



Republic of Uganda
Ministry of Water & Environment

Austrian
 Development Cooperation

South-Western Towns

A Review of the Results and Sustainability of
Water and Sanitation Interventions since 1996

Final Report

October 2013

Reinold Seidelmann



DOCUMENT INFORMATION SHEET

PREPARED BY: Reinold Seidelmann, Team Leader



hydrophil iC GmbH
Schoenbrunner Str. 297, 1120 Vienna, Austria
T +43 1 521 69-0, F +43 1 521 69-180
office-water@ic-group.org, www.ic-group.org
FN 260405z
EN ISO 9001

IN ASSOCIATION WITH: Clarissa Mulders
Ernst Sonneveld, Fieldwork Coordinator
Christine Bbosa, Social Scientist
George Omara, Water & Sanitation Engineer



Water, Environment and Geo Services
P.O. Box 22856, Kampala, Uganda
Phone +256 41-4505798 /+256 772-222049
Fax +256 41-505798

WITH FUNDING FROM: The logo for Austrian Development Cooperation, featuring the word "Austrian" in a serif font above a horizontal line, and the words "Development Cooperation" in a serif font below the line. To the left of the line is a red graphic element consisting of two horizontal bars.

EDITOR: Revision 02 / October 2013

ACKNOWLEDGEMENTS

We are grateful to the Austrian Development Agency for the opportunity accorded to hydrophil iC in association with WE Consult to undertake this review.

We want to thank the Ministry of Water and Environment through its Directorate of Water Development, especially the Urban Water Supply Department and the Water Sector Liaison Division, for the open-minded attention given to us and all the information and reports shared with us.

We are particularly grateful to the management teams of the Water and Sanitation Development Facility South-West (WSDF-SW) and the Umbrella Organisation South-West (SWUWS), who worked with so much enthusiasm with the consultant team to recall in detail the development of the approach, retrieve documentation on piped water schemes constructed many years ago, and providing clarification whenever the need arose.

We want to thank all the key informants for providing us with valuable information on the intentions and motivations behind the activities and for openly sharing their views on past and recent developments.

We also want to thank the District Local Governments of South-Western Uganda for receiving the team and providing us with valuable background information.

We are immensely indebted to the authorities, particularly the members of Water Supply and Sewerage Boards (WSSBs), and scheme operators of the 46 small towns and rural growth centres in South-Western Uganda that were visited. Without their readiness and openness to participate in focus group discussions and share detailed technical information this review would not have been possible.

Last, but not least, we are greatly indebted to all of the 1,381 household members/water consumers who readily provided detailed information for the household questionnaires about their water supply, sanitation and hygiene situation.

CONTENT

| | |
|--|-----------|
| Abbreviations | 5 |
| Executive Summary | 6 |
| 1. Introduction | 16 |
| 1.1 Rationale and Purpose of this Review | 16 |
| 1.2 Scope of the Review | 16 |
| 1.3 The South Western Towns Water and Sanitation Programme | 17 |
| 1.4 Key Features of the Implementation Approach | 18 |
| 2. Methodology | 20 |
| 2.1 Selection of Towns..... | 20 |
| 2.2 Sources of Information | 23 |
| 3. Key Findings: Sustainable Access to Piped Water | 28 |
| 3.1 Functionality of the SWTWS Piped Water Schemes..... | 28 |
| 3.2 Actual Use of Piped Water..... | 28 |
| 3.3 Time Saved and Reduced Workload..... | 30 |
| 3.4 Affordability: Are the Poor Using Piped Water?..... | 31 |
| 3.5 Service Level and Service Quality | 34 |
| 3.6 Dynamics of Scheme Extensions after Completion | 36 |
| 3.7 Functionality and Service Reliability | 36 |
| 3.8 Water Quality Surveillance | 40 |
| 3.9 Water Source Protection | 41 |
| 4. Key Findings: Sanitation and Hygiene Awareness | 43 |
| 4.1 Access to Safe Sanitation / 100% Latrine Coverage | 43 |
| 4.2 Hygiene Awareness..... | 44 |
| 4.3 Ecological Sanitation..... | 44 |
| 5. Management Structures and O&M Performance | 46 |
| 5.1 Overall Findings | 46 |
| 5.2 Scheme Management..... | 47 |
| 5.3 Water Metering | 47 |
| 5.4 Support by the Umbrella Organisation..... | 47 |
| 6. Financial Viability | 49 |
| 6.1 Overall Findings and Conclusions | 49 |
| 6.2 Tariffs | 50 |
| 6.3 Revenue and cost recovery | 52 |
| 6.4 Savings | 53 |
| 6.5 Auditing..... | 53 |

