Rural Water Supply Network

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Self Supply Flagship

Accelerating Self Supply

A Case Study from Uganda 2010

Executive Summary

The Ministry of Water and Environment as well as numerous Non-Government Organisations in Uganda have several years of experience in the promotion of rainwater harvesting for domestic use as well as the piloting of household-led improvements to hand-dug wells. It is becoming clear that many households are able and willing to invest in making improvements to their own water supplies. This field note documents the story of promoting such investments in Uganda from the late 1990s to 2010 and sets out a number of key issues that need to be considered as the country develops a *Guiding Framework for Accelerating Access to Safe and Reliable Water through Self Supply in Uganda*. These issues include the development of clear guidelines, training of the private sector, and links to planning and financial mechanisms.

Contents

Abbreviations

(D)RWH	(Domestic) Roof Water Harvesting
ACORD	Agency for Cooperation and Research in Development
CBOs	Community Based Organisations
DHS	Demographic Health Survey
GDP	Gross Domestic Product
HDI	Human Development Index
JMP	Joint Monitoring Programme (UNICEF/WHO)
KDWSP	Kigezi Diocese Water and Sanitation Programme
MWE	Ministry of Water and Environment
NGO	Non-Government Organisation
NDP	National Development Plan
NSDS	National Service Delivery Survey
RWSN	Rural Water Supply Network
SPR	Sector Performance Report
TOR	Terms of Reference
UMURDA	Uganda Muslim Rural Development Association
URWA	Uganda Rainwater Harvesting Association
UWASNET	Ugandan Water and Sanitation NGO Network
WEDA	Wera Development Association
WSP	Water and Sanitation Program (World Bank)

The Self Supply Approach

Supported Household Investment in Water Supply

Approximately one billion people around the world do not have access to a safe and reliable water supply at a reasonable distance from their home. Many more consider their existing water supply to be inadequate in terms of quality, quantity, reliability or convenience. Consequently, increasing numbers of households have improved their own water supply in small and affordable steps using their own resources. Their capacity to do so and the advantages this may bring are seldom recognised or built upon.

Conventional community supply refers to heavily subsidised water supply services which are implemented by Governments and NGOs and then managed by communities. Supplies that have been improved with household investment tend to be more effectively managed and maintained. They are particularly relevant in small or remote communities, and where there is easy access to groundwater or plentiful rainwater.

Under the Self Supply flagship, the Rural Water Supply Network (RWSN) is encouraging authorities, NGOs and the private sector to recognise that many households and small groups can actually construct, or pay for, the construction of wells and rainwater harvesting facilities. Households can also improve water quality by upgrading existing water sources or undertaking household water treatment, or a combination of the two. Many are showing the demand for such improvements and the constraints which they face in achieving their aims.

To enable and encourage them to make such investments, four supporting pillars are required (Sutton 2009):

- Policies which encourage individual initiatives
- Technology and technical advice for consumers
- A developed private sector
- Access to micro-credit or savings mechanisms

The overarching aim of piloting initiatives in the four countries of Ethiopia, Mali, Uganda and Zambia is the establishment of these pillars to create an enabling environment and ultimately taking the self supply approach to scale.

This report is the fourth in a set of five. Four of these reports present progress in countries (Ethiopia, Mali, Uganda and Zambia) which have been piloting Self Supply. The fifth report draws together the lessons from these projects.

Introduction

Uganda has been fairly successful at increasing access to improved water supplies in rural areas, from about 20% in 1991 (Danert 2010) to an estimated 65% by 2010 (MWE 2010). These twenty years have witnessed substantial financial investments by the Government, Donors and Non-Government Organisations (NGOs) in infrastructure through projects and a national programme. Over the years, there has been considerable support to build skills, knowledge and systems at national and district government level. There have also been marked efforts to try to ensure that improved water supply infrastructure continues to function (MWE 2010).

At a much smaller scale than the conventional rural water supply programmes, Government and NGOs have undertaken a number of initiatives to encourage and enable households to make their own investments in water source improvements, i.e. self supply. This field note documents the story of self supply in Uganda using improvements in domestic roofwater harvesting (DRWH) and groundwater sources.

Country Context

Physical Environment

Uganda is a landlocked country lying almost totally within part of the upper Nile Basin. Compared with the other countries which have been piloting self supply (Ethiopia, Mali and Zambia), it has a relatively small land area (200,000 km^2), with a further 42,000 km^2 (18%) being lakes and rivers (UBOS 2010), as shown in Figure 1. This tends to mean that much of the rural population have good access to surface water sources. To a great extent, the country consists of high plateau (averaging 1,100m), with more mountainous land to the West, Southwest and East.

