources into those which are "traditional", "unimproved", "unsafe" and therefore unacceptable, and those which are "improved", "safe", and therefore acceptable.

2. In the study we identified **four main groundwater water source types** which fit the self-supply concept. **Type 1** is a very shallow (<1m) small water hole ("almost a spring") on a hillslope or near the valley floor, sometimes protected by earth bunds and/or stone or timber to allow access without entering the water. **Type 2** is a more extensive, deeper (up to 2-3m) valley tank, utilising shallow groundwater from a swamp or near-swamp. **Type 3** is a self-initiated usually brick lined shallow well, with rope-and-bucket, windlass or handpump. **Type 4** is a private borehole with handpump or submersible pump.

3. **The initiators of self-supply improvements** tend to be (a) influential community members or leaders; (b) relatively wealthy rural or urban householders who can invest in, for example, shallow wells; (c) rural or urban householders with political influence who can use their authority to steer Government investment to their own and their neighbours' advantage; and (d) businesses and institutions (including NGOs and foundations), often with foreign funding links.

4. Regarding **source use**, we found very few truly private sources. "Private" sources are usually shared, either free of charge, or at a small charge for water. Water users tend not to participate in maintenance and care of the source. In the more rural

areas, paying for water can be completely unacceptable still, although this is less so in trading centres and conurbations. Multiple source usage (using the better quality supply for drinking, and an inferior quality source for other domestic purposes) does happen, but in many cases rural people were found to use one source for all purposes.

5. **Investments** in self-supply fall into four categories: (a) input of local labour and materials only; (b) investment of private Ugandan cash; (c) "steering" of Government funds; and (d) foreign money.
6. **Barriers to self-supply** include (a) the official position of the authorities, to discourage use of poor water quality sources; (b) the insistence by both Government agencies and NGOs that they support communities, not individuals; (c) the blind-spot of both Government and NGOs regarding the positive steps people have made to improve their sources; and (d) the inability of all except a very few to invest in the more expensive (type 3 and type 4) technical options.

We propose a new way of conceptualising water supply services that recognises a spectrum from unimproved traditional sources through to a full in-home on-demand service. This approach scores any individual source on a scale of 0 (poor), 1 (medium) or 2 (good) against each of five characteristics: **access, water quality, reliability, cost and management.** In this way a source can score anything from 0 to 10. We stress though that access, water quality and reliability are only achieved at a cost, in both financial and management terms. Consequently even a traditional unimproved source can score up to about 4 (if access and reliability are good, and since cost and the management burden are small). A fully treated piped water supply would probably only ever score 8, because of the high per capita cost of development.

Our conceptual framework allows **a more integrated and balanced approach** to the consideration of water supply service improvements, without over-emphasising one issue (such as water quality) at the expense of others which may be more important to consumers (eg access and reliability). The trade-off between service level (access, quality, reliability) and cost and management is made explicit. It also enables one to rapidly assess the characteristics of a "traditional" source and identify areas for support or assistance. Rather than ignoring people's own self-supply initiatives and investing only in "conventional" improved sources, issues of access, source protection and reliability can be prioritised with households and communities, and addressed accordingly – perhaps at significantly lower cost than in the conventional approach.

We offer four initial thoughts on self-supply support options. These are: (a) the use of the scoring framework to identify **incremental (low-cost) source improvements**, building on the initiatives households or communities have already taken. Deepening, extending, protecting, covering, and/or fencing would be some of the possible interventions here; (b) **support and subsidy to 'private' source owners** to develop water sources, on the basis that such sources will be used not just by the individual, but also by the surrounding community; (c) **support to private source operators**, to enable them to carry out source management and maintenance without the need for water user committees, but with sensitisation of user households to the need to contribute financially in return for source reliability; and (d) **support to private well diggers (artisans)** in the form of training, equipment and/or improved access to credit.

Stage 3 of the study is a Cranfield University (UK) MSc thesis which has focused on the 108 self-supply wells in Busia town, integrating owner interviews and and water quality testing. The thesis involved will be available mid-September 2005.

1 Introduction, Background and Context

1.1 Introduction

This document is the report of a small study of self-supply rural water improvements in Uganda. The work was commissioned by WSP through the Rural Water Supply Network, was contract-managed by WaterAid Uganda, steered by a committee consisting of representatives of the GoU Directorate of Water Development (Chair, Assistant Commissioner Rural Water Aaron Kabirizi), UWASNET, WaterAid, and WSP. The study team consisted of Richard Carter (team leader), Joyce Magala Mpalanyi and Jamil Ssebalu. The full study TOR are set out in Annex A, and study itineraries in Annex B.

This study is complementary to a similar study which has been undertaken in Mali by the Ministry of Health and WaterAid.

1.2 Background

Self-supply is a new concept to those in Ugandan Government and NGOs who are trying to improve rural and urban water services. The concept has been extensively investigated in Zambia and work has been carried out in a few countries in west Africa, but is new to Uganda.

Self-supply refers to local-level or private initiatives, by households or groups, to improve their own water supplies, without waiting for help from Government or NGOs. In this study we have maintained an open mind concerning the scale of self-supply (individual, household, community), the type of user (domestic, institutional, productive), and the location of such initiatives (rural, trading centres, urban). We have tried to take an inductive approach, letting the data define the concept rather than the other way round. In section 5 we propose a definition of self-supply which fits the findings of the present study in Uganda. This can be compared to definitions developed elsewhere, to highlight features which are common, and those which vary from place to place.

Self-supply is not "conventional" community-based externally driven provision of water services, in which the initiative lies with Government or NGOs, and communities (of various degrees of heterogeneity) participate according to the rules set down by those external agencies[4].

1.3 Ugandan Context and Sector Trends

From projects to programme. Until the last five years or so, rural water sector activities tended to be projectised (in particular split between RUWASA in the eastern districts and the WES programme in most of the remaining districts). Now rural water supply is largely addressed under a single nation-wide decentralised programme funded in part by donor budget support ("basket funding").

Over recent years Uganda has carried out an increasing programme of **decentralisation** of Government to its 56[5] districts. Implementation of rural water services is carried out by districts, mostly using PAF (Poverty Alleviation Fund) monies released in the last three years by the HIPC process.

Construction of new water sources has been "**privatised**" – more accurately contracted out – by districts in a process starting in the second half of the 1990s. The private sector has grown and strengthened, but the sector still faces considerable challenges in terms of service delivery and cost-effectiveness.

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[4] Those rules usually involve a community contribution in cash and kind ranging from 5% to 15% of the capital cost, the establishment of a water user committee, and full community responsibility for O&M.
[5] Soon to be increased to 62, and with further plans to increase to 70.

The emphasis on coverage, and hence new source construction, in recent years has been at the expense of **sustainable operation and maintenance**. This issue is being addressed however, the publication of the National Operation and Maintenance Framework being an important milestone in the on-going process of balancing expenditure between construction and post-construction support.

NGO funding of rural water and sanitation in Uganda probably lies between 4% and 17% of total sector spending[6], although the exact figures are not known with certainty.

With special relevance to self-supply, GoU and URWA have made significant strides in recent years, initially in putting community-level and institutional **rainwater harvesting** on the agenda, and now moving increasingly toward support of household level initiatives.

Ugandan improved rural water **technologies** include protected springs, shallow wells, deep boreholes, gravity flow schemes (GFS), community rainwater tanks, and valley tanks and dams (the latter for productive (ie agricultural) purposes).

The current national safe water **coverage** is estimated[7] as 57%, varying across districts from 29% to 85%). Aspects of the available data however suggest that in some cases the coverage figures are over-estimates.

A privately initiated shallow well (type 3) with handpump supplying water to the community in a trading centre.

[6] According to the 2004 Sector Performance Report (MoWLE, 2004), 29% of the USh150bn allocated to the water sector in 2003-04 was for the rural water sub-sector.
[7] Water and Sanitation Sector Performance Report 2004.

2 Literature Review

The relevant literature for this study falls naturally into **five categories**. Each is considered below. The full references to documents cited are given at the end of this report.

2.1 Self-Supply

Much of the ground-breaking work in support of self-supply took place in **Zimbabwe**, following recognition of the importance of so-called family wells. It was estimated that prior to 1980, around 30-40% of the rural population were obtaining their domestic water from self-supply wells of this type (WSP, 2002). From the early 1990s onwards a rapidly accelerating programme of support to this sector took place, so that by 2002, it was estimated that around 50,000 upgraded family wells (UFWs – shallow wells with headwalls, concrete drainage aprons, and windlasses or handpumps) were serving about half a million people with both domestic and productive (small-scale irrigation) water.

A number of comparisons between the Zimbabwe experience and the Uganda study findings which are presented in this report stand out. First, there are similarities between the percentages (30-40%) of rural people not served with a "modern", "engineered" water supply pre 1980 in Zimbabwe, and today in Uganda. However, then in Zimbabwe people relied on hand-dug wells; today in Uganda many people use valley-bottom swamp water (the type 1 and type 2 sources described in section 4 of this report). Second, there was great resistance in Zimbabwe in the 1980s to the apparently retrograde step of promoting self-supply through a programme of simple improvements to family wells. This attitude is present today in Uganda, not so much among the sector professionals, but among the politicians who influence policy and practice. Third, the upgraded family wells in Zimbabwe now serve both domestic and productive (crop-raising) functions; in Uganda productive use of water mainly focuses on livestock watering, with very little tradition, but perhaps significant potential, for small-scale irrigation.

Detailed research into self-supply was carried out between 1998 and 2002 in **Zambia**, where a three year DFID funded research project was carried out by Sally Sutton and colleagues. The field research into potential low-cost improvements to traditional water sources led to piloting and capacity-building, and incorporation of self-supply approaches into national policy (Sutton, 2002; Sutton and Nkoloma, 2003).

A number of particular findings of the detailed research project in Zambia (Sutton, 2002) stand out in relation to the present work. First, understandable concerns about **water quality** (especially in relation to shallow groundwater sources) were discovered to be unfounded there. Bacteriological water quality testing of water sources which had received low-cost improvements showed similar levels of risk to more expensive sources with full conventional protection. Furthermore little evidence was found of deterioration of water quality from source to point of consumption. This latter observation is unusual, in the light of the wider literature on the subject, but it does demonstrate the variation which can exist between one context and another.

"Private" does not mean "exclusive". Few "private" water source developers construct wells solely for their own or their immediate household's needs. A combination of fear (that others might poison a private source), and status (associated with sharing one's own source with the wider community) are offered in explanation of this observation. So-called "family wells" each typically serve 50-80 people in the parts of Zambia studied. This is similar to the findings of the Uganda study.

Third, it is noted that the effects of high levels of donor subsidy to high-cost technologies (such as boreholes with handpumps) can be highly **de-motivating** to communities considering self-help improvements. This should act as a warning in the present context.

Fourth, the Zambia study reflects at some length on **initial Government attitudes** ("retrogressive") to the self-supply concept, and on the means that are required to overcome such attitudes. The emphasis on "seeing is believing" is particularly pertinent.

Finally, the Zambia research clearly demonstrated the importance of **finding ways for communities to implement and pay for their self-supply improvements**, in a step-by-step manner, matched to their abilities to pay, and with appropriate partnerships between communities, public and private sectors. The imposition of externally designed mechanisms which fail to take full account of the pace, decision-making processes, and economics of communities is seen as fundamentally flawed.

Self-supply has been adopted as one of the three "flagships" under WSP's RWSN, and a strategy for further investigations in more countries has been developed (HTN, 2003; Sutton, 2004).

2.2 Uganda Water Sector Policies and Strategies

The National Water Policy, the Strategic Investment Plan 2000-2015 (SIP15) and the five year Operational Plan 2002-07 (OP5) describe Uganda's overall water sector strategies. A **decentralised, privatised, demand responsive approach, with full community responsibility for source operation and maintenance** is described. The realities of these approaches have been comprehensively investigated in recent years in studies of private sector performance, value for money, tracking of GoU funding, and operation and maintenance. Consequently the outworking of GoU strategy on the ground is a very dynamic process, even if at times the process of change is inevitably lengthy (DWD, 1999; DWD, 2002b; DWD, 2003c; DWD, 2004b).

Implicit dualism, and emphasis on water quality. In relation to the present study, the following observations on policy and reality are relevant: first, although the policy documents recognise the multi-faceted nature of the water supply problems faced by rural people (problems of distance, time and energy expenditure, poor water quality, unreliability, cost of improvements), in practice water sector professionals tend to distinguish between "safe" or "improved", and "unsafe" or "unprotected" sources. The emphasis here is implicitly on water quality, to a greater extent than on the other aspects of inadequate service.

An externally driven programme. Second, the approach taken to the development of "improved" water sources is conventional in the sense of being externally driven, and with the majority (90-100%) of the investment costs coming from outside the beneficiary communities. Nevertheless, operation and maintenance has been assumed until recently to be manageable and able to be financed by communities, without external support. Community contributions to investments in rural water supply range in practice from nil to a few (up to 10) percent, and in the cases where a community cash contribution is paid, this may be paid by the community as a whole, by one or more relatively wealthy individuals, or by some other more or less representative mechanism.