| | | |
|--------------|--|-----------|
| 7. | Implementation approach and Design Assumptions | 55 |
| 7.1 | Community Participation and Demand-driven Approach | 55 |
| 7.2 | Appropriateness of Design Assumptions..... | 56 |
| 7.3 | Solar pumping..... | 56 |
| 7.4 | Tank Types | 59 |
| 8. | Indirect Impact | 60 |
| 8.1 | Time Saved..... | 60 |
| 8.2 | Health | 60 |
| 8.3 | School Attendance..... | 62 |
| 8.4 | General and Economic Development of Towns | 62 |
| 8.5 | Educational and Health Institutions | 63 |
| 8.6 | Effects on Women’s Role and Workload | 64 |
| 9. | Relevance and Key Success Factors | 66 |
| 9.1 | Overall Relevance | 66 |
| 9.2 | Key Success Factors | 66 |
| 9.3 | Factors for Sustainability | 67 |
| 9.4 | Strengths of the Implementation Approach..... | 68 |
| 9.5 | Weaknesses of the Implementation Approach | 69 |
| 9.6 | Reasons for Rolling out the WSDf and Umbrella Institutional Models..... | 69 |
| 9.7 | From Project Modalities to Integration into the Joint Sector Framework | 71 |
| 10. | Lessons Learned and Recommendations | 72 |
| 10.1 | Overall Effectiveness and Sustainability | 72 |
| 10.2 | Lessons: The Development Cooperation Perspective | 72 |
| 10.3 | Lessons: Uganda’s Water Sector Perspective..... | 73 |
| 10.4 | Lessons: Sustainable Piped Water Supply for Small Towns | 75 |
| 11. | References | 77 |
| Annex | 78 | |
| | Annex 1: List of Key Informants Interviewed | 78 |

ABBREVIATIONS

| | |
|---------|---|
| ADA | Austrian Development Agency |
| ADC | Austrian Development Cooperation |
| CAPEX | Capital Expenditure |
| DWD | Directorate of Water Development |
| DWO | District Water Office(r) |
| ECOSAN | Ecological Sanitation |
| FGD | Focus Group Discussion |
| FY | Financial Year |
| GIZ | Gesellschaft für Internationale Zusammenarbeit (Germany) |
| GoU | Government of Uganda |
| HH | Household |
| IRC | International Resource Centre on water supply, sanitation and hygiene |
| ISH | Improved Sanitation and Hygiene |
| IWA | International Water Association |
| JPF | Joint Partnership Fund |
| JWESSP | Joint Water and Environment Sector Support Programme (2013-18) |
| JWSSPS | Joint Water and Sanitation Sector Programme Support (2008-13) |
| KfW | Kreditanstalt für Wiederaufbau (Development Bank, Germany) |
| LCD | Litres per capita per day |
| LG | Local Government |
| MDGs | Millennium Development Goals |
| MWE | Ministry of Water and Environment |
| NDP | National Development Plan |
| NGO | Non-Governmental Organisation |
| NRW | Non-Revenue Water |
| NWSC | National Water and Sewerage Corporation |
| O&M | Operation & Maintenance |
| PO | Private Operator |
| RGC | Rural Growth Centre |
| SACCO | Savings and Credit Cooperative Organization |
| SO | Scheme Operator |
| SPR | Sector Performance Report |
| SWAp | Sector-Wide Approach |
| SWTWS | South Western Towns Water and Sanitation (project) |
| SWUWS | South Western Umbrella for Water and Sanitation |
| TC | Town Council |
| TSU | Technical Support Unit |
| UDDT | Urine-Diverting Dry Toilet |
| UGX | Uganda Shillings |
| ULGA | Uganda Local Governments Association |
| UO | Umbrella Organisation |
| WATSAN | Water Supply and Sanitation |
| WSDF | Water and Sanitation Development Facility |
| WSDF-SW | Water and Sanitation Development Facility – South Western Branch |
| WSS | Water Supply System/Scheme |
| WSSB | Water Supply and Sanitation Board |