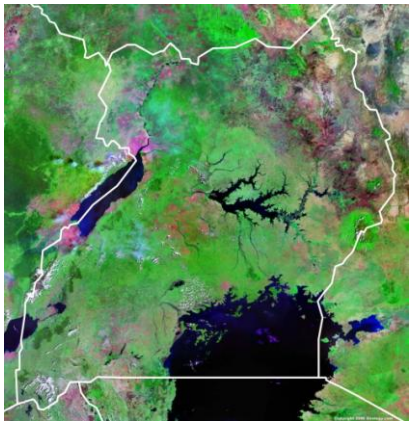

Figure 1: Satellite Image of Uganda

With a generally equatorial climate, rainfall is plentiful over much of the country, with two, usually fairly reliable, wet seasons. The North-east is the area most prone to drought. Two-thirds of the country receives over 1,200mm per year (Danert and Motts 2009) and the wetter areas of the South, West and around Lake Victoria may have as much as 1,500mm per year, making rainwater harvesting feasible over most of the country. Much of the land is underlain by fractured basement rocks with weather surface layers which provide limited groundwater storage and yields. Alluvial areas associated with the Nile and its tributaries and lakes receive constant recharge from these bodies of water. High fluoride levels are found in the volcanic waters of the Rift Valley to the West, as well as high iron and manganese levels in some of the weathered zone aquifers (BGS 2001).

The 2010 population was estimated to be 32 million, of which 27 million live in rural areas (UBOS 2010). Average population density is 135 people/km^2, varies geographically and is particularly high in some parts of the country (e.g. 952 people/km^2 in the eastern highlands).

Economics

The Ugandan economy has shown robust growth over the past few years, with Gross Domestic Product (GDP) rising by 7% in 2008 (AEO 2009), and 6% in 2010 (UBOS 2010). Agriculture provides around 70% of employment in the country and contributed about 21% of GDP in 2010 (UBOS 2010). Coffee remains the dominant cash crop for the country (UBOS 2010). In 2009, Uganda came 157th out of 182 in the Human Development Index (HDI) ranking (UNDP 2009), the highest of all the countries piloting Self Supply (Ethiopia, Mali, Uganda and Zambia).

The National Development Plan (NDP), launched in 2010, has a vision to transform Uganda *"from a peasant into a modern and prosperous country within thirty years"*. It is organised around four sector clusters: primary growth, complementary, social and enabling. Government is promoting investment in productive sectors to grow the economy so that wealth (including taxes) can be used for social sectors, including domestic water supply.

Access to Improved Water Supply in Rural Areas

The Ministry of Water and Environment (MWE) has set a target of providing access to improved water supply water for 77% of the rural population by 2015 (MWE 2010). This is higher than the rural share of the Millennium Development Goal Target of 72% (AMCOW/WSP 2010).

Access to an improved water supply in rural areas in 2008 was 64% according to the JMP (UNICEF & WHO 2010). The Ministry of Water and Environment (MWE) puts it at 65%, showing a high level of agreement between estimates. Government policy requires an improved water supply within one kilometre of users. The following assumptions are made regarding the number of users per source (MWE 2010):

- Protected springs – 200;
- Shallow well with handpump – 300;
- Deep borehole with handpump – 300;
- Gravity flow scheme, or other piped water supply tap – 150
- Rainwater harvesting - 3 people per tank of <10 m^3 and 6 people for larger tanks.

The National Service Delivery Survey (NSDS) in 2008 found that 60% of the rural population are served by boreholes, wells, protected springs and gravity flow schemes, with 13% drinking from open sources such as lakes, rivers and ponds and 19% from other unprotected sources in the dry season (UBOS 2008). However, for many rural dwellers, the type of water source used for drinking water depends on the season. Whereas less than 1% of rural dwellers rely on rainwater in the dry season, this rises to 27% of the population in the wet season.

Access to improved water supplies ranges from as low as 9% in the sub-county of Banda in Bugiri District to 95% in the districts of Kabarole and Rukungiri (MWE 2010). It is estimated that 19% of improved water supplies are not functioning, a figure which has remained fairly constant for the last six years (MWE 2010).

The main funds available to increase access to safe water supply in rural areas are in the form of a Conditional Grant which is managed by District Local Governments. In 2009/10, a sum of $26 million was invested through this grant, serving an estimated 670,000 people with new, improved water supplies.

With Uganda's extremely high population growth (3.2% per annum), stagnating investments and rising per capita costs, it is proving difficult to increase access to safe water beyond current levels (AMCOW/WSP 2010). In addition, there are some pockets of the country which are particularly difficult to serve with the main technologies (protected springs, wells and small piped water systems). There is an urgent need for increased investment as well as to explore alternative approaches to the high State subsidy for construction that is currently practised by the conventional programmes.

Much of the country has hydrological or hydrogeological conditions which are suitable for small-scale water supply development using rainwater or groundwater. There remains scope to expand informal practices into more reliable perennial or near-perennial supplies. Moves to develop these are now being accelerated, primarily through the promotion of domestic roofwater harvesting and improved hand-dug wells.

The Story of Domestic Roofwater Harvesting

The proportion of people using rainwater as their drinking water supply increases in the wet season rose from 18% in 2004 to 27% in 2008. Given the incremental manner in which investments in rainwater harvesting can be made by households (i.e. adding gutters and increasing the storage quantity over time), the technology is a very suitable self supply option.