The challenge of sustainability ("O&M") of improved water sources is being faced and addressed increasingly by GoU at the present time. It is clear that community-based maintenance without on-going support has been an inadequate strategy, and there has been a good deal of learning from the few programmes (such as the Kigezi Diocese Water and Sanitation Programme) which have been able to provide such support to communities over a number of years (Carter et al, 1997; Morgan et al, 2001; Danert et al, 2004). It remains to be seen to what extent Government will be able to provide post-construction support for O&M of rural water supply systems in future, and whether the inclusion of support to self-supply initiatives can help to increase coverage, while minimising the long-term burden on Government.

What is very clear from the approaches taken by GoU with the support of the major donors is that, **until the present study, self-supply has been ignored**. Neither the existence, nor

the extent, nor the relevance, of self-supply are acknowledged in any of the documents just referred to. This study, and others in future which may extend its scope and detail of investigation, therefore fill an important gap.

2.3 Uganda Poverty/Water Supply Statistics

Many surveys, inconsistent data. A large number of regular or irregular GoU surveys and censuses (including the Uganda Participatory Poverty Assessment Process, the Uganda Population and Housing Census, the Uganda Demographic and Health Survey, the National Service Delivery Survey, and the Uganda National Household Surveys) attempt to measure aspects of poverty and service provision. Not all are consistent in what they measure and in how they define water sector terms. It is beyond the scope of the present study to attempt a comprehensive comparison of the statistics collected, but it is clear even from a superficial analysis of the relevant materials that greater clarity of definition and consistency in the information gathered are desirable (MoFPED, 2002; MoFPED, 2004; MoWLE 2003a; MoWLE 2003b; UBOS, 2003a; UBOS, 2003b; UBOS, 2005).

Sector performance indicators. DWD itself has gone through a lengthy process of defining and refining performance indicators for the sector, and that process is documented in internal and published papers over a number of years. The present situation is that sets of performance indicators have been agreed and will be rolled out across the districts over the coming months, in order to provide better-focused and more reliable sector data than hitherto (DWD, 2004c;.DWD 2004d; MoWLE, 2003a; MoWLE, 2004).

The present list of **Key Performance Indicators** for the water supply and sanitation sector is as follows (DWD, 2004d):

1. percentage water coverage of rural population;
2. percentage water coverage of urban population;
3. percentage of improved water sources that are functional at the time of spot check;
4. average cost per beneficiary of new water and sanitation schemes;
5. percentage of people with access to improved sanitation (household and schools);
6. percentage of water samples taken at the point of collection or discharge that comply with national standards;
7. new storage volume for water for production;
8. number of water points in each parish/village;
9. percentage of people with access to hand-washing facilities;
10. percentage of water and sanitation committees in which at least one woman holds a key position.

As already commented above, implicit in the indicators which relate to rural water supply (numbers 1, 3, 4, 6, 8, 10) is a dualistic way of analysing the situation – populations are “covered/served” with “improved” water sources, or they are not. It is not easy to condense sector performance measurement into a small number of indicators, but it is worth noting here that indicators 3, 4, 6, 8, and 10 are dealing with the same issues of source reliability, cost, water quality, access, and management which we adopt later in this report.

2.4 Uganda Rainwater Harvesting

Roofwater harvesting is the main self-supply initiative. The focus of the present study is on shallow groundwater. However, one of the most active areas of rural water self-supply in Uganda is roofwater harvesting, and the study TOR required the team to reflect the literature on this subject in our report.

Studies and Action Plan. Self-supply of rainwater by households probably has a very long history. NGO support to households, institutions and communities extends in some cases

over at least 10-15 years; and Government investment in rainwater harvesting at community and institutional level has been going on for about the last five years. Research and consultancy work over the last five years have led to an Action Plan for a five-year programme of accelerated promotion of domestic rainwater harvesting, commencing July 2005 (DWD, 2003a; DWD, 2004a; URWA, 2004; DWD, 2005).

The Policy Study. Considering the Policy Study (URWA, 2004) in relation to the present work, seven points are particularly relevant. First, it is observed, as in the present work, that "informal" or "opportunistic" roofwater harvesting is widespread in Uganda. Self-supply is alive and well, if unsophisticated in terms of technology, and involving limited capital investments. Self-supply roofwater harvesting is primarily a household-level activity, and communal or institutional systems tend to be those which have been promoted by Government or NGOs. Roofwater harvesting may contribute at present around 5% of national household water consumption.

Second, it is observed that **communal management of water sources is highly problematic**, and that management at the household level may be easier and more sustainable.

Water resources. Third, it is noted that in many parts of Uganda the water resources available for roofwater harvesting are available and attractive. In the more densely populated southern districts of Uganda, the rainfall distribution is such that only relatively short periods can be described as "dry". In the present study the corresponding resource is shallow groundwater, and although its availability is known in less detail, it is certainly the case that parts of Uganda offer considerable potential for further development of this resource.

Attitudes. The Policy Study notes (former) resistance in Government to the promotion of domestic, as opposed to communal, roofwater harvesting. The report notes that this situation is changing, however. In the present study, the association in the minds of some Government and NGO staff of self-supply initiatives with "private" supply sources also represents resistance to the idea of support to self-supply.

A roofwater "ladder". The fifth point at which the Roofwater Study and the present one touch is in the conceptualisation of a "ladder" of improvements to technology and management of roofwater harvesting. The report sets out a sequence of six "rungs" by which households can climb the "ladder" towards rainwater as their sole water source. Improved water supply is portrayed as a set of incremental improvements, and not as a dualistic, all-or-nothing, pair of alternatives ("improved" or "unimproved").

Sixth, the report demonstrates that in the present interim period in which demand for improvements in roofwater harvesting has not fully taken off, costs are rather higher, and skills are less available, than than they will be in future when the **market** matures. This may also be true in relation to shallow groundwater development, since the number of people able to invest in self-supply shallow wells is rather small at present.

Finally, the report presents some **economic analysis** of costs, benefits and hence pay-back periods associated with improvements to household rainwater systems. We would caution against too heavy a reliance on the conclusions from such analyses, as they often omit to consider the wide range of reasons why people may choose to invest in self-supply initiatives. Such reasons may have much less to do with time and money savings than with less tangible notions of convenience, prestige, security of investment, or community service, all of which are difficult to quantify or monetise.

The Draft Action Plan. Proceeding from the Policy Study and related discussions in DWD is the Draft Action Plan for Accelerated Domestic Roofwater Harvesting in Uganda (DWD, 2005). This Action Plan aims to bring about an increase in the number of households enjoying the benefits of improved roofwater harvesting from 6,000 to 21,000 over the five-year period commencing July 2005. This will be carried out through a combination of five

areas of attention, expressed as outputs in the Action Plan logframe: (a) NGO and CBO capacity-building, (b) private sector organisation and artisan capacity-building, (c) provision to districts of clear policies and guidance, (d) local Government capacity-building, and (e) improvement of, and dissemination of information about, roofwater harvesting technologies.

In the Draft Action Plan each district will be **categorised** according to its present degree of involvement in the sub-sector, into one of four categories: (a) implementing, (b) fast-track, (c) knowledgable, and (d) sympathetic. The aim is to bring all Uganda's districts into one of the first two categories by 2010.

In relating the Domestic Roofwater Harvesting Action Plan to the present study, three points are important. First, **many of the concepts of the Action Plan, including the five outputs listed above, may be directly transferable**. The categorisation of districts proposed in the Roofwater Action Plan, and indeed the corresponding categorisation of NGOs and CBOs, may also be useful for self-supply promotion more widely – if adapted to take account both of staff attitudes and the physical potential for self-supply sources in their geographical areas of operation.

Risk of stifling initiative. Second, a key factor with self-supply – both the domestic roofwater catchment described in the Action Plan and related documents, and the shallow groundwater initiatives described later in this report - is that local initiatives have taken place, and these have not been closed down or stifled by external assistance. It is a fact, observed in many places, that too much external interest in household or community activities, expressed in terms of advice, support, financial assistance, technology, training, guidance, regulation or control, can eliminate any sense of local ownership, and choke the very initiative on which the success of self-supply depends. This issue needs to be clearly understood.

Self-supply promotion therefore needs to be managed with a very light touch, and careful observation made in order to learn just how much support is optimal, and how much is a step too far. Assistance will need to be targeted with care, on a case-by-case basis, according to the critical constraints experienced by households, communities, CBOs, NGOs and local Government organisations.

2.5 African and Ugandan Groundwater

Groundwater studies. A wide range of issues concerning development (especially cost aspects) and management of groundwater for community water supply (especially handpump maintenance and supply chains) have been, and are being, studied in various countries of sub-Saharan Africa[8] (MoWR Ethiopia, 2003; WAWI, undated). The WAWI study provides a useful general overview of some of the issues which affect groundwater development costs in three countries of west Africa (Ghana, Mali, Niger), but without providing great detail or depth. The general perception in the WAWI report and others is that the cost of drilling conventional boreholes in Africa is excessive. However, this perception is notoriously difficult to pin down with clear demonstrations of over-pricing or over-charging. Work in progress under RWSN's Cost-Effective Boreholes Flagship is exploring these issues at the present time, and in particular the possible ways in which costs could be reduced through alternative technologies (including well designs, equipment selection, siting methods, low-cost alternatives), different approaches to management of drilling programmes (eg through batched contracts allowing more cost-effective logistical planning), and other means. In the present context however, the key issue is that the per capita cost of a drilled borehole is perceived as high. Alternatives such as the roofwater options discussed above, or the shallow groundwater option described later in this report, in which households or

[8] Including through the **cost-effective boreholes** and **sustainable handpumps** flagships, which together with the topic of **self-supply** form the scope of the RWSN.

communities take on a much greater share of the investment than with conventional Government or NGO programmes, appear very attractive.

Uganda Shallow Well Study. In Uganda the Shallow Well study carried out in 2002 in 17 Districts of Uganda (DWD, 2002a) led to subsequent discussions concerning possible action research to improve siting, construction quality and sustainable O&M of shallow wells, but so far this has not turned into specific concrete actions. The study describes what would be considered a "conventional" approach to shallow well development in the present report. In other words it describes the externally-initiated use of shallow well technologies by Districts and NGOs, and barely recognises the existence of self-supply[9]. However, it provides useful background information for this and other studies which aim to find new and more cost-effective ways of supplying water to rural households and communities in Uganda. In particular, the study estimates that nearly 50% of the land area, in the four districts[10] in which detailed studies were undertaken, has significant potential for development of shallow wells.

2.6 Conclusion

The literature as a whole points to **steady progress in the face of continuing challenges** in raising rural water supply coverage using "conventional" community based approaches in a decentralised and 'privatised' environment. Coverage, in the sense of access to an "improved" source, is probably increasing although the absolute figures may be over-estimates. Operation and maintenance – sustainability – poses the biggest challenge to the "conventional" approach.

The increasing focus on technologies such as rainwater harvesting and shallow groundwater, which especially lend themselves to self-supply initiatives and carefully targeted external support, makes this study especially timely in Uganda.

A type 1 self-supply source on a hillside. Note basic source protection using stones, to prevent user contact with water

[9] There is one reference to "dug well construction ... on going in most districts of Uganda at communal level as well as household level."

[10] Soroti, representing the Basement Complex; Mubende, representing the Buganda-Toro System; Mbarara, representing the Karagwe-Ankolean System; and Nebbi. The reason for the inclusion of Nebbi is not clear.

3 Approach to the study

The study has been approached in three stages. These are described below.

3.1 Stage 1: Reconnaissance

Summary of work done. In the first stage the study team held two planning meetings, briefed the Steering Committee, and carried out a small number of key informant interviews in Kampala. We then spent 5 full days in the field visiting a total of 9 districts in eastern[11] and central[12] Uganda. Site visits, involving discussions with 40-50 individuals, and key informant interviews, numbering around 20 in total, were held by the team together in order to develop common understanding and consistency of approach. During and after this first field visit, a number of conceptual frameworks and survey instruments were developed (see section 5) and the more detailed work of Stages 2 and 3 was planned. A second Steering Committee meeting was held on 20th June, at the end of Stage 1, and a report presented.

3.2 Stage 2: In-depth field work

Stage 2. Following the Steering Committee on 20th June 2005, two members of the study team continued further in-depth work over a two week period in a smaller number of districts and with a sharper focus than in Stage 1. In Stage 2 each of the local consultants set out to hold a further 5-10 in-depth key informant or focus group interviews, and collect site data from 15-20 more sites. In this way the database and conceptual framework so far developed was to be extended, consolidated and refined. In the event, both these target numbers were exceeded, so that after Stage 2 discussions had been held on a total of 67 sites, and a total of nearly 70 key informant interviews had been held. Annex C lists the Key Informants interviewed, and Annex D catalogues the sites.