EXECUTIVE SUMMARY

The intention of this review is to conduct a “reality check” on the outcomes and sustainability of a long-term programme to improve access to safe water and sanitation in small towns and rural growth centres in South-West Uganda, the South Western Towns Water and Sanitation (SWTWS) programme.

Reviewing the sustainability of piped water supply for small towns in SW Uganda

The SWTWS – including its successor, the Water and Sanitation Development Facility South-West (WSDF-SW) – is ongoing since 1996 without interruption. The review covered all the piped water schemes completed more than 6 years ago and a selection of the more recent schemes. The key actors who were involved in developing, managing and implementing the programme were interviewed to understand the development and success factors of the programme.

The findings are relevant for both the Ugandan water sector and Austrian Development Cooperation. For Uganda mainly because the approaches and institutional structures that originated in the South-West – known as Water and Sanitation Development Facilities (WSDFs) and Umbrella Organisations - have become national models for implementing infrastructure in small towns, and for providing backup support for the operation and maintenance of this infrastructure. The review results can therefore help improving the water sector framework. Austrian Development Cooperation, on the other hand, commissioned this study to gain a better understanding of the factors that led to lasting results in a generally successful programme.

Double interest and perspective

The review covered 46 towns in South-West Uganda with a population of mostly between 2,500 and 20,000 people. The average age of the 42 schemes implemented by SWTWS/WSDF-SW is 9 years. Four “control towns” in the same region but not implemented by the SWTWS were included in the review for comparison. In each town a technical and financial assessment was made and focus group discussions were held with water users and the members of the Water Board. 1381 households were interviewed to gain first-hand information on the water users’ views.

46 towns visited, 1381 households interviewed

Distinctive features of the SWTWS implementation approach were a demand-driven approach; the systematic introduction of water metering and payment for water; piloting of appropriate and innovative technologies (including solar pumping and ecosan); source protection; land acquisition and achievement of 100% latrine coverage as community commitment; and backup support to scheme operation and maintenance after commissioning; for the latter task the concept of the Umbrella Organisation as a member association was developed.

Key features of the SWTWS approach

Beneficiaries

By 2013, the total number of people served by the SWTWS and its successor programmes (co-funded by the European Union and the Government of Uganda) has exceeded 550,000 people (estimate of the current population of the served area; see section 1.3 for calculation details). The 42 SWTWS towns visited represent about 380,000 beneficiaries of the programme.

Access to piped water

According to the household survey, 42% of the beneficiary households had been using unsafe water sources before the intervention. The others used improved sources (in most cases protected springs, or boreholes/wells equipped with a handpump) but mostly at a much longer distance than the national standard of max. 200 meters for urban areas.

*Situation before
the intervention*

Key findings – water supply

Of the 42 SWTWS towns visited, 39 water schemes (that is, 93%) were operational at the time of visit, including 14 of the 16 schemes (88%) that were constructed more than 10 years ago. Of the remaining schemes, 2 were temporarily out of order (since 2 weeks and 8 months, respectively) and 1 had been replaced as the original scheme had never become fully operational due to management problems.

*93% of
SWTWS towns
operational*

On average, 88% of the households said to be using piped water as their main source of drinking water, even though most use other sources as well (mainly for washing, bathing etc.). By comparing the water quantities used and distributed by the scheme operator it can be estimated that roughly half of the water needs are covered from other sources than piped water, mainly in order to save on the cost of water.

*88% of
households are
using the piped
water*

Of the 14% of the households classified as “poor” or “very poor” 73% said to be using piped water. This is below average but a clear majority of the poor is benefitting from the water schemes. It should be noted that a local definition of poverty has been used, with many of the “average” households also being poor by international standards.