Figure 2: Typical informal Domestic Roofwater Harvesting

As well as catchment from rooftops, rainwater harvesting includes collection of water from natural catchments. However, since these are not commonly used for drinking water purposes, they are not considered further here. They do, however, have considerable potential for productive water use and income generation.

Rainwater harvesting is not completely new in Uganda. In fact, the collection of rainwater with banana stems and storage in containers has a very long tradition. When one spends time in rural areas in the rainy season, the eyes soon become accustomed to seeing water being tapped from rooftops and being collected in all kinds of available vessels.

In the colonial period, larger water storage systems such as brick-lined cisterns and reservoirs were constructed, particularly at administrative buildings. There was a period in the late 1990's when rainwater harvesting at community level was promoted by Government. More recently, several new domestic roofwater harvesting technologies have been promoted and adopted in various parts of the country.

Broadly speaking, the story of DRWH so far can be divided into four stages: (1) introduction of the idea; (2) demonstration of what can be done; (3) increasing self-reliance and (4) scaling-up. The first three stages are described below. We shall consider the fourth stage, *scaling up*, later in this paper, together with groundwater source improvements.

Stage 1 Introduction of the Idea

It was 1997 that witnessed the re-introduction of institutional rainwater harvesting collection, i.e. for schools and clinics, but these attempts were not particularly successful (AAH 2006). Recognising the limitations in managing such facilities, more emphasis started to be placed on household collection and storage, i.e. domestic roofwater harvesting (DRWH).

It was Rolf Winberg of the Swedish International Development Cooperation Agency who piloted the ideas of alternative water supplies in Kooki County, Rakai District, where groundwater was heavily mineralised. In the late 1990's, a women's group from Rakai District travelled to Kenya for training in the construction of DRWH facilities. Returning inspired from their visit, they started to construct facilities in the local area. Kigezi Diocese Water and Sanitation Programme (KDWSP), an NGO in Kabale District, subsequently introduced DRWH technologies, as did the NGO ACORD (Agency for Cooperation and Research in Development) in Mbarara District.

Stage 2 Demonstration of what can be done

Warwick University undertook considerable research in rainwater harvesting technologies in Uganda from the late 1990's up to 2003 and developed designs for partially underground tanks as well as other innovations (Warwick University 2010). The Uganda Rainwater Harvesting Association (URWA) was established in 1997 to promote the technology and has done much to raise awareness and identify potential and technical solutions.

Figure 3: Construction of Ferro-cement Rainwater Tank

The Government of Uganda prepared a strategy for rainwater in Uganda in 2003 (MWE 2003). It divided the promotion of the technologies into an *NGO delivery mode*, involving promotion and capacity building of communities, and a *private sector mode,* which is based on the development of enterprises to provide facilities. DRWH started to be included in the activities of other NGOs throughout the country. Most of these organisations were building facilities for water users. Some (notably ACORD and KDWSP) were training masons and women's groups to construct facilities. The usual concept was to support the masons in building demonstration facilities to trigger other households to invest their own financial resources in them. Traditional savings groups, with revolving loans, were among the strategies used by households to finance construction.

In 2004, MWE started to support further piloting of DRHW through the NGO delivery mode, sending out a clear signal that there was growing Government support for this technology. Since 2006, District Local Governments have been allowed to construct demonstration DRWH facilities and train masons from their Water and Sanitation Conditional Grant. DRWH was first included in national safe water coverage estimates in 2006. In 2008, a rainwater harvesting training centre was opened in Kabale. It had trained 82 masons from the south west of the country by early 2009. The African Development Bank showed interest in DRWH, funding a study and exchange workshop in 2008 (see Obote 2008). MWE has also just established an *Appropriate Technology Reference and Development Centre* in Mukono district. Managed by Netwas Uganda, the centre will promote rainwater harvesting alongside other technologies. Indeed, the popularity of DRWH as a viable technology option for rural water supplies continues to grow within institutions and among individuals.

Stage 3 Increasing Self-Reliance

An estimated 60% of rural houses had tin roofs in 2006 (UBOS 2006). Hard roofs are a basic requirement for DRWH. Many rainwater storage products are available on the market in Uganda (Box 1). Occasional collection of rainwater is widespread, as the large variation in numbers of dry season and wet season users shows.

Box 1: Domestic Roofwater Harvesting Storage Products

A study for Enterprise Works (Danert and Motts 2009) in 2009 identified "*about 30 distinct DRWH storage products which include: 20-litre jerry cans; 50 and 100-litre blow-moulded plastic drums: 200-litre steel drums; 420 to 1,500-litre cement jars; plastic tanks from 220 litres to 15,000 litres; above-ground plastic-lined tanks (3,000 litres); below ground plastic-lined tanks (10,000 litres and above); ferro-cement tanks (4,000 to 10,000 litres); partially below-ground cement-lined tanks (6,000 to 10,000 litres) and brick tanks (10,000 litres). Broadly, these can be categorised as either manufactured or Built-In-Place rainwater harvesting storage products*". Enterprise Works is now testing flexible membranes of a volume of about 1.3 m^3 to provide low-cost lining to ground level and below-ground.