In Stage 2 **Joyce Magala Mpalanyi** returned to Iganga and Bugiri districts, and Busia rural areas, focusing especially on very simple low-cost improvements to traditional water sources. **Jamil Ssebalu** returned to Kayunga and Luwero districts, and afterwards to Iganga, Bugiri and Busia, focusing especially on finding and interviewing shallow well entrepreneurs and well diggers.

3.3 Stage 3: Master of Science thesis

The third stage of the work, complementary to the main study and overlapping with Stage 2, was a period of 4-5 weeks field work focusing on the shallow wells of Busia town. This will lead to the production of a **Master of Science thesis** in Community Water Supply by Edith Rogenhofer, an experienced water sector specialist with extensive African field experience.

3.4 Summary and Reporting

This report supercedes the report of Stage 1, which was presented in June 2005. Edith Rogenhofer's MSc thesis will provide further detail, specifically on the shallow wells of Busia, and will be available mid-September 2005. A paper on self-supply was drafted after Stage 1, and this will be presented at the WEDC conference in Kampala in October 2005. A workshop was held in Kampala on 16th August 2005, and its deliberations are reflected in this report.

[11] Kayunga, Mukono, Jinja, Iganga, Bugiri and Busia.
[12] Wakiso, Luwero and Nakasongola.

4 Findings

Site visits. The study team visited a total of 67 sites in nine districts between mid-June and early July 2005, and in all cases interviewed the owners/initiators of the water points or, in their absence, local water source users. GPS locations (latitude and longitude) were taken at all sites visited, and photographs were taken at many sites. Annex D sets out in summary form the self-supply sites visited during the study. Some photographs are included in the text of this report.

Key Informant interviews. In addition to the site interviews with water source owners, 61 key informant interviews were held with individuals or small groups in Kampala and in the nine districts visited. Annex C lists these individuals, with contact details and comments.

The following sections summarise key aspects of the findings of the study.

4.1 General Observations

Perceptions. The office interviews showed that for many informants it was very difficult to appreciate what is meant by self-supply or private or local initiatives. There is a deeply entrenched view that private initiatives are not only far inferior to conventional improved water sources, but that they have no significant part to play in improving water supply coverage in Uganda. This said, there was a significant number of informants who had either thought about self-supply issues already, or were very willing to do so, and who provided not only guidance in the field, but also extremely helpful conceptual input to the study team's thinking.

4.2 Types of Water Source Seen

A number of different water source types were visited during the study. Table 1 summarises the main types, excluding household rainwater catchment.

Table 1 shows that technologies of self-help groundwater supply vary from the rudimentary (types 1 and 2) to the increasingly sophisticated (types 3 and 4). And yet, across the whole spectrum of technologies people have done something for themselves to improve access to water, protection of the source, or reliability of supply.

Table 1 Self-Supply Study Uganda: Main Water Source Types by Technology

Source type	Description	Comment
1. **Water hole** – locally improved domestic water source.	A very shallow (water within 0.5m of surface) hole, usually unlined, but sometimes protected by earth bunds and/or timber. Usually drained, sometimes fenced.	Typically a hill slope or valley bottom location, where shallow groundwater almost emerges as a spring, but it can only be accessed by a shallow excavation.
2. **Valley tank** – locally constructed and acting as shared source of water.	A hand-dug excavation, typically $100m^2$ or more in plan area, up to 2m deep supplying domestic water.	In valley bottom locations, utilising shallow groundwater, but often catching surface runoff too.
3. **Shallow well** – water shared or sold.	Typically a brick-lined hand-dug well, up to about 20m deep, with rope-and-bucket, windlass, rope pump or handpump.	Found in rural locations, trading centres and towns. In eastern Uganda this is known (misleadingly) as a "shadoof".
4. **Borehole** – water sold.	A "deep" drilled borehole with handpump or submersible pump.	Only found in trading centres and towns in Stage 1.

4.3 Source Owners/initiators

The initiators of self-supply water improvements show wide variation in personal characteristics. However, almost by definition, they all share an entrepreneurial spirit or a sense of leadership or initiative, and in many cases they have the wealth to carry their ideas into practice. At the wealthier end of the spectrum some self-supply initiators are businessmen, NGO workers, teachers, or others with incomes or pensions who are willing to invest in their communities. At the poorer end are community members who mobilise their friends and neighbours to improve traditional water sources using local labour and materials.

Table 2 lists the main types of source owners/initiators identified in this study.

Table 2: Main Types of Self-Supply Water Source Owners/Initiators

- **a community member or leader with sufficient initiative and influence** to be able to mobilise neighbours or community to construct or improve a self-supply source (typically of type 1 or 2 in Table 2);
- **a rural or urban householder who has sufficient cash** to invest in an improved source (typically type 3 or 4 in Table 2) for him/herself; source is then almost always shared freely with neighbours or water is sold;
- **a rural or urban householder with administrative/political influence** who by using (abusing?) that authority can achieve self-supply (by improved source, typically type 3 or 4) and share with a few neighbours;
- **businesses and institutions** investing in improved sources often by mobilising foreign funds.

4.4 Source Use

Out of the 67 water sources visited during this study almost all (80%) exist primarily for domestic water use. There is evidence in some cases that consumers use low quality sources for bathing and laundry, and improved (typically handpump or tap water) sources for drinking and cooking. But in many cases a single source may supply all domestic functions, with recourse to a more distant, reliable and better quality source when the nearby source dries up. The issue of access is of significantly greater importance to most (especially rural) consumers than quality; while for sector professionals objectionable quality alone (by appearance or testing) can be enough to condemn a source as unacceptable.

Table 3 sets out the main source uses encountered in this study. It should be noted though that the categories in this table are not watertight, and there is some overlap or possibility of minor differences in interpretation of the field data.

Box 1 Urban-Rural Trends in Self-Supply in Eastern Uganda

Three urban-rural trends have been seen in this study: ***first***, there appears to be evidence of technology transfer from urban to rural areas – self-supply sources seen in the towns and trading centres are copied in more rural areas; ***second***, there is a greater concentration of private individuals with sufficient wealth to invest in self-supply sources in the towns; and ***third***, the acceptability of user payment for water increases along the line from deep rural, to trading centre, to town proper.

Table 3: Main Source Uses Encountered in the Uganda Self-Supply Study

Source Use	Number of Occurrences	Percentage of sample
Domestic supply for private personal use by owner/initiator and household only.	3	4
Domestic use by owner/initiator and neighbours (usually with no user fees).	33	49
Domestic water primarily as a business venture (water for sale).	6	9
Domestic water for both owner/initiator use and for sale.	6	9
Domestic water – other - (eg community initiative; politically influenced siting of Government-provided source; conventional externally driven initiative).	7	10
Business use (community centre/restaurant, brick making, coffee factory, agriculture).	6	9
Institutions (schools, mosque).	7	10
Totals	**67**	**100**

An important cultural issue concerning self-supply in Uganda concerns shared usage and payment for water. Three points emerge:

- **first**, especially in rural areas, it is abnormal for a private source owner to prevent his/her neighbours from sharing use of the water source, even if they have had no share at all in the investment. Private wells for exclusive use by one family have amounted to only 4% of the sample visited in this study. This finding concurs with those found elsewhere in sub-Saharan Africa, perhaps with the exclusion of Zimbabwe's "family wells"[13];
- **second**, water users sharing a "private" well typically show great unwillingness to cooperate in source maintenance and care or payment. Owners comment on the fact that water users fail to participate in care or maintenance, but the owners appear largely accepting of this;
- **third**, payment for water (by volume or by monthly or annual charge) becomes increasingly acceptable as one moves from rural areas to trading centres to urban locations. In rural areas it is usually unacceptable, while in the more urbanised areas users fully expect to pay.

Box 2 Self-Supply Sources: Benefits and Disbenefits

Self-supply sources were reported by users to offer convenience, time-saving, and opportunity to use greater quantities of water than otherwise. By reducing queues at other water points, self-supply sources helped to reduce fatigue and conflict among users. The view was also expressed that self-supply sources help to reduce spread of HIV by saving young girls long walks and encounters with men at water sources.

The downside of many self-supply shallow well sources relates to (a) their location – often too close to latrines – and (b) the quality of construction. Furthermore, even in (the majority of) cases in which water is abstracted by rope and bucket, when the rope breaks this can result in the source remaining out of action for a significant time. Water users understand the difficulties of maintenance, and we found evidence of resistance to handpumps. In the words of one lady: *"if they could not afford to buy ropes in the past, how will they buy spare parts for the pump? Tujja kukikuba kiveewo (they will break and dismantle the pump if it develops any problem)".*

[13] Personal communication with Sally Sutton.

4.5 Investments

Investments in self-supply fall into four categories, based on the 67 sites visited in the study. Table 4 sets out the investment types encountered in this study.

Table 4 Investment Types Encountered in the Uganda Self-Supply Study

- **investments of labour and local materials** (soil, timber, stone) only – especially in the case of source types 1 and 2;
- **investments of private cash sourced within Uganda** (anything from USh1m for a shallow brick-lined well – handpump extra (USh150,000 for a rope pump; USh700,000 for a U2), to USh10-20m for a deep borehole with submersible pump and overhead tank);
- **investments of Government funds for community water supply "steered"** to combine self-supply or a business venture with community water;
- **foreign investments mobilised** through individual benefactors, NGOs, Churches or donors.

4.6 Barriers to Self-supply

There are four main barriers to the wider existence of self-supply initiatives. **First**, sources which fall short of Government standards of construction quality, and, especially, water quality, are verbally, if not actively[14], discouraged by the authorities. In Busia town for instance (population approx 40,000), the piped water supply serves less than half the population, and around 108 private shallow wells serve the remainder. And yet, the official position of town and district authorities is that these highly accessible, if risky quality, sources should be discouraged.

Second, many NGOs and Government authorities will not (and say they cannot) assist individual households. They exist to support "communities"', and they fear that assistance to individuals in water supply would somehow undermine their mission and objectives. This may change however, especially as the domestic roofwater action plan (section 2.4) is put into operation. Also as community management becomes even more challenging in future under the social pressures of urbanisation and the negative impacts of contracting-out, other (perhaps more individually focused) ways of managing rural water services will need to be found – such as 'private' owner-managers.

Third, almost no support is given to communities which make type 1 or type 2 improvements. Most organisations appear blind to the positive significance of the investments made by individuals or communities, and none of the NGOs or Government agencies interviewed were considering simple low-investment improvements to such sources. As an example, two valley tanks north of Nakasongola town provide accessible, poor quality water to about 600 households. They dry up for two to three months per year, necessitating a much longer walk to a "safe" water source. Deepening of the sources would almost certainly improve their reliability, and fencing would help to protect them. It may be too that the use of local water lilies (kitengejja is used in Wakisi sub-county of Mukono) could help to preserve water quality – more understanding of such traditional practices is needed.

Fourth, the investments necessary to construct protected shallow wells or boreholes are available to very few individuals. Some form of cash subsidy from the State could alter this, but the attitude that "Government does not help individuals" would have to be overcome first.

[14] We did not find any examples of Government authorities closing down sources.

Box 3 Private Well Diggers and their Experiences

During the study more than 10 companies, informal groups and formal associations, representing 20-30 individual well diggers, were interviewed. Six individuals who were able to give quantitative data were able to report their direct involvement in 160 shallow wells constructed either directly for individuals or communities, or as sub-contracts to pre-qualified companies tendering for district contracts, over about the last five years.