*73% of the poor
are using piped
water*

A majority of the interviewed households says that water is affordable (59%), that it is fair to pay for good water (58%), and that the money is well spent and used to maintain the water supply system (52%). Not surprisingly this varies from town to town, according to service quality.

*Willingness to
pay*

It is however worrying that in most towns there are no arrangements to help very poor or vulnerable households to access safe water. People who cannot afford to pay for water are usually obliged to use other water sources. It is recommended to consider introducing pro-poor policies, e.g. by providing a basic quantity of free water to very poor households. However this type of arrangement has to be carefully designed and tested as misuse might jeopardize the financial viability of the schemes.

*No
arrangements
for vulnerable
households*

Since the commissioning of the water schemes, the majority of the schemes has been extended, many considerably. About 85,000 additional people were served by the various extensions, which were funded from various sources including local government and internally generated revenue. The number of private household connections (including yard taps) has increased by 147% since the commissioning of the schemes. These are positive signs of a dynamic development of the piped water schemes.

*Dynamics of
scheme
extensions*

Drinking water quality is generally good, as confirmed by regular testing by the Umbrella Organisation. The number of observed cases of bacteriological

*Good water
quality*

contamination is limited to a few cases (e.g., one case in one town during the last three years). Iron removal by aeration and filtration is working well in two out of three towns. Users complain about “salty” water in three other towns where indeed conductivity is close to or slightly above the recommended guideline value of 1000 $\mu\text{S}/\text{cm}$, which is not a health-based limit but relates to the acceptability of drinking water.

Key findings – sanitation, hygiene and source protection

Sanitation improvements of the SWTWS programme consisted essentially of constructing public toilets, constructing ecosan demonstration toilets, and improving latrine coverage and hygiene awareness by a sensitisation campaign and by making 100% latrine coverage a pre-conditioning and community commitment for commissioning the water scheme.

Sanitation interventions

After commissioning the piped water scheme latrine coverage has remained close to 100%. 28% of the households (those who could remember) said that they had constructed (11%) or improved (17%) their toilet at the time of construction of the water scheme. The others had a toilet/latrine before. This is roughly in line with the findings of the sanitation baseline surveys made by the SWTWS prior to scheme construction.

97% latrine coverage

However, the majority of households (53%) use traditional pit latrines rather than “improved” sanitation facilities according to international definitions (minimum standard: pit latrine with a slab). “Improved sanitation” coverage – counting ecosan toilets, flush toilets and improved pit latrines with a slab only – is 54% in the four large SWTWS towns (> 10,000 inhabitants) and 39% in the smaller towns (for comparison: 21% in the small non-SWTWS “control towns”). There was also a surprisingly high percentage of shared latrines, i.e. latrines used by more than one household.

“Improved” sanitation?

Hygiene education was not very effective in promoting handwashing. Only 25% of the households had handwashing facilities at the latrine at the time of visit.

Handwashing

86% of the SWTWS towns had a source protection area that is free of buildings and agricultural use or other sources of contamination. (control towns: 25%). The SWTWS policy of requiring the community to purchase the land around the water sources has apparently been largely successful.

Water source protection

Management structures and service quality

All towns have active management structures in place. Most towns have an active Water Board which has a management contract with a private scheme operator, which may be a company (6 larger towns) or an individual (28 towns). In the remaining cases (7 towns) the scheme operator has no contract or is directly employed by the Town Council or Water Board. Staffing is not always adequate with 15 towns having no technical staff or only a plumber trained on the job.

Management structures are in place

Overall, 56% of the interviewed households said that they were satisfied with the service (management response to complaints or breakdowns). In 16 towns customer satisfaction is above 70% but in 8 towns it is below 30%.

Customer satisfaction

The reliability of service provision remains a challenge, despite all efforts to set up adequate management structures and to provide backup support through the Umbrella Organisations. Population growth and scheme extensions have contributed to this as many schemes encounter capacity constraints. Only 39% of the schemes provide essentially reliable service, with all or most inhabitants having permanent 24-hour supply and rare breakdowns being fixed within a short time. 7 other schemes appear to be well managed but capacity problems lead to insufficient supply or water rationing in parts of the network. Service reliability is not related to the age of the schemes (systems constructed more than 10 years ago show the same performance as newer ones) but – not surprisingly – gravity schemes are clearly more reliable than pumping schemes.