Households can make investments in the containers and guttering required for DRWH according to their means. It is thus possible for DRWH users to move up a **service ladder** (MWE 2003, Thomas and Martinson 2007):

- Wet-season DRWH, whereby 14 litres per person per day is supplied but only in the wet season(s) or on days with significant rainfall.
- Adaptive DRWH, whereby at least say 7 litres per person per day of potable water can be provided throughout the year increasing to 20 litres per person per day in the wet season(s).
- Main-source DRWH, whereby >85% of annual water demand can be met if a sufficiently large tank is installed.
- Sole-source DRWH, whereby >95% of annual water demand (say 20 litres per person per day of potable water) can be met if a sufficiently large tank is installed.

Moving to an approach whereby water-users are more self-reliant and can progress up a service ladder requires increased knowhow among water users of the options available and capacity among masons or other enterprises to provide the required service. There is also a role for the public sector in providing advice, carrying out works, stimulating the market for DRWH as well as undertaking a regulatory function. In some parts of Uganda, particularly the west and south west, this self-reliance is growing considerably. There are increasing numbers of women groups where the members help each other to save and even build DRWH facilities. In other areas, rural dwellers consider rainwater facilities as something which an NGO or local government should provide for them. Meanwhile, there are several Districts in which there has been relatively little exposure to the collection and storage options available.

District local government construct DRWH facilities (2199 in 2007/8; 773 in 2008/9 and 810 in 2009/10) (MWE 2008, 2009 & 2010). The idea is that these are demonstration facilities which should encourage others to copy them and upgrade their own facilities using their own finances and the skills available in the private sector. Training of masons in the construction of various DRWH solutions by the rainwater centre in Kabale and others has boosted skills, particularly in the south western region.

The extent to which the wider uptake is taking place has not been measured. Based on a rather limited sample, a study by Enterprise Works in 2009 noted that the so-called "demonstration" facilities appeared to be constructed for better-off homes.

A further problem was that despite the numerous types of DRWH technologies available throughout the country as a whole, knowledge of them seems to be fragmented, with some types widespread in one area, but lacking in another. Thus rural consumers are rarely aware of all the available options. Despite these concerns, the statistics do indicate that the use of DRWH in the rainy season increased by about 50% between 2004 and 2008. In fact, DRWH is the most popular water supply technology for private investment. Of the estimated 15,000 rainwater tanks of 6m^3 and above in the country, about 28% have been privately financed (MWE 2010b).

Groundwater Source Improvements

A **scoophole, or waterhole** is a very shallow hole, filled by groundwater seepage or a small spring. It can be improved by protecting the catchment area immediately around it (fencing), supporting the sides with concrete or brick lining and ensuring drainage and site hygiene. Depth is limited by the stability of the unsupported ground, so as a source, a scoophole may often dry up at certain times of the year. Adding support to the walls may therefore provide a more perennial source close to the house.

Hand-dug wells of up to 20 or more metres depth provide access to deeper groundwater. The wells may be unlined or have partial full brick lining, depending on the ground conditions. In Uganda, covered hand-dug wells which are fitted with a handpump are considered to contribute towards safe water coverage. In certain parts of the country, many hand-dug wells have been constructed through Government and NGO programmes. These are usually managed by the users as part of Uganda's Community-Based Maintenance Strategy (CBMS). Of the estimated 16,000 improved hand-dug wells in Uganda, about 3% were privately financed (MWE 2010b).

It is increasingly being recognised by Government that there are numerous cases where hand dug-wells have been constructed, or funded by users themselves. These have often been fitted with a rope and bucket. Such wells can be improved by inserting impermeable top (or full) lining (rising at least 30cm above ground level), top slabs, lids, aprons, drainage, parapets as well as higher-level lifting devices. Higher-level improvements include submersible pumps (where electricity is available) or solar or mechanised pumps, which can be linked to ground or elevated storage.

Figure 5: Household-owned shallow well in Eastern Uganda

Boreholes fitted with handpumps form a key technology for rural water supplies. There are almost 25,000 boreholes in Uganda. Most of these have been constructed by Government and NGO projects, with about 3% privately financed and equipped for private and productive use or for selling water (MWE 2010b).

Springs occur when underground water makes its way to the earth's surface and emerges as a water hole or wet spot. With its undulating landscape and highland areas, some parts of Uganda are particularly well-endowed with natural springs. In fact, to date, almost 25,000 springs have been protected in Uganda. In general, it is Government and NGO projects which have protected the springs in order to prevent contamination and ease water collection. However, the recent national inventory shows that only 1% of protected springs were privately financed.

As with DRWH, the story of groundwater source improvements for self supply can be broadly divided into the three stages of 1) introduction of the idea; (2) demonstration of what can be done; and (3) increasing self-reliance. When we look at the fourth stage, scaling-up, we shall consider DRWH and groundwater source improvements together.