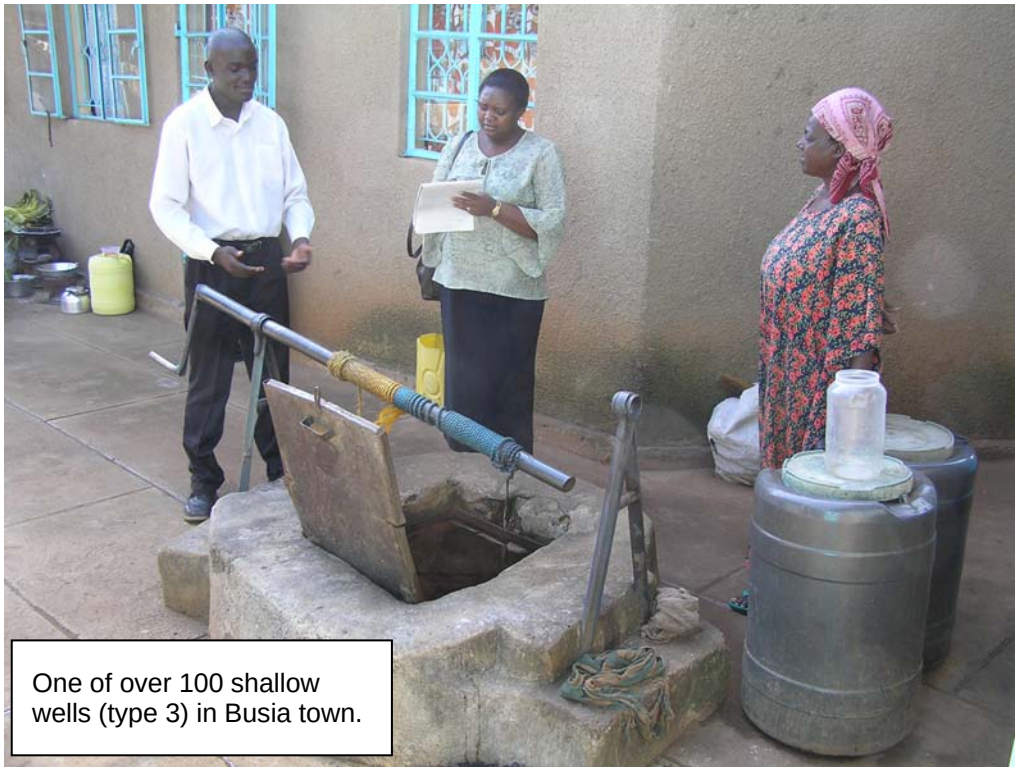
Private well diggers themselves are generally artisans, sometimes with technical qualifications (but not specifically related to well construction), who are not usually formally registered (because of the expense and other challenges which this poses). Business is limited, and they struggle to make ends meet, often carrying out other forms of construction work as such opportunities present themselves. They tend to have little business know-how, very limited capital and equipment, limited formal training, and limited access to credit (usually by informal means only). Cash-flow represents a serious challenge for them.

When working directly with communities, two common problems arise: first, disputes about the siting of the well; and second, failure of the community to pay for the work completed.

Box 4 Water Quality

The subject of water quality was explicitly excluded from this study, so no water samples were taken, and no measurements of water quality made. Judgments about the water quality of sources visited in the field were primarily based on subjective judgments of pollution risk. Furthermore, no attempt was made to asess deterioration of water quality between source and point of consumption.

Very little evidence was seen of water treatment by self-supply owners or the users of self-supply sources. In some cases the team was told that individuals boil or otherwise treat water, but such claims are hard to substantiate without direct observation. In a few locations the team was informed that communities encourage the growth of indigenous water lilies on open ponds (kitengejja), but the mode of operation of this method of treatment, and its effectiveness or otherwise, are not known.



One of over 100 shallow wells (type 3) in Busia town.

5 Conceptualisation

5.1 From Dualism to Pluralism

The point has already been made that "conventional" thinking (by Government and NGOs) on rural water supply tends to be dualistic. **Either** the water source people are using is seen as "traditional", "unimproved" and "unsafe", hence unacceptable; **or**, it is seen as a modern "improved", "protected" or "safe" source. Nothing exists between these two extremes.

Moreover, in the "conventional" approach, the ideal would be a piped, treated, water supply service, delivering water into the yard or house, and paid for by the users.

Our experience and thinking in the study so far would support a different point of view, one which is more pluralistic – recognising a range of technical, investment, and management options, each with their own strengths and weaknesses.

5.2 Trade-offs

Valued characteristics of water sources. We suggest that five key water source characteristics are important for water consumers and the authorities and NGOs developing water services[15]. These characteristics are:

- access;
- water quality;
- reliability;
- cost; and
- management.

We deliberately do not include water quantity here, since it is implicit in the issues of access and reliability.

Compromises are necessary. An important point to recognise is that there is a trade-off between the first three and the last two. To achieve high standards of access, water quality and reliability implies in most cases high cost and more challenging management. On the other hand low-cost water supplies which can be easily managed by households or communities are often compromised in terms of access, water quality or reliability. Sources which score high on all five aspects are difficult to envisage; compromises are necessary.

5.3 Toward an Improved Conceptualisation of Rural Water Supply

We propose here **a scoring system** for all types of water source, based on the five source characteristics listed above. The purpose of this scoring system is to synthesise the most important characteristics of rural water sources, and allow one to think along the full continuum from traditional unimproved source, through protected community source to piped supply.

Each of the five source characteristics is scored according to the descriptors in Table 5. Each characteristic can score 0 (poor), 1 (medium) or 2 (good). The scores for a given water source are then summed to give an overall score which can therefore range in principle from 0 to 10. The scoring system as presented implies that each characteristic has equal weight.

The table has been drawn up from the assumption that a totally unimproved "traditional", distant, surface water source (with no protection) should score near to zero[16]; a basic

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[15] These issues are a close reflection of the Ugandan water sector key performance indicators, and they reflect wider international goals too.

[16] But not zero itself, since people at least have enough water to stay alive.

protected rural community source (eg protected spring, shared tap, or handpump) should score around the mid-point of the scale; and treated piped water delivered into the home and managed well should score near to 10[17].

In the table, the scoring of **access** is straightforward, and consumption (quantity) is implicit. A score of zero is for situations where water is very distant and consumption correspondingly low[18]. A score of 1 reflects a reasonable level of shared access, while score 2 is for water in the yard or home.

Water quality scoring is also straightforward. Zero is for obviously polluted or at-risk sources (usually open); 1 is for untreated protected sources (quality is good most of the time, but it cannot be guaranteed; also deterioration between source and point of use is the norm); 2 is for high quality disinfected water in the home.

With **reliability**, a zero score signifies an unreliable source, for instance a pond, well or rainwater system which is dry for a significant part of the year. A score of 1 is for a shared source in which consumption is limited[19] not by source performance, but by distance (eg a communal handpump). A score of 2 is for water supplied reliably into the yard or home, allowing consumption typically to exceed (and sometimes far exceed) 20 litres per person per day.

For **cost**, a zero score signifies a very high value. This may be the very high human cost associated with a distant polluted water source (in terms of time, energy, health and lost opportunity); or the high investment cost of, for example a pumped treated piped water supply. A score of 1 is for a typical "conventional" improved rural community water source, in which the community can only contribute a few hundred thousand Uganda Shillings, or around 10% of the investment cost. A high score (2) is for sources in which mainly local materials and labour are used, and dependence on external financial support is low or non-existent.

Finally for **management**, a high score (2) is typically for traditional sources in which dependence on external management support is nil or negligible. A medium score (1) is for typical "conventional" improved sources (eg handpumps or GFS), where it is becoming increasingly recognised that significant long-term external support to communities is necessary to ensure O&M sustainability. A score of zero is for sophisticated systems in which supply management and maintenance necessarily require a technically competent individual or body. However, if that individual or body is competent and reliable (eg management by an NGO), the score is raised to 1, and if it is also permanent (eg State or faith-based organisation) the score is raised to 2.

[17] But not necessarily 10, because high cost and management challenges may reduce the overall score.
[18] Typically to 3-4 litres per person per day.
[19] Typically to 8-12 litres per person per day.

Table 5 Proposed Scoring System for (Rural) Water Sources

Characteristic	Score 0	Score 1	Score 2
Access	Distance and/or ascent result in very limited consumption (typically less than about 8 litres per person per day.	Water is close to most users (typically within 0.5-1.0km), but still has to be carried home.	Water is supplied into the yard or house.
Water quality	Water is obviously polluted, reported to taste unacceptable, or is clearly at risk of contamination from pit latrines, livestock or other cause.	Source is well protected but untreated. Any storage is covered, and there are no obvious routes for contamination.	Water is treated (including disinfection), and treatment is managed to a high standard.
Reliability	Source performance fluctuates with season, or dries up with heavy use, such that users have to go elsewhere at certain times. Unreliability or low yield may lead to conflict between users.	Although consumption may be low because of access, the demands of the users can nearly always be met, and queuing times do not cause conflict or recourse to inferior sources.	Water is always available on demand, and consumption rates exceed 20 litres per person per day.
Cost	Cost is high. In the case of some "traditional" sources there is a high human cost in time, energy and ill health. In the case of some improved sources, capital cost can only be borne by a state or private investor. User fees may cover part or all of O&M costs, or users may pay no user fees.	Typically the users can contribute 10-15% of the capital cost. User fees cover basic maintenance only, when the need arises (and no contribution to capital cost recovery).	Capital cost is such that users can bear at least 50% of the investment. User fees are negligible.
Management	System maintenance is the responsibility of a competent body or person. User contribution to management is purely financial. If the private or public body provides a reliable service, raise score to 1. If the body is permanent, raise to 2.	Long term external support is needed to enable user manage-ment to function satisfactorily.	The source, as constructed, can be managed by the users, without external support.

Table 6 illustrates how the scoring system works for a range of sources from totally unimproved self-supply through to piped urban water supply.

Table 6 Examples of Use of the Scoring System

Description of source	Quality	Access	Reliability	Cost	Management	Total
Untouched traditional surface water or swamp water source: polluted, distant, drought-prone.	0	0	0	0	2	2
Shallow uncovered hand dug well with rope and bucket, near to users, but near to pollution sources. Yield is good.	0	1	1	0-1	2	4-5
Deep borehole with handpump, serving extended community.	1	0-1	0-1	0-1	1	2-5
Protected spring, near to users, and well maintained.	1	1	1	1	2	6
Household rainwater system with small storage capacity (less than $2m^3$)	1	2	0	1-2	2	6-7
Household rainwater system with large storage capacity (more than $2m^3$)	1	2	1	1-2	2	7-8
Piped, treated water into the home, provided by a competent, permanent body.	2	2	2	0	2	8

Annex D includes the scores allocated by the team to the water sources visited during the study.

The most obvious feature of Tables 6 and Annex D is the fact that **no source (including open ponds and water holes) falls below a score of 4**. This is because such ("unacceptable") sources provide ready and often reliable access to water at negligible cost and easy management – even though water quality may be poor.

Second, **no "improved" source, including deep boreholes with handpumps scores more than 6**. This is because access still requires expenditure of significant time and energy, consumption is correspondingly low, cost is high, and management is challenging – despite significantly improved water quality and reliability.

5.4 Implications for Self-Supply

An integrated tool. The usefulness of the new conceptual framework just presented is twofold. First, it is a single tool for assessing water supply sources, equally applicable to traditional and improved sources, rural and urban contexts. It allows a more integrated and balanced approach to the consideration of water supply service improvements, without over-emphasising one issue (such as water quality) at the expense of others which may be more important to consumers (eg access and reliability). The trade-off between service level (access, quality, reliability) and cost and management is made explicit.

Identify aspects for intervention. Second, it enables one to rapidly assess the characteristics of a "traditional" source and identify areas for support or assistance. Rather than ignoring people's own self-supply initiatives and investing only in "conventional" improved sources, issues of access, source protection and reliability can be prioritised with

households and communities, and addressed accordingly – perhaps at significantly lower cost than in the conventional approach. This is pursued further in section 6.

Box 5 A Definition of Self-Supply, Based on the Uganda Study

Self-supply water sources are those which have been constructed at the **initiative** of an individual or group of individuals in civil society, with little or no support from Government or NGOs. The individual or group provides most of the **investment cost** of the source, in cash or kind. While **ownership** may or may not be clear in law, there is no perception that Government or NGO has joint or total control of the source. **Utilisation** of the source is nearly always enjoyed by a larger group than the individual(s) who initiated and paid for construction. **Upkeep** is nearly always the responsibility of the initiator of the source, often with little or no support from the wider user group. In the case of trading centres and urban locations, it is common for users to pay **user fees**, on a volumetric basis; in rural areas this is still unacceptable. To date self-supply has received very little **support** from Government, and great caution will be needed if such support is proposed, to avoid undermining the strengths of self-supply.

A shallow valley-bottom groundwater source (type 2) constructed by the community. Fencing, deepening, and improving access would represent significant first stage improvements to such a source.

6 Options for Support to Self-Supply Initiatives

Self-supply is usually independent. Generally, self-supply initiatives are undertaken without reference to Government, or after giving up waiting for Government support. Most informants in Government had rarely, if ever, been consulted by private water source initiators. However, some cases were found in which Government had assisted self-supply initiatives. For instance in Bugiri, the DWO has recently installed handpumps on four self-supply wells. All but one are functional, the exception being a pump which developed a mechanical fault during installation. It is not known to what extent this assistance by Government has affected the sense of ownership by the initiator and user community.

Baseline. A number of possible options exist for support to self-supply initiatives. Each of these would have to follow a thorough baseline assessment of the existing water supply situation, perhaps using a scoring system such as that set out in Section 5.

Ownership. Before embarking on any of these options, the implications for ownership would need careful examination. There is little doubt that ownership of "conventional", externally initiated, water sources such as boreholes with handpumps is perceived to lie only partially with the user community, who have only limited scope to alter, modify, or dispose of the technology. This probably accounts in part for the difficulties encountered by community-based maintenance systems, in Uganda and elsewhere.

In the case of self-supply water sources, ownership is clear. However, that sense and reality of private ownership could easily be upset by external intervention. It is vital to avoid this.