The reliability challenge

There is no single factor or pattern to explain the relatively high percentage of schemes with unreliable services. There is a variety of management and technical problems combined with scheme capacity problems (demand exceeding supply), unreliable power supply (power cuts, unreliable solar systems, lack of funds for fuel for the generator), and incidents such as damages by road works and vandalism. Improving the situation means developing managerial, technical and financial capacities in the same time and investing in schemes that are coming close to their lifetime or encounter capacity problems. It should be noted that, in the case of breakdowns, most schemes managed to re-establish service within reasonable time, often with support from the Umbrella Organisation.

Factors for unreliable services

On the other hand, many of the towns have quite favourable performance indicators. Non-revenue water is approximately 20% (water losses: 17%) for those towns where complete data are available, a satisfactory value for piped water schemes operating under comparable socio-economic conditions. In general, collection rates (percentage of the distributed water that is actually paid for) are very high, around 90%.

Many towns have favourable performance indicators

Financial viability

In general, the financial situation of the schemes is encouraging. The fact that 90% of the users pay for the water is clearly a result of SWTWS policies (water metering, contracted scheme operators) combined with managerial support and auditing by the Umbrella Organisation. For comparison, in the two small control towns (schemes constructed by local government and an NGO, respectively) there is no payment for water and hence no revenue collection at all.

Encouraging financial situation

Despite a high variability of O&M costs, the vast majority of the SWTWS schemes is able to cover these costs without subsidies. On average, revenue is 154% of the direct day-to-day O&M costs (pumping schemes: 143%). 30 of the 38 towns with financial data (79%) have a revenue exceeding 120% of the direct O&M costs, of which 19 above 200%. Direct O&M costs as defined here include staff, energy, administrative costs and the Umbrella contribution but not depreciation or major repairs.

More than 70% of the schemes have a revenue exceeding 120% of the regular O&M costs

As a result, many towns manage to save a percentage of their regular revenue for future investments and repairs. For 38 towns where this data was provided the average amount saved is 23% of the annual revenue. These funds are kept in the Umbrella's credit scheme, in a bank account, or both. The accumulated funds are not sufficient to cover any substantial reinvestment. This is in line with Uganda's tariff setting guidelines for small towns where tariffs are not required to cover full cost recovery.

Saving for future extensions and repairs

Water tariffs vary in an extremely wide range – from 800 UGX/m³ to 9000 UGX/m³ – that cannot always be explained by differences of technology. Some tariffs are too low to cover the O&M costs, others create very high monthly excess revenue. There is evidence of abuse in some places, where water is being sold at several times its production costs despite low service quality. Also the percentages how the revenue is shared between the scheme operator, the Water Board and how much is set aside in a savings account (for future extensions or major repairs) is very variable. More guidance and regulation is needed, based on best practice from the well performing towns.

Extremely variable water tariffs

A related problem is the price at which water is being sold at public tapstands and water kiosks. This varies from 25 UGX to 500 UGX per jerrycan. On average, people pay twice as much at the water kiosk than they would pay per m³, but this varies extremely: The majority of towns charges only up to 25% more to pay the kiosk/tapstand attendant. On the other hand, 9 towns charge more than 5 times and 3 more than 10 times the normal tariff.

Paying 10 times the normal tariff at water kiosks?

The analysis of tariffs illustrates the need for guidance and regulation. Apparently the Umbrella was not able (and does not have the enforcement power) to avoid tariff irregularities in a number of towns.

A strong case for regulation

Umbrella Organisation

Throughout the study it was obvious that the Umbrella Organisation plays a key role – and often an exclusive role – in several important areas. These are

- **Water quality surveillance** (exclusive role of the Umbrella, nobody else is taking samples except in two of the largest towns)
- **Auditing:** Umbrella is involved in auditing of all member schemes
- **Credit scheme (SACCO)** for scheme extensions and reinvestments: Two thirds of