Stage 1 Introduction of the idea

There have been a number of triggers for consideration of household-level solutions in Uganda, including traditional efforts to improve shallow wells in Kamuli, Kumi and Busia districts. Some of the well-diggers from these areas provided skills and knowledge to other parts of the country. Other efforts were undertaken for commercial interest in local trading centres. The RWSN Forum of 2003 further raised the profile of household level solutions. By this time, there was already considerable momentum building with respect to DRWH as a viable technology for rural water supplies. The 2003 RWSN Forum in Durban provided another slant to this technology and shone the spotlight on groundwater source improvements by households themselves.

In 2005, MWE became aware of self supply initiatives in other countries including Zambia. In a bid to start a self supply initiative, the Uganda Government, with funding from the Water and Sanitation Programme (WSP), conducted a scoping study on the potential of self supply in 12 districts. Given that considerable research on DRWH had already been carried out, the scoping study focused on groundwater source improvements, with field work in the east of the country (Box 2). The study revealed that there was much more household investment in improving groundwater sources than had previously been realised. It also developed a scoring system for supplies which gives more weight to users' values rather than just those of planners/ policy-makers.

Box 2: Key Findings from Initial Self Supply Study (Carter et al 2005)

- 75% of sources were privately owned, mostly shared with neighbours and mostly with no charge
- Innovations were more easily accepted first by urban and peri-urban people, and payment for water more acceptable to them as conventional piped supply is only offered on a payment basis
- Barriers to encouraging groundwater source improvement include:
  - official discouragement of what are regarded as poor quality supplies
  - lack of mechanisms to support individual ventures
  - a lack of awareness by professionals in what people already do for themselves
  - most owners were not able to make changes to their water supplies in one large step
- Proposed support options for accelerating groundwater source improvement:
  - support to low-cost incremental source improvement technologies
  - support to private-sector supply owners to develop water sources for the common good
  - support to private sector operators for management and maintenance dealing with households directly, not through committees
  - support to artisans through training, equipment and access to credit

The study findings stimulated debate amongst government and NGOs and were discussed at a national workshop organised by UWASNET in November 2005. This increased the awareness that both groundwater and rainwater could offer household-level solutions.

Stage 2 Demonstration of what can be done

The scoping study gave way to pilot projects (2006 to 2008), funded through the Joint (Government of Uganda/Development Partner) Partnership Fund (JPF). Two NGOs, UMURDA (Uganda Muslim Rural Development Association) and WEDA (Wera Development Association) encouraged households to improve their own water supplies, with no, or very low subsidies. UMURDA worked mainly on communal sources, with a particular emphasis on springs, whilst WEDA worked more with privately owned supplies, especially shallow wells. The communities and individuals either carried out the work themselves or contracted artisans to do it for them.

In terms of outputs, 41 sources were improved, benefiting an estimated 3,600 people (Carter et al 2008). 26 communal or private springs were protected as well as 15 private or communal shallow wells. The cost per source improved was about $1,000 (Carter et al 2008) and the cost per head $10. In both cases, source users paid around 40% of the total cost of works, or some $US 400 per site. The lower cost of improvement compared to conventional means (25% of the cost of contracted options) and the far lower subsidy (60%) suggests that this approach reduced the cost to the state for an improved supply by 85%. The pilot projects confirmed the potential of self supply in the provision of water supply in Uganda and enhanced MWE and NGO understanding on the opportunities and challenges of self supply (Box 3).

Box 3: Lessons Learnt from the Self Supply Pilot Projects (Kiwanuka 2008)

1. **Importance and potential of self supply**. Targeted support to self supply is one important strategy for the provision of safe sustainable water supplies. It has significant potential to serve many more people at low cost than through the conventional approach and with a greater degree of cost-sharing between government and the community.
2. **Drivers**. Self supply initiatives are common in areas where supply is distant, unreliable and costly but with opportunities for shallow groundwater or DRWH possibilities. The drivers which motivate individuals to initiate self supply improvements include personal convenience, the desire for self-improvement, potential for productive water use and the provision of service to the wider community.
3. **Ownership**. At the heart of true self supply is the issue of water supply ownership. Communal ownership and management are problematic, while ownership by a motivated individual provides a greater prospect of functional sustainability.
4. **Technical constraints**. Certain water source technical options are better suited to groundwater source improvements than others. In the Uganda pilot, the focus has been on shallow wells and natural springs, with wells the preferred option. Where deep boreholes are needed, groundwater source improvements may not be an option.
5. **Selecting project locations**. The selection of locations for future pilot projects or scaled-up initiatives needs to take account of technical options, the existence of motivated individuals, the need for improved access to safe water, and opportunities for productive uses of water.
6. **Communicating the concept**. Communicating the concept of self supply to NGOs and CBOs, local Government, and other stakeholders is important, but challenging. It is easy for the concept to be misunderstood, or for some stakeholders to feel threatened by it.
7. **Water safety**. Experience from the Uganda pilot demonstrates (a) that water quality can be significantly improved through groundwater source improvements, but that (b) water users often wish to quickly progress up the "ladder" of improvements, to a covered source equipped with a handpump.
8. **Role of implementing agencies**. The role of organisations which become involved in support to self supply is to promote and encourage self supply initiatives; provide technical and management advice, specialist skills and (limited) material support; promote sanitation and hygiene improvement; all while avoiding the stifling of private initiatives.
9. **Ongoing support to water users**. Implementing agencies must continue to be available to water source owners, providing continuing advice on technical or management problems.
10. **Ongoing support to implementing agencies**. Implementing agencies themselves need continuing support from local and central Government and/or international NGOs, to resource their support activities to water users, and to ensure their knowledge is kept up-to-date.