6.1 Rural water supply ladder

The first option is to identify minimal low-cost access, water quality or reliability improvements to existing traditional sources, and target technical and/or financial support to water users in a planned incremental manner. Improvements could involve some or all of: re-siting sources nearer to consumers, deepening shallow groundwater sources, constructing simple source protection using locally available materials, fencing, or sealing and installation of a low-lift pump (such as the Rower pump or rope pump). The existing sanitation ladder, and the domestic roofwater ladder described in URWA (2004) could provide models for this approach.

6.2 Support to private source owners

Where individuals demonstrate their willingness to invest in, for example, shallow wells, local Government could assist by supplying some or all of materials, equipment (eg windlass, ropepump, or U2/U3), and maintenance support. Such an approach can be fully justified in all except the most urban of situations,if it is true (as this stage of the study has concluded) that exclusive private sources rarely if ever exist outside of the largest conurbations.

6.3 Focused O&M support to private operators

Where self-supply sources already exist, and are used by the wider community, local Government could focus assistance on the owner as the one responsible for source repair and maintenance, obviating the need for water user committees. Communities would need to be sensitised to the importance of paying for water.

6.4 Support to private sector well diggers

The skills of well construction exist in central and eastern Uganda, but the artisans involved have limited technical and business training, capital, equipment and access to credit. Support to artisans in all or some of these aspects could be of great value in stimulating the supply side of the market.

7 Overall conclusions and recommendations

7.1 Conclusions

Self-supply initiatives to improve water supply provision are alive and well in Uganda. Type 1 and 2 sources may provide water to around one third of rural people, while type 3 and type 4 sources probably serve fewer than 5% and 1% respectively[20] of the water supply needs of the rural population. Need, initiative, capital, and skills exist, although the last two of these are scarce compared to the first two.

Contrary to some expectation prior to this work, **most self-supply or "private" initiatives result in supply to an extensive user group** (tens or even hundreds of households), and only very few are reserved for the exclusive use of the owners.

The greatest potential advantages of self-supply initiatives lie in the **ownership** of, and identification with, the source by the owner/initiator. Construction of the source involves considerable effort and/or cash, and the interest in managing the source is consequently strong.

This advantage also accounts for the greatest potential threat to self-supply: it would easily be possible for Government or NGOs to **overwhelm** existing or potential self-supply initiatives by providing too much assistance or support of the wrong kind.

7.2 Recommendations

Government and NGOs should see water source improvement as an incremental process, in which unsafe, inconvenient, unreliable, distant and polluted water sources, can be transformed step-by-step into safe, convenient, reliable, close, manageable water points. The present dualism of "safe/unsafe" or "improved/unimproved" needs to be replaced by a ladder of improvements.

Government and NGOs should recognise that in assisting self-supply, they are not targeting support on individuals, but on more extensive water user groups.

Government and NGOs should consider how they might assist or encourage the construction of new self-supply sources, by partial subsidy, technical advice, or other means.

Government and NGOs should consider how they might assist or encourage the management of self-supply sources, by community mobilisation, technical advice, or other means.

Government and NGOs should consider how they might assist or encourage private well diggers (artisans), by training, provision of equipment, access to credit, or other means.

[20] Based on the estimate that roofwater harvesting may contribute about 5%, the subjective judgment that self-supply type 3 sources may serve a further 4-5%, type 4 sources almost certainly fewer than 1%, and "conventional" Government NGO rural water supply coverage is around 58%.

8 Self-supply study workshop, Kampala, 16th August 2005

On 16th August 2005 a workshop was held in Kampala to report back to stakeholders on the study findings, and to continue the process of building self-supply into national Governmental and NGO rural water strategies. More than 30 representatives of central Government (DWD and Ministry of Health), donors, local Government, NGOs (UWASNET and WaterAid), and the private sector took part in the meeting.

The meeting was hosted by WaterAid, with opening remarks made by Yunia Musaazi, and chaired by Assistant Commissioner Rural Water, Eng. Aaron Kabirizi. The Guest of Honour was Assistant Commissioner of Health Services, Paul Luyima (Ministry of Health). Eng. Moses Gava (DWD and RWSN) introduced the Rural Water Supply Network to the participants. Executive Director John Byarugaba of UWASNET formally opened the meeting, and closing remarks were made by the Chair, the Guest of Honour, and Mr Sam Mutono of Danida.

The discussions in the workshop focused especially on the next steps which could be taken by Government and NGOs, to promote and support self-supply in Uganda. Suggestions for the way forward were structured under four headings, each of which is dealt with in the following sections.

8.1 What should Government and NGOs do to support self-supply?

The suggestions made under this heading were[21]:

- Government [taken to include central and local Government] should ***encourage*** self-supply initiatives, rather than projecting an attitude of disapproval.
- **Subsidies** to "private" well initiators should be piloted in selected districts [all 9 of the districts included in this study could be candidates, although there is probably less potential in Nakasongola than in the other 8].
- The results of such piloting should contribute to **evidence-based policy/strategy** for self-supply.
- Local Government in particular should be encouraged to collect more **data** on the existence and extent of self-supply.
- NGOs should develop and enhance their **understanding** of self-supply, its realities, experiences, potential, and opportunities.
- NGOs should particularly campaign for **upgrading** of type 1 and type 2 sources [this is perhaps most appropriate for small NGOs and CBOs, while larger national and international NGOs could also support type 3 and occasionally type 4 technologies].
- **Competitions** (with prizes) should be held to identify the best self-supply wells. These could be conducted by Government or NGOs [there is significant precedent for the successful use of such competitions, for example in the Kigezi Diocese Water and Sanitation Programme, Kabale District].

8.2 How should private (artisanal) well diggers be supported in the sector?

The following ideas were put forward:

- More information and in-depth **understanding** is needed of artisanal well diggers [the Private Sector Study (DWD, 2003b) made a significant start in this area]. The Private Sector Study should be revisited and linked to the emerging self-supply strategy for Uganda.

[21] Comments by the study team are included in square brackets.

- Given that neither Government nor NGOs are well placed to carry out **research** in self-supply or other aspects of rural water supply, a R&D unit should be established, separate from Government, but with some Government [and NGO?] support.
- Well diggers need to **promote** and market their services more pro-actively [this can be easier said than done, given their limited business expertise; however training in this aspect of business management is readily available in Uganda].
- Private well diggers should receive **training** in business skills, especially management and marketing, and in safety issues.
- The **conditions** (eg formal company registration, VAT registration) for the employment of artisanal contractors by local Government should be relaxed [at present local Government contracts are let to registered companies which then sub-contract the physical work to artisanal contractors. These individuals are often very poorly treated and poorly recompensed for their front-line work].
- However, it was felt that the primary **market** for private well diggers should be under direct contract to private well initiators (rather than under contract to local Government).
- Private well diggers need access to short-term **credit**.
- Private well diggers [or artisanal workers more widely perhaps] need **a common voice**, which could be achieved through forming local or national associations.
- Construction **costs** should be reduced to make private wells more affordable [although the costs identified in this study are already only about one quarter to one third of those routinely paid by districts to registered contractors!].

8.3 Policy and strategy implications

The following comments were made:

- Self-supply as a **concept** is diametrically opposite to present pressures on DWD to pursue “bulk supply” (ie “modern” large-scale piped urban-style water supply systems, sometimes for multi-purpose (domestic/productive) water use). These two approaches need reconciling, and there needs to be clear explanation to politicians as to the conditions under which each is appropriate.
- Water sector professionals need to develop better ways of **communicating** with politicians, especially presenting evidence-based arguments, rather than theoretical opinions [data, visual evidence, experiences, and especially the stories of water users carry far more conviction and persuasive power than abstract argument].
- Sector **professionals** need to clarify their own thinking on self-supply, to avoid the risk of pursuing half-cooked strategies.
- Rather than trying to develop an entire self-supply **strategy** in one leap, Uganda should work to interest donors, NGOs, local Government and others, and gradually build up the evidence base (a critical mass of data) on the usefulness of self-supply.
- It should be noted that self-supply is **[only] one of several mechanisms** for the provision of rural water.

8.4 Immediate actions

The following immediate actions were put forward:

- **Review the self-supply and private sector studies**, and identify common areas for intervention [the most obvious being support to artisanal well diggers, combined with positive promotion of the private source option to the public].

- **Research and document other self-supply initiatives**, and disseminate this material widely.
- **Assess the location and extent of resistance** to the self-supply concept [politicians, policy-makers in Government, sector professionals, junior technical and professional staff, at the centre, in the rural areas, among NGOs].
- Develop “catchy” **communication strategy** to help convinced sector professionals to lobby politicians and policy-makers.
- **UWASNET** will begin the process of sensitising its member NGOs to the concept of self-supply. One of its Working Groups will take up the theme of self-supply in its regular deliberations.
- **WaterAid Uganda** will consider whether and how to build on the initiative of this study.

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ANNEX A Study Terms of Reference

Study of Potential and Experience in Self-Supply of Water for Domestic use in Uganda

Background

It is becoming increasingly realised that people are investing considerable sums and/or efforts throughout the continent on improving their own water supplies. In Uganda with a rural population of more than 22 million, almost 30% take water from springs and unprotected wells (DHS 2001). It is becoming apparent that people have taken the initiative to develop their own sources to a degree, and only some 15% use purely unprotected surface water sources. It is thought that some 6 million are using unlined hand-dug wells which they have constructed themselves or paid local artisans to dig for them. Little is known of these sources, or of the progressive investment made in them. Most of these have been dug on the initiative of one family, or more rarely as a community effort, but have been essentially self-financed. Solutions may be only a hole in the ground or to put an oil drum at the top to keep out rain, or an apron to avoid collapse, but linings, introduction of rope pumps for domestic and productive use offer a continuum of improvements which are thought to exist and could be further built on. In Uganda there are also a number of private individuals who have built up their own mechanised water supplies which they share (freely or at a charge) with their neighbours.

Additionally there several districts where groundwater and surface water are not easily available, and where interception of rainwater offers a solution. People have traditionally collected rainwater over much of the country, but without adequate storage to provide a year-round supply. The channelling of run-off for crops and trees is an additional form of self supply which may exist but appears to be little known about as a contributor to productive use. In all cases there is a possibility to build on what people have already done, as a option alongside or, in difficult areas, instead of communal supplies. This can build on the existing strengths of household level management, local skills, and greater willingness to invest in private rather than communal facilities.

DWD and NGOs are already piloting rainwater harvesting (RWH) at household level, but household level solutions are not being considered alongside communal ones in areas of ample groundwater. Yet in some of these areas there are widely scattered farmsteads and also many households which have other sources nearer than the 1.5 km radius assumed for communal supplies. As a result there is a likelihood that people are and will continue to use traditional sources although they theoretically access a safe supply. In addition, as coverage increases, and the more nucleated communities are covered, it is the more scattered ones which will be more often encountered and may require different strategies for improving their supplies if planned coverage (now set at 77%) is to be achieved by 2015. These aspects of rural water supply are often ignored, leading both under-estimates of the number with access to safe water sources, but also perhaps over-emphasising the number who choose to use them.

Improvement of household level supplies has been found in other countries (eg Zambia, Zimbabwe, Sierra Leone, Mali, South Africa) to offer a cost effective alternative under certain conditions, and to offer far higher levels of sustainability. Unit costs are much lower (half to a tenth of a borehole and handpump) and owners are prepared to provide a much higher proportion of the investment (50-100%). As a result the cost to governments is very much reduced, systems of technical and financial (may be credit, revolving funds, subsidies) support can be easily managed at county or sub-county level, and funds can benefit a much larger number of people. Owners can be encouraged to make incremental improvements, moving them up the ladder of water supply, and progressively and increasing the effect on all MDGs, not just those for water.

If more people can be persuaded to invest in self supply then it takes away some of the pressure (queuing etc) on public water systems and should mean that future public systems can be better targeted to poorer communities where people are less likely to afford self-supply and difficult areas where more expensive technologies are required.

In this light RWSN would like to examine the present situation in Uganda with regard to self supply potential and existing experiences. This would provide both the context for possible further development of the concept with government and NGOs, and raise the profile of people's capacity to develop their own solutions where they see a problem. The output would be used both within country and to relate to the experiences in other countries.

Objectives

Principal

To develop an in-depth understanding of the utilisation, potential and limitations for self-supply in Uganda. Self supply is defined as a water source situated within a family compound which was initiated by the household members or the extended family and is owned by them.

Scope of the Work

Key Questions

The study will answer the following key questions:

- How are Governments and NGOs supporting self supply in terms of policy, finance, and projects/programmes?
- What is the experience of utilisation of subsidies to support self supply?
- How widely is self supply, in various forms, is already practiced within Uganda?
- Why do families opt for self supply and how is it initiated?
- Where self supply exists, how much are families investing in it and how does this relate to total investment cost and family income? How did they raise funds to pay for the self-supply source?
- How do families maintain their self supply sources?
- What aspirations do families have to further improve their self supply water sources?
- What different water sources, including self supply do families utilise (for domestic and productive use) and what is the rational for use of multiple sources?
- Are there particular geographic areas, or social groups where self supply is of particular relevance?
- What are the main barriers to increasing self supply in Uganda and how could they be overcome?

Methodology

The desk research will consider the wide range of self supply options. As significant research has already been undertaken on rainwater harvesting, the findings should be drawn into the desk research. Field work will focus on family wells.

In broad terms the methodology is as follows:

1. Literature review on self-supply within Uganda (include policy documents, investment plan, Private Sector Study, Rainwater Harvesting Study and Strategy and other relevant documents)

2. Preliminary scoping study from national data bases (census, DHS, Living conditions surveys), government, university and NGO studies, to identify primary areas where self supply exists or is of relevance.
3. Sample surveys (in geographical regions agreed with the steering committee after scooping study) in households using family wells for self-supply.

The lead consultant is expected to present more detailed methodology to the steering committee for approval. The work should be co-ordinated by a lead consultant who will be responsible for information reliability, and for commissioning the field level data collection. The lead consultant will work with a local consultant in the field. Considerable information should be available through UWASNET and it's membership.

Outputs

1. Report containing information specified under scope of work (all information sources must be clearly referenced, and recommendations well justified)
2. Draft four page paper for WEDC conference (with joint authorship with chair of self supply steering committee)
3. Presentation at workshop (organised by UWASNET) at national level to present results and develop recommendations for policy level direction on self supply (recommendations must be ready for presentation in JSR in September 2005)

Timing

The study should be completed by end of July and should take approximately one month.

Reporting

The consultant will report to the Director, DWD. For day to day management there will be a steering committee chaired by the Assistant Commissioner for Rural Development, DWD.

Core Competence

The lead consultant must have the following:

1. Experience of field based research;
2. Ugandan Water and Sanitation Sector understanding (social, institutional and technical issues);
3. Demonstrable analytical skills;
4. Ability to set up and coordinate a team.

Payment

A fixed sum of $20,000 (for lead and local consultant) is available for the work. This includes consultancy fees, transport and accommodation.

ANNEX B Stage 1 Itineraries

Stage 1, Full Team

Date	Activity/meetings
Weds 8th June	Team meeting of consultants. Steering Committee.
Thurs 9th June	Public holiday. Interviewing, planning and reading documentation.
Fri 10th June	Interviewing, planning and reading documentation.
Sat 11th – Sun 12th June	Planning and organising for field visit.
Mon 13th June	Kayunga DWO and sites. Wakisi SC, Mukono District, and sites. Busoga Trust, Jinja. Slept Iganga
Tues 14th June	Iganga DWO, and sites. UMURDA, Bugiri, and sites. Busia DWO. Slept Busia.
Weds 15th June	Well diggers Busia. Town Council, and sites. Busoga Trust, Jinja. Slept Kampala.
Thurs 16th June	VAD, Kampala. Busoga Trust Luwero. Private well digger, Luwero, and sites. Luwero DWO and sites. Slept Nakasongola.
Fri 17th June	Nakasongola DWO and sites. Wakiso DWO. Wakiso private well diggers. Return to Kampala.
Sat 18th – Sun 19th June	Report writing.
Mon 20th June	Steering Committee. Arranging Stage 2 fieldwork.
Tues 21st June	Stage 2 commences.

Stage 2 Jamil Ssebalu and Joyce Magala Mpalanyi

Date	Activity/meetings	
	Jamil Ssebalu	**Joyce Magala Mpalanyi**
21st June	Kayunga DWO meetings; slept Kayunga.	Travel to Busia; meeting with DWO; site visits; slept in Busia.
22nd June	Meeting With Felix (DWD); site visits; slept Kayunga.	Meetings at sub counties; site visits; slept in Busia.
23rd June	Well Diggers Kayunga; site visits; Fiba Coffee Factory; Senyonga Joel; Kanamuka Technical Services; slept Kayunga.	Meetings at sub counties; site visits; interviews with well users; slept in Busia.
24th June	Rwemwedde Coffe factory; site visits; DWO Luwero; Well Diggers Luwero; Nsubuga Ephrahim; slept Luwero.	Travel to Bugiri; meetings with Councillors and sub county staff; site visits; interview with well diggers; slept in Bugiri.
25th June	Meeting well diggers; Sejengo Richard; Ssalongo Sambwa Simon; site visits; DWO Luwero; Yesu Yeka farm Luwero; slept Luwero.	Return to Kampala; report writing.
26th June	Rest.	Rest.
27th June	DWO Iganga; site visits; slept in Iganga.	Travel to Bugiri; meeting at DWO; site visits; interview with Hand Pump Mechanic; slept in Bugiri.
28th June	Site visits; Iganga Central Primary School; Slept Iganga.	Meeting DWO office; site visits; slept in Iganga.
29th June	Well Digger Walusimbi and Sons; site visits; slept in Iganga.	Site visits; slept in Iganga.
30th June	Iganga private Well Diggers; site visits; slept Iganga.	Interviews with well users; site visits; slept in Iganga.
1st July	Salim Muyinda, Kenwood Company, Ismail Kyona; site visits; slept Iganga.	Returned to Kampala; report writing .
2nd July	Report writing.	Report writing.
3rd July	Report writing.	Report writing.
4th July	Report writing.	Report writing.
10th July	Wakiso: Masajja well diggers.	

ANNEX C Key Informants Interviewed in the Self-Supply Study[22]

District/Org	Individuals	Contacts
Bugiri District	Godfrey Kintu (District Water Office, District Planner)	077 652299
	Hassan Ndada (LC3 Chair, Buyinja SC)	078 478338
	Okware Tito (Parish Councillor, Buyinja SC)	077 640002
	Twaha Kisimbula (Nakigo SC, Parish Chief Bunyama)	
	Mugoba Amin (Nakigo SC, LC1 Chair Kakombo Village)	
	Hajj Habib Mbulyanga (Chair, UMURDA)	
	Muhunga Ehyosa (Programme Officer, UMURDA)	078 865488
Busia District	Isaac Natukunda (DWO)	077 456249
	Wanyama Stephen (Engineering Assistant)	077 918841
	Wesonga David (Private Well Digger)	
	Oruma John (Private Well Digger)	
	Hadoto Simon (Private Well Digger)	
	Wesonga David (Private Well Digger)	
	Oruma John (Private Well Digger)	
	Wabudi Albert M N (Town Clerk)	
	Martin Sekamanya (Deputy Engineer)	077 552940
	Michael Obanestra (DED Technical Adviser) (not met)	077 772084
	Mike Ebu (Bulumbi SC Chief)	077 325703
	Makaaga Andrew (Bulumbi SC Attendant)	
	Teddy Nabwire Ogubi (Women Councillor, Nagwe Parish)	
	Chris Mbogo (Lumino SC, Majanji Parish Chief)	
	David Lwagula (Lumino SC, Hashule Parish Chief)	
	Waiswa Karim (Dep. Speaker, Majanji SC)	077 650303
	Osinde Joseph (Buhehe SC Chief)	
	Osinye Stephen (Farmer Forum Chairperson)	
Busoga Trust, Jinja and Luwero Districts	Johnson Waibi (Busoga Trust, Project Manager)	077 452693
	David Alderton (Busoga Trust, Liaison Officer)	078 358625
	Sam Kizza (Busoga Trust, Field Officer)	
DWD, Luzira, Kampala	Aaron Kabirizi (assistant Commissioner Rural)	077 400876
	Kerstin Danert (Technical Adviser)	077 402304
	Angela Bwiza (Focal Point, TSU4)	077 404758
	Stanley Watenga (Focal Point TSU5)	077 500976
Iganga District	Makinabu Yahaya Lukwitira (ADWO)	071 929958
	Ronald Katebela (Private Well Digger)	077 481643
	Kamubele Benefansia (Private Well Digger)	
	Kawuma Edrisa (Private Well Digger)	
	Salim Muyinda (Kenwood Co)	078 684548
	Ismail Kyona (Kenwood Co)	077 694855
	Walusimbi Charles (Walusimbi & Sons)	077 331538
	Lubaale Emmanuel (Nakigo Subcounty, farmer)	078 457199

[22] Not including water source owners and users interviewed on site.

Key Informants (continued)

District/Org	Individuals	Contacts
Kayunga District	William Ssebale (DWO)	077 591878
	Violet Nambawa	078 840110
	Senyonga Joel (Private Well Digger)	077 360026
	Kayondo Andrew (Kanamuka Technical Services)	075 304443
	Bagalaliwo Ivan (Kanamuka Technical Services)	078 688267
Luwero District	Mugwanya (ADWO)	
	Okullo Peter (Seok Eng. & Constr Co)	077 334073
	Achen Josephine (Seok Eng. & Constr Co)	077 492815
	Semengo Ronald (Waterford Contractors)	078 902990
	Kizito Johnson (Waterford Contractors)	077 952015
	Kiganda Paul (Seamok Services Ltd)	077 354834
	Sambwa Simon Peter (Private Well Digger)	
	Hadoto Simon (Hadoto Water & Sanitation Engineers)	078 648757
	Emmanuel Bukenya (Private Well Digger)	077 593565
	Tebandeke (Water is Life)	077 489097
	Nsubuga Ephraim (Luwero Diocese)	078 961587
	Namirembe Sylvia (Luwero Diocese)	075 825111
Mukono District	Robina Ketaka (SC Chief, Wakisi SC)	077 488422
	Masa Apollo (LC3 Chair, Wakisi SC)	077 821685
	Annette Alupo (HA)	
Nakasongola District	Isaiah Kalanzi (ADWO mobilisation)	077 688642
	William Kasozi (ADWO water supply)	
Wakiso District	Fred Kato Ssemugera (DWO)	077 436813
	Benedict Male (Director, VAD)	077 317445
	Isaac Wamala Sembatya (Financial Administrator, VAD)	077 446212
	Billy (Private Well Diggers Association, Founder)	
	John (Private Well Diggers Association, Member)	
	Wamala Mohammed (Private Well Diggers Association Mobiliser)	
	Lukwago (Private Well Diggers Association Vice Chair)	

ANNEX D Self-Supply Water Sources Visited during the Study

Stage 1 Field Work (full team), 13th-17th June 2005

Site number and description	Location	Reason constructed	Number of households served	Initiated by	Cost	Any external support?	Source score [23]
1. A shallow brick-lined hand-dug well with low head wall and cover (broken off). Constructed 1992, approx 5m deep. Water level less than 0.5m below ground. Owner paid full cost of construction and maintains source.	Edge of Kayunga town beside Bugerere Modern Dairy. N 00 41.232' E 32 54.642'	No other nearby domestic water source.	2-300	Owner, Haji Sudi Kimbugwe.	Approx USh450,000 in 1992. No user fees.	No.	5
2. A brick-lined shallow hand-dug well with concrete apron and plinth, and remains of windlass frame. Water abstraction now by shared rope and bucket fabricated from jerry can.[24]	Edge of Kayunga town on Jinja road. N 00 40.773' E 32 55.500'	Nearest domestic water source was distant.	100	Community request to Town Council.	Not known. Community households contributed USh500 each. No user fees.	Yes – Town Council carried out construction and covered approx 80-90% of the capital cost.	5
3. Private borehole, about 50m deep, constructed ca. 1995. Owner very reluctant to talk. Possibly constructed "unofficially" by Government or contractor.	Nazigo trading centre, behind petrol station. N 00 38.608' E 32 59.140'	No other nearby sources. Owner sells water by the jerry can.	100	Owner, Bayitanaima Mohammed.	Not known. Users pay USh50 per jerry can.	Not known.	4
4. Shallow "well" on hillside – water level about 0.5m below ground. Stones for access, lily (kitengejja) to improve quality.	Between Wakisi sub-county headquarters and River Nile, on farmland. N 00 38.708' E 32 59.139'	Nearby protected spring dried up. Nearest alternative source is River Nile approx 1km down slope.	20	Owner	Negligible cost – no foreign materials.	No.	6

[23] See section 5.3.
[24] This source is not strictly a self-supply source, but it is included here for completeness and comparison.