Stage 3 Increasing Self-Reliance

In FY 2009/10, MWE embarked on a communication and promotion campaign involving officers from 32 districts and 40 NGOs from East and Central Uganda. The purpose was to bring about thorough understanding and knowledge of the existence and potential of self supply and to demystify fears held by stakeholders on this different approach.

During the sensitisation meetings, stakeholders within District Local Governments and NGOs pledged to support and promote self supply initiatives through carrying out baseline surveys, undertaking advocacy meetings to market self supply at community level, and through provision of technical advice to communities. Box 4 sets out the main achievements so far, as revealed by a follow-up in seven districts where sensitisation of the self supply concept has taken place.

Figure 6: Household Improved Well with Handpump

Box 4: Key Achievements with Respect to Self Supply (MWE 2010a)

Local Governments are advertising and marketing the concept of self supply to district politicians, technical officers and communities, through workshops, meetings, radio announcements and face-to face discussions.

As a result, the number of enquiries from private individuals/ investors in private sources to district offices is growing.

District Water Officers and local pump mechanics are assisting private individuals in installing / upgrading and repairing water sources.

Local pump mechanics have been sensitised to support private initiatives, to install pumps for private owners and provide operation and maintenance services to private source owners.

Baseline surveys of private supply owners have been carried out in Jinja and Iganga districts, showing significant contribution of private supplies to coverage. Data from Iganga district shows that private supplies equal some 10% of all supplies in the district, with about half of them reaching standards which can contribute to coverage.

A mechanic in Bugiri has made one low-cost pump (Canzee) and bought another from Kampala, as well as installing 11 others for piloting with NGO UMURDA, shortly after the pump was introduced.

A local NGO in Soroti district Pentecostal Assembly of God (PAG) has assisted communities in improving over 120 wells by offering technical support and a few materials which the communities cannot afford.

User demand grew as people began to see what they could do for themselves. Initial improvements to protect sources also raised demand for higher levels of technology, such as handpumps. The demand for progression up the 'technology ladder' indicates a wish both for safer and more accessible water, in which convenience plays a major part in triggering investment. Both NGOs remarked on demand being higher than they can satisfy.

The idea that shallow wells are inherently unsafe may hold true in urban and peri-urban areas, but with the lower population densities of rural areas, this is not so likely. Simple upgrading appears to have led to significant improvements in water quality in almost all cases, with Tillett (2007) finding a 10-20-fold improvement in quality with upgrading.

Figure 7: Rope Pump in Use

Household water treatment

There have been a range of projects establishing small-scale pilots of household water treatment and storage (HWTS). These include almost all technical options from chlorination (PUR and liquid chlorine) to SODIS (solar disinfection) (MacGourty 2006) to bio-sand and ceramic filters and safe storage. Piloting with HIV-related safe water programmes in Uganda, Population Services International (PSI) and others found a 25% reduction in risks from diarrhoea and a 33% reduction in ill days (Lule et al 2005) with chlorination. At present, according to Demographic Health Survey (UBOS 2009), less than 5% of rural people consistently undertake household water treatment. It should be noted that to date, there has not been extensive documentation of household water treatment in Uganda as compared to DRWH and groundwater source improvements.

Convergence in Self Supply

Stage 4 Going to Scale

So far, we have discussed three stages with respect to DRWH and shallow groundwater technologies for self supply in Uganda, i.e. 1) introduction of the idea; (2) demonstration of what can be done; and (3) increasing self-reliance. As these processes for the two types of technology have largely been running in parallel, it has been useful to consider them separately. However, as we look forward and consider how to take household investments in DRWH and shallow wells to scale, it is worth considering these technologies together. Such

an approach is also likely to be more useful for MWE as it builds up the *Appropriate Technology Reference and Development Centre*.

Piloting of DRWH has grown from one or two small initiatives to more than 20 NGOs working across the country. There is therefore now a wide experience of different technology options for capturing rainwater. The challenge is more how to make these more widely available and constructed at household level without creating over-dependency on outsiders (government/donors/NGOs). Many of the NGO projects have trained artisans and/ or women's group to construct small ferro-cement storage, but it seems this has not often led to a spread of the technology beyond the areas where it has been introduced. Thus achievements in capacity building are at present quite area-specific. The private sector is becoming more involved, and small storage containers of 200- 250 litres (oil drum size) are now easily available in roadside markets. Sale of larger plastic tanks of 500-1,000 litres is generally confined to district-level markets.