Site number and description	Location	Reason constructed	Number of households served	Initiated by	Cost	Any external support?	Source score [23]
5. Private borehole with electric submersible pump and overhead tank, in compound of 3-storey town house, supplying approx 600 jerry cans per day to surrounding users.	Iganga town, by White Horse Inn. N 00 36.510' E 33 28.691'	Business venture, and community service.	2-300	Owner, Isaac Basangwa.	Approx USh16.5m.	No. Some resistance from Town Council.	4
6. Private rural hand-dug well with windlass, by owner's house in rural village. Started August 2004, completed Feb 2005. Construction by well diggers from Iganga town.	Nambale sub county, north of Iganga, Nasooti village. N 00 45.128' E 33 31.371'	Nearest water source a distant unprotected spring.	180	Owner, Ebanda Ewald.	Well cost about USh1.1m. Owner has purchased most above ground parts for a U2, at about USh330,000. About USh400,00 still to spend. No user fees.	No.	5
7. Private hand-dug well with handpump, in trading centre, by owner's shop. Owner is LC2. Constructed Jan-Mar 2005 by local (Iganga town) well diggers. Sells 100-200 jerry cans per day to surrounding users.	Namungalwe trading centre. N 00 42.912' E 33 29.499'	Business venture.	50-100	Owner, Basalirwa Birali.	Users pay USh50 per jerry can.	No.	4
8. Private family well with functioning windlass and cover. Constructed by Busia-based well diggers over 3 month period in 1998. Serves whole cell	Bugiri town. N 00 34.202' E 33 45.061'	Former source was distant (about 1.5km).	Not known – whole cell.	Owner.	No user fees.	No.	5
9. A spring/water hole at valley bottom in rural location. Protected with low earth bund, planks for access. Was constructed in 1950s.	Bugiri district, Kasongolwe sc. N 00 30.898' E 33 41.742'	Opportunistic: man digging yams on the site discovered the spring.	With another similar source, it serves whole LC1 (200hh).	"David"	Negligible cash cost. Labour unknown.	No.	4
10. "Martin's well". A brick-lined hand-dug well in an enclosed	Busia Town, South West	No convenient sources nearby.	20	Deceased husband of	Approx USh1m.	No.	5

Site number and description	Location	Reason constructed	Number of households served	Initiated by	Cost	Any external support?	Source score [23]
compound in town. Well is covered, and uses windlass for water abstraction. Constructed in 1996 on initiative of landlord (deceased) and managed by his widow. Compound also has piped water supply. Supplies about 30 jerry cans per day.	Parish, Kisenyi A village, Ekaka Link Road. N 00 28.003' E 34 05.175'			widowed landlady, Jane Onyango.	Landlady charges USh100 for 3 jerry cans.		
11. Hand-dug shallow well with hand-operated force pump on in enclosed compound of Community Centre which serves food and drink, and hosts workshops.	Busia town, South West Parish, Majanji Road. N 00 27.783' E 34 05.107'	Needed water for restaurant and social functions.	None.	Owner, Mrs Ogutu.	Not known.	No.	4
12. Hand dug shallow well with rope pump (Kenyan). Constructed in 2004. Owner installed electric submersible pump which quickly failed, and he replaced it with rope pump. Owner is practical man, in transport business.	Busia town, near border post, on Custom Road. South East Parish, Marachi village A. N 00 27.919' E 34 05.826'	To have an accessible water supply without relying on vendors.	15	Owner, Haji Abbas.	Approx USh1m. Rope pump approx USh150,000. No user fees.	No.	5
13. A shallow hand-dug brick-lined well at a private day and boarding primary school. Constructed in 2001 by local contractor, using funds from an Australian benefactor. Approx 6m deep, with U2 pump.	Just north of Luwero town on west side of main road. N 00 51.808' E 32 29.091'	School children had to cross main road to fetch water, and their numbers were causing conflict with other users.	School of 320, of which 210 boarders.	Owner, Peter Paul Sekanwaji.	Approx USh4.5m	Australian lady benefactor.	5

Site number and description	Location	Reason constructed	Number of households served	Initiated by	Cost	Any external support?	Source score[25]
14. Shallow hand-dug well with U2 on land of member of District Service Commission, Serves a few nearby hhs, but owner paid community contribution to obtain Government well near to his land.	Just S of Luwero town on E side of main road. N 00 48.136' E 32 30.427'	To supplement owner's rainwater harvesting system (approx 6m^3 storage).	15	Walulya - Mukasa	Approx USh4m.	Yes, District Government paid all except USh200,000 'community' contribution.	4
15. Shallow hand-dug brick lined well with U2 pump on compound of well contractor. About 20m deep. For use of owner and surrounding households.	West of Luwero town. N 00 48.071' E 32 29.789'	To have water for domestic, agricultural and building use nearer to home.	20	Owner and contractor Pastor Tebandeke.	N/A	No.	4
16. Shallow well under construction. Excavation has reached water, but shaft not yet lined. Built by Pastor Tebandeke, as service to community.	West of Luwero town. N 00 48.440' E 32 29.230'	To supply contractor's neighbours.	N/A	Contractor Pastor Tebandeke.	N/A	No	4
17. Shallow well with submersible pump serving buildings and facilities at commercial farming enterprise	East of Luwero town. N 00 50.776' E 32 34.453'	For domestic water needs of agricultural workers and surrounding hhs.	Approx 12, and Centre for the Blind residents.	Sulma Foods Ltd.	USh4m, plus overhead tank.	No.	4

[25] See section 5.3.

Site number and description	Location	Reason constructed	Number of households served	Initiated by	Cost	Any external support?	Source score[26]
18. Government Secondary School set up and still strobgly supported by the Catholic Church. Extremely well kept compound has a total of 50m^3 rainwater storage capacity, and own borehole with U2 handpump.	South of Nakasongola, Kakooge village. N 01 03.589' E 32 28.461'	To supply school and provide back-up supply to surrounding area.	625 pupils (of whom 180 board), and occasional use by neighbouring households.	School management.	N/A	Rainwater system paid for by Canadian NGO (TSF); borehole by German funds.	5
19. Extensive rural NGO/Mission (Cornerstone Uganda) complex, with ranch supporting schools and community work. Private boreholes (2) and valley tank supply people and livestock.	South of Nakasongola, Kakooge village. N 01 07.185'' E 32 32.505'	To supply livestock as income generation for other community services.	Approx 600 livestock and unknown number of people.	Ugandan and muzungu leaders of Cornerstone.	N/A	Muzungu links to overseas funding	4
20. Two small valley tanks built around 1987 by local community, tapping shallow groundwater. These sources provide reliable (if drought-prone) supplies in place of failed boreholes with handpumps.	North of Nakasongola town, Nakajooga village. N 01 20.106' E 32 28.625'	To obtain closer access to water (alternative source at the time was town borehole 2-3km away).	Each pond serves about 300 households.	Koloneliyo Senkonyi, a local leader.	Local labour only.	No.	5

[26] See section 5.3.

Stage 2 Field Work (Jamil Ssebalu), 22nd-29th June 2005

Site number and description	Location	Reason constructed	Number of households served	Initiated by	Cost	Any external support?	Source score[27]
21. A private borehole about 50m deep constructed in 1995. All construction cost incurred by owner.	Nazigo N 00 38.707 E 032 59.140	Water sold in jerry cans	100	Mohamed Bayitanaye	USh5,000,000. Users pay USh50 per jerry can.	Owner paid all the cash.	4
22. A shallow brick–lined hand dug well with low head wall and no cover. Constructed in 1998 for maize mill. 15ft deep. Owner paid full capital cost and maintains the well.	Nsotoka, At Nsotoka maize mill. N 00 39.865 E 32 56.988	To give water to the maize mill, cattle farm and family.	2-100	Hajji Twaha Lwangasa	USh500,000 No user fees	No	5
23. A shallow brick-lined hand dug well with low headwall and no cover. Constructed in 2001	Gangama Senda Zone. N 00 38.987 E 32 58.636	To give water to Kayiira Memorial day and boarding school with 350 pupils and the families.	600	Sentamu Joseph	USh800,000	No	5
24. A water pond, about 0.5m deep.	Gangama N 00 39.133 E 32 58.749	To give water to Kayiras family and the cattle	2-10	The late Kayiira.	Unknown	No	2
25. A water pond, about 0.5m deep.	Gangama N 00 39.135 E 32 58.757	To wash coffee from Sentamu's farm	2-10	Joseph Sentamu	USh100,000	No	2
26. Shallow "well" about 0.6m deep. Wood for access. Constructed in 1997.	Namagabi, B Zone. On the outskirts of Kayunga Town. N 00 41.987 E 32 54.568	Constructed by Traditional Healer to give water to the patients	300	Hajji Katumba. (A traditional healer)	Not Known. Hajji has left the place. No User fees.	No	5
27. Water pond, about 10m deep. Seemingly abandoned.	Namagabi N 00 41.995 E 32 54.567	Constructed by brick makers	2-40	Unknown	Unknown. No user fees.	No	2
28. Shallow well, about 0.5m. Used by village.	Namagabi N 00 41.998 E 32 54.568	Constructed by community	2-40	Unknown	Unknown. No user fees.	No	2
29. A shallow well constructed in 1950.	Kaazi (Namagombe)	Cultural and Natural well. No	300	Unknown but looked after	Unknown. No user fees.	No . But some external people	2

[27] See section 5.3.

Site number and description	Location	Reason constructed	Number of households served	Initiated by	Cost	Any external support?	Source score[27]
	N 00 43.114 E 32 56.102	other source nearby		by the community. Land owned by the church.		are trying to close it.	
30. A shallow well lined with bricks, about 3m deep, constructed in 1998.	Ndeeba. N 00 40.795 E 32 55.407	To provide water for the coffee factory and the workers	70	FIBA Coffee factory	USh1,000,000. No user fees.	No	5
31. A shallow well which is part fed by runoff water. Constructed in 1942.	Kakakala, Kalele Zone, Ziroobwe parish, Bamunanika Sub county. N 00 41.912 E 32 43.715	To provide water for the community.	150	The late Damulira	Unknown, maintained by the community	No	2
32. A valley dam constructed at RDC Deo Nsereko's farm in 1989.	Wakatatayi Kakakala parish N 00 41.236 E 32 42.733	To give water to the farm	120	RDC, Deo Nsereko	Unknown	No	2
33. A shallow well, protected by kitengejja, constructed in 2000.	Lukyamu Centre (Kalilo Katono) Tweyanze Parish Katikamu Subcounty. N 00 42.591 E 32 34.840	To provide water for the community.	400	Community	Unknown	The District people have come to this place very many times but have never provided an alternative source.	2
34. An incomplete shallow well about 30m deep. It was started on 10th May 2005.	Kabuye Nalongo LC 1 Kabakedi. Luwero. N 00 50.485 E 32 32.615	To provide water for the community of Nalongo L C 1.	500	Mr Luwaga Kasim. Nakito Frolence. Kalabagwa. Ochen Patrick.	Expected to cost USh2,500,000. To be collected by the community.	The District people have come but have never provided any help.	4

Site number and description	Location	Reason constructed	Number of households served	Initiated by	Cost	Any external support?	Source score[28]
35. A spring constructed in 1959.	Kabuye Nalongo LC 1 Kabakedi. Luwero. N 00 50.627 E 32 32.749	To provide water for the community of Nalongo village.	500	Mr. Luyinda Bernado	Unknown but maintained by the community.	The District people have come but have never provided any help	6
36. A shallow well called Kakindu well, protected by kitengejja and wood (Nkoma) for stepping on. Constructed in 1958. 10m deep.	Kasenene LC1 Bamunanika. N 00 39.608 E 32 37.658	To provide water for the community of Kasenene village.	400	Mr. Kanyike Godfrey	Unknown. Maintained by the community led by Kasenene LC1 Chairman, Juma Kagulire.	No	6
37. A shallow well about 6m deep, protected by water reed and a thick bush around. Constructed in 1960.	Rwemwedde coffee factory. Zirobwe LC1 Zirobwe. N 00 40.868 E 32 41.850	To give Production water to Rwemwedde Coffee Factory.	350	Rwemwedde coffee factory.	Unknown but maintained by the community	The District people know the well but have not assisted.	5
38. Shallow hand-dug brick lined well with U2 pump on a farm with 53 cows and 56 goats. Its 34m deep. For use of farm.	Yesu Yeka Farm Ltd. Mulugogo Nakaseeta LC1 Kasambya Parish.	To have water for animals and Irrigation	20	Owner and Director Yesu Yeka Farm Ltd, Mr Daudi Mpanga.	USh2,800,000	No	5
39. An unprotected spring constructed in 1972.	Buwaga Buwaga Parish Bulange SC N 00 44.370 E 33 43.573	Constructed for the people of Buwaga. No other domestic water source.	150	Mr Lwanga James a retired health Inspector	USh1000	No	2
40. A water pond about 0.4m deep. Used only in the dry seasons.	Nalukero LC 1 Buwaga Parish Bulange subcounty N 00 44.097 E 33 43.392	Constructed for the people of Buwaga. No other domestic water source.	20	Mr. Kifaana Ali	Unknown	No	2
41. A brick lined well with a rope pump and a cover. About	Namutumba LC1 Ssabawali	Constructed to give water to the	300	Sheikh Nagibu	USh1,700,000	No	5

[28] See section 5.3.

Site number and description	Location	Reason constructed	Number of households served	Initiated by	Cost	Any external support?	Source score[28]
60m deep, constructed in 2002.	Namutumba. N 00 50.127 E 33 41.110	Mosque.		Mugweri	Users Pay USh50 per jerry can.		
42. A brick lined well under construction. It was started in July 2004.	Namutumba LC1 Ssabawali Namutumba. N 00 50.259 E 33 41.130	Constructed to get water for sale.		Sheihk Nagibu Mugweri	So far USh700,000 for digging.	No	4
43. A brick lined shallow well with rope pump behind maize mill. . Has not been repaired and has bad water. It was constructed in 2002.	Namutumba LC1 Ssabawali Namutumba. N 00 50.099 E 30 41.075	Constructed to get water for sale.	100	Muyaka Magid	USh1,100,000 Users pay USh100 per jerry can.	No	5
44. A brick lined well under construction. It is about 16m deep and was started in July 2004.	Kasokosa North Iganga Town Council N 00 36.394 E 33 28.538.	Constructed to give water to the owner. Not any other person.	Expected to serve only the home.	Ronald Katebela	USh2,000,000.	No	4
45. A brick lined well, with a rope pump. About 16m, constructed in April, 2005.	Iganga town Near Iganga Central primary school.	Constructed to get water for sale.	460 This includes the children at the school.	Kamubele Benefancia and Kauma Edisa.	USh2,000,000.	No	4

Stage 2 Field Work (Joyce Magala Mpalanyi), 22nd-29th June 2005

Site Number and description	Location	Reason Constructed	Number of households served	Initiated by	Cost	Any External Support?	Source Score
46. A shallow brick- lined hand dug well with concrete apron and metallic cover. Rope and bucket. (Rope broken waiting for owner to buy he is just helping users). Constructed 2004. Approx 13m deep. Owner paid full cost and maintains source.	Buwero village 10kms before Busia town. N 00 29.210' E 34 00.489'	River water source was far. Approx 2kms.	15-20	Headmaster Buhore Primary School. Has a well selling water in TC.	Approx USh600,000. 13hhs contributed towards rope (USh 6000)	No	4
47. Private hand dug shallow well with U2 hand pump. Constructed 2003. Approx 20m. High yield through the year. Stopped other users. Children spoil the pump and make noise	Bulumbi village 8 kms Busia Iganga Rd. N 00 28.725' E 34 00.815'	Farmer 500 hens 13 cattle, 8 goats.	5	Wanyama Israel, retired civil servant	USh1.1m. Servicing every 6 months, pipes are rusting need replacement. Pays USh15,000 to mechanic from Masafu.	No	5
48. Unlined hand dug hole 20m in 2002. fetched water for four months had very low yield, was strictly private, well dried up abandoned. Plans to change site and dig new well.	Buwembe parish, Nabatasi village N00 27.839' E 03 57.837'	Reduce distance. Spring approx 1 km away	1	Sub County chief Masafu, Ofiti Fred. Plans to re sink well. Just moved from Busia town in January 2005	Approx USh400,000.	No	0
49. A brick lined hand dug shallow well with concrete apron. 33m deep. Rope and bucket. Well protected metallic tight cover. Very high yield throughout the year. Poles not strong risky while pulling the rope. Constructed 1999.	Busumba B Nangwe Parish 2 kms South of Busia town. N 00 25.913' E 34 04.628'	Reduce distance. Spring 3 kms away.	12 – 15 hhs 8 clan members 7 neighbours	Bursar Busia Sec School Mr. Ogubi and brother, a businessman	Approx USh600,000	No	5

Site number and description	Location	Reason constructed	Number of households served	Initiated by	Cost	Any external support?	Source score [29]
50. A brick lined hand dug shallow well with concrete apron, rope and bucket. 25m, constructed in 1984, but deepened, lined and improved in 2000. Wooden cover no apron. High yield and reliable, reduces during dry season 300m from the house. Well diggers from Busia town. Plans to install a pump.	Buwuuma A village 0.5km behind Dabani sub county offices. N 00 27.110' E 34 03.810'	Reduce distance of 2kms. Farming, clonal nursery beds.	6	Retired worker. Century Bottling Co. Ojambo Charles.	Cost him two 'medium sized cows' Approx USh1.2m	No	5
51. Hand dug shallow well with cracked thin lining, no cover, rope broken, a lot of algae around the top. Approx 20m and dug in 1974, had logs, collapsed in 1999 re dug lined and newly constructed apron in 2004. High yield all year, but no rope and was not in use at the time of visit.	Busumba B village Nangwe parish 2kms to Kenya border. N 00 26.103' E 34 04.602'	Reduce distance 3kms away	12 family members 2 neighbours	Late Hajji Hambo Idi. Now Juma Idi is the caretaker (son to Hambo) Mechanic	Initial Cost unknown. Renovation cost approx USh200,000	No	3
52. Well covered hand dug shallow well with concrete apron. Constructed in 2003 during rainy season. 20m deep used for 2 months and dried up completely. Have been advised to demolish well and start all over again. Original plan was for household consumption, eventually turned house into private school. Still seeking technical expertise.	Mountainable High School in Nandwa A-Lumino parish 28kms South of Busia town. N 00 19.056' E 34 00.442'	Reduce distance, improve quality. Salty borehole, and nearest swamp water seasonal 1km.	School students - 120 and 150 hhs	Owner/ School proprietor	Approx USh1.3m	No	0
53. Properly covered well awaiting pump installation, but funds not readily available. Have been using rope and bucket in May, 40m deep constructed in 2005.	Buyodi B Lumino parish 32 kms from Busia N 00 18.398' E 34 00.897'	Reduce distance of 2kms, Get adequate water for animals(30 cows)	Was serving 15 neibouring hhs	Retired Railways Worker. Odongo Edward	Above USh1.1m	No	2
54. Dug open pond towards lake shore in 1992. Remove clay every six months	Namundiri A village Majanji	Reduce distance of 1-	150	Community initiative.	Local labour	No	4

[29] See section 5.3.

Site number and description	Location	Reason constructed	Number of households served	Initiated by	Cost	Any external support?	Source score [29]
to regain good water, however was very close to gardens and very bushy, sandy and water level low tending towards dry season.	parish near the Lake Victoria shore N 00 16.245' E 33 58.587'	2kms		Waiswa Karim-Care taker			
55. Hand dug Shallow well with a pump connected to an overhead tank that used to supply water to the main house and tap outside the house. Pump was broken and disconnected from the well. Now use rope and pump. Had iron sheet with wooden cover. 23m, constructed in 2000. Plans to renovate the system.	Bulwani village in Bushaba parish N 00 21.473' E 34 01.325'	Easy access to water in house	5	Owner of the home. Late Egesa. Mrs Egesa is the care taker now.	Not known	No	4
56. Hand dug shallow well 200m from the house covered with logs no apron. Inadequate water supply less than 1000litres/day. Planning to deepen and install a hand pump.	Bulwani Village in Bushaba parish N 00 19.372' E 25 00.275'	Reduce distance and get adequate water for crops and animals	10	Sam Okuku, Sec. school teacher Dabani Girls	USh900,000 now need about USh600,000 deepen and install pump.	No	0
57. Shallow hand dug well, concrete apron with U3 pump installed 13th June 2005.Previously have been using a rope and bucket until recently when the district staff installed a pump. It is 34m deep, constructed in 1993 and improved on 2005. Two well diggers volunteered with support from community members. Lugero offered land for the well and signed an agreement with the LC1. Found children and care taker cleaning the apron. Community members very sceptical about pump maintenance and swore to dismantle it if it fails. Preference was their rope and bucket.	Namavundu village in Namavundu parish, Buyinja SC N00 21.854' E 33 49.247'	Improve quality and quantity. Used swamp/pond water 2kms away.	Approx 80	Lugero offered land to community. Community members made contributions in cash and kind. Constructed in phases.	USh600,000 Pump estimate USh400,000	Yes. Government pump	5

Site number and description	Location	Reason constructed	Number of households served	Initiated by	Cost	Any external support?	Source score [30]
58. Hand dug shallow well with U3 pump. Well fenced with drain channel and soak pit. 25m and was the first shallow well initiative in Buyinja S/C in 1991. Family members dug it with advice from well diggers in Busembatya S/C. District installed hand pump in June 2005. Was not in use due to a mechanical fault with the pipes during pump installation. Now people fetching water from neighbouring wells, but are being chased away. Following up with the district office.	Namavundu village in Namavundu parish N 00 21.812' E 33 49.016'	Reduce distance of 6kms to the swamp. No springs in the village.	Approx 80	Tito Oware Parish Councilor	USh900,000	Yes Community contributed USh300,000	4
59. Shallow hand dug well with cracked apron and rope and bucket. Had rusted metallic cover with a padlock used at night. Constructed in 1994 by community members. Has collapsed three times, but been re dug. Low yield 200 liters/hour. Community contributed USh200,000 to get well improved by the district but have not got the support yet. Resistant to team at beginning they thought the team was form district who had come to install a hand pump. Did not want the pump having learnt that the well in the neighbouring village was non functional after pump installation. Have user committee and USh50,000 for O & M when the need arises.	Bukerere trading centre in Namavundu parish, Badaya S/C N 00 21.998' E 33 48.530'	Reduce distance of 4-6kms	Approx 100	Community members	Approx USh1m then about for repairs USh800,000	No	4

[30] See section 5.3.

Site number and description	Location	Reason constructed	Number of households served	Initiated by	Cost	Any external support?	Source score [31]
60. Shallow well 20m under construction three well diggers, one digger inside well dewatering using rope and bucket. Taken 2 months to hit water. Located near house on farmland surrounded by banana plantations. Over 1000 liters water in poly fibre containers at site. Brick lined and will construct apron by first week of July 2005	Budidi village in Bulamba parish N 00 20.295' E 33 50.757'	Reduce distance of 3km from swamp and get water for farming (nursery beds for mangoes, vanilla, coffee).	Willing to serve family members and neighbours approx 10.	Owner farmer/ businessman dealing in bicycle spare parts in Bugiri town.	Approx USh800,000	No	3
61. Two months old hand dug shallow well with rope and bucket. No apron covered with iron sheet. 10m away from latrine and 15 m from the house. 20m, high yield.	Nsango village in Kifuyu parish N 00 22.438' E 33.50.138'	Reduce distance of 3 kms from swamp.	10	Ddembe Charles works with Nile Breweries in Jinja	Approx USh800,000	No	3
62. Hand dug well with rope and bucket in trading centre. 25m, constructed in 2000. High yield. Wooden cover. Houses within 100 – 200metres.	Kifuyo A in Namavundu S/C N00 22.684' E33 50.280'	Reduce distance and get adequate water	50	Community initiative and has care taker Kamasende Tom	Approx USh1m	No	4
63. Hand dug shallow well with rope and rusted old metallic bucket. 17m, constructed in 2004 Cracked apron, no drain channel and soak pit. Surrounded by shops. Has care taker selling water at USh 50/jerry can. Sells 1000litres/day - low yield. Constructed by well diggers form Busia.	Namutumba Trading Centre in Namutumba S/C 35kms Mbale Tirinyi Rd N 00 50.104' E 33.41.082'	Get adequate water for family and sell the surplus.	20	Owner Muyaaka Ali	Approx USh900,000	No	1

[31] See section 5.3.

Site number and description	Location	Reason constructed	Number of households served	Initiated by	Cost	Any external support?	Source score [31]
64. Shallow hand dug well with overhead poly fibre tank and tap. Supplied water for six months in tank and got spoilt. Now using local rope with a wheel and bucket had metallic cover 17m, constructed in 2004.	Bulubandi village in Nakigo parish, Kigulu S/C along Nakivumbi Rd N 00 36.212' E 33.30.098'	Reduce distance from swamp of 2kms	20	Owner Haruna Kamanda businessman with a motor vehicle garage. Aisha caretaker	Approx USh1.5m	No	4
65. Hand dug shallow well used rope and bucket. Concrete apron. 20m deep. Cons in 2002. Was the only improved water source within 5kms. Located in owner's compound. Was widely used by community members who crowded the team with hopes that the well would be worked on immediately. Used for 8 months and started collapsing and getting silt clay oozing from the walls during the rainy season	Kakombo Luwayira Nakigo S/C 40kms from Iganga town N 00 32.867' E 33.31.326'	Reduce distance of 5kms and get adequate water	Over 80	Owner works with a protestant church	Approx USh900,000	No	0
66. Hand dug shallow well with apron, drain channel and soak pit 25m deep surrounded by thick vegetation. Constructed in 1992, U3 pump installed in 1996. Has been relined three times since construction and has a high yield.	Busowobi village in Busowobi parish Nakigo sub county 20kms from Iganga town N 00 36.054' E 33.32.914'	Reduce distance, water for animals.	Over 50	Owner Hajji Issa Iddinda Mechanic in Iganga town	Approx USh1.2m	No	4
67. Private shallow hand dug well with overhead tank and electric pump in compound of semi detached houses. 17m deep constructed in 2004. Very high yield	Bulubandi village in Bulubandi parishkigo SC N 00 34.072' E 35 44.992'	Adequate water supply in house.	1 Expecting tenants soon and will sell surplus	Owner farmer Lubaale Emmanuel	Approx USh4m	No	6