In order to go to scale in Uganda, MWE is trying to increase the number of NGOs introducing the concept of household investment in groundwater source improvement and DRWH to the rural population. It is also sensitising district and local governments about the concept of self supply. This has taken place in eastern and central Uganda. As a result of this sensitisation, many district staff are being encouraged to consider, for the first time, what water supplies people are already using. As a result of sensitisation efforts by MWE, recognition of the possibilities for household investments in shallow wells by district local government and NGOs has already grown.

Figure 8: Rainwater Harvesting Jar under Construction

Key Actors

Incorporating such a different approach to rural water supplies is not something which can happen overnight. It takes time as well as the dedication of motivated individuals to bring about such change. It took more than four years to establish the *Appropriate Technology Reference and Development Centre*. One of the key aspects to note with respect to Uganda is the involvement and leadership by several key stakeholders in promoting DRWH and groundwater source improvements for self supply. It is worth noting the extent of their involvement from the outset, as this has provided a broad base for scaling-up.

The **Ministry for Water and Environment (MWE)** is responsible for rural water supply and has been exploring various options to reduce costs, improve service levels and attract greater user investment in infrastructure for a number of years. Once domestic roofwater harvesting had been demonstrated as viable through research projects and by NGOs, MWE supported further pilot projects, developed a domestic roofwater harvesting strategy and encouraged district local governments to invest in training and demonstration of the technologies. With respect to groundwater source improvements, MWE was open to a scoping study and then supported two pilot projects to learn more about self supply options and approaches. MWE is continuing to promote self supply to district local governments and NGOs. It should thus be noted that MWE has demonstrated an openness to test out and invest in new, innovative ways of working to try and raise access to safe and reliable water supplies. MWE has recently established an *Appropriate Technology Reference and Development Centre*, further illustrating its commitment to low-cost options for water supply and sanitation.

Cranfield University was involved in researching the potential and the impact of groundwater source improvement for self supply. Prof. Richard Carter led the initial scoping study in 2005 and provided technical support afterwards, as well as supervising MSc students. **Warwick University** (notably Dr. Terry Thomas) supported the establishment of the **Uganda Rainwater Harvesting Association** (URWA) back in 1997 and has carried out much research in RWH systems in the country.

In 2005, **WaterAid** Uganda assisted UWASNET in setting up the scoping study to look at the degree to which Self Supply (through groundwater source improvements) already existed in Eastern Uganda, its form and potential to accelerate its progress. **UWASNET**, as the co-ordinating body for NGOs in Uganda, was involved in the identification of suitable NGOs and areas for the self supply pilot projects, providing a platform for debate on the lessons learned from the findings and raising awareness among other NGOs. The local NGOs **UMURDA** and **WEDA** carried out the first self supply pilot projects, and others are now taking up this approach. URWA has extensively promoted DRWH in Uganda.

The role of **RWSN** has been to initiate the 2005 self supply study, ensure international promotion of the findings and wider debate and in 2010, providing support to MWE to develop a framework plan for self supply.

Figure 9: User-Owned Handpump in Eastern Uganda

Supporting Roles and Responsibilities

Sutton (2009) states that in order to enable households to make investments in their own water supplies, four pillars are required:

- Policies which encourage individual initiatives
- Technology and technical advice for consumers
- A developed private sector
- Access to micro-credit or savings mechanisms

Government's role is particularly to provide advisory and regulatory services and promote incremental improvement to the unserved. It may also become important in hosting micro-credit facilities or subsidies. Government and NGOs have a role to play in the provision of technical advice to consumers with respect to suitable technologies and possible incremental steps.

The private sector's role is complementary, promoting and providing services for:

- Well construction and protection
- Storage tanks and container construction
- Pump production and installation
- General maintenance
- Household water treatment consumables
- Advice on stocked products

There is also a role for micro-finance as well as credit and savings organisations to provide mechanisms for households to be able to afford to make investments in water supply improvements.

Although there are still a number of outstanding challenges, the Uganda Government has now embarked on the process of developing a comprehensive framework for self supply. It is trying to set out the roles and responsibilities of various actors and calls for actions to further define the possible technologies that can be developed in incremental steps. The action plan also notes the need for more analysis of water quality and the establishment of benchmarks which clearly show which level of water source improvement would be considered as contributing towards the national figures of access to an improved water supply. The recent visit of a delegation from MWE and Unicef to Zambia provided insights into practical ways of doing this.

Synthesis of Key Issues

Although the concept of self supply is being promoted in Uganda, there is much that still needs to be done to enable it to be integrated into sector operations so that it can sit alongside conventional approaches to rural water supply. There is still need for wide consultation, particularly with respect to the issues set out below.

Technology

Guidance and Training: Low-cost improvements use the same principles as those for more expensive options to avoid contamination, store and lift water. However, for smaller user groups, the designs can be less robust, so that costs can be lower. Lower-cost measures are essential to enable people to consider investing in Self Supply options. Planning construction with later additions in mind can make bigger changes affordable over time. However, this is not a concept that masons and others are used to. Developing guidelines and providing training would help accelerate the process and enable people to see the next step they could aim for. In order to be fully accepted, such guidance needs to be provided by the same authorities that provide other training materials and design guides.

Incremental steps: If the steps promoted for improvement are too large and do not fit the levels of investment households can afford, then there will be no adoption of the technologies. Danert and Motts (2009) point out that in DRWH, starting promotion with 4,000 litre or more capacity containers may put upgrading out of the reach of most people, leading to poor demand and few improvements. Similarly, insisting on a certain level of well-head improvement as a starting point may scare off people who can achieve the same level but in smaller steps.

Planning

Institutional support: The step from demonstration and pilot projects to wider adoption of self supply options requires strong institutional support in the form of proactive encouragement in household investments by local and national government technical staff and politicians as well as demonstration of viable investments and support to the local private sector (e.g. through awareness raising and training). There is also a need for monitoring and further research, e.g. to examine issues of equity and inclusion or water quality.

People who are motivated to make their own investments need to have clear alternatives of how to proceed, including:

- Well-defined options in terms of technology (steps/levels)
- Local administration, entrepreneurs and artisans who can provide relevant services and advice, and
- Micro-credit, or other finance mechanisms such as savings and credit organisations within or outside the community.

Without these elements, the number of people picking up incremental water source improvements and doing something with it may remain simply those who were involved in the pilot projects, or the wealthier members of the community. This will not help fill the gap between targets and achievements which MWE wish to address.

Integrated planning: Self supply options are not all equally applicable everywhere. Not all households need DRWH or household water treatment, and not all groundwater is affordably accessible by families in the form of a household well. There is need for flexibility but also for addressing how household-level solutions can fit into District planning. It is important to ensure that planners understand use patterns and user perspectives while still considering their role in working towards coverage targets. There are two key questions in this regard:

- Are there specific areas/households that should be targeted for self supply?
- Should the purpose of self supply be to make services available (at cost) for those who find that the supply they use is inadequate and wish to improve upon it?

These issues are often better understood by CBOs and NGOs, or lower local Governments (sub-counties) who are closer to the end user and can see the support needed. Uganda finds itself in the transition from Self Supply as a project-enabled strategy, targeting particular communities, to one which is creating an enabling environment to facilitiate everyone to access an improved water supply.

Policy and Finance

There is a tension between stakeholders that argue for subsidies for households that cannot afford DRWH and those that would like to avoid creating donor dependency.

In the past, the Government of Uganda policy did not allow direct subsidies for hardware for rural water supplies at household level. In contrast, Government heavily subsidises the construction of community supplies. In order to keep in line with these policies but still promote DRWH, there was a change in policy. The District Water and Sanitation Conditional Grants can be used to construct demonstration facilities at household level. However, if self supply is to fill the gap that public services cannot reach, government may wish to subsidise self-help activities at household level, particularly for the poor. This will require clear guidelines on how District Water and Sanitation Conditional Grants funds could be channelled to individual families. In the short term, household subsidies are indirectly achieved by channelling finance through NGOs. Over the longer term, other support mechanisms may be needed, such as vouchers for the poorest of the poor. This may enable more families to upgrade their water supplies in a shorter period.

Within the Self Supply pilot projects implemented by WEDA and UMUDRA, the public subsidies for upgrading water supplies were around 60%. In the case of DRWH, public subsidies for demonstration facilities are about 40%. Danert and Motts (2009) suggest that at this level, the 'shadow' of subsidy is sufficient to deter many households from trying to solve problems on their own. In other words, the subsidy for DRWH may be so high that it suppresses demand by households and thus inhibits the growth of market forces to stimulate private sector development of services to self supply.

There is a delicate balance between encouraging a population with a low income to new an unfamiliar ways through subsidies and creating dependence which kills personal initiative. This is a very difficult problem. The need to invest in an improved water supply needs to be balanced with other pressing demands such as school fees, medical bills and other social obligations. Offering loans to individuals through revolving funds may provide one way of striking this balance.

Conclusion

Self Supply is a concept that is taking root well in a sector where dependency on outsiders (i.e. government, donors and NGOs) to improve rural water supplies has been strong. It required very good marketing and communications to avoid misunderstanding of the concept, particularly by local government and NGOs.

Self Supply does not replace the need for conventional communal supplies but augments them where services are inadequate. It also offers opportunities to end-users to solve some of their own problems with support from government, NGOs and the private sector. Clarity is needed on what role government wants Self Supply to take within rural supply water strategy.

Uganda is fortunate in having a government which has achieved much higher improvement in access to safe water in rural areas than most countries in sub-Saharan Africa. MWE recognises that Self Supply may play a valuable part in closing the gap between the 2015 targets and present rates of progress. It may play an even more important role in trying to reach universal access.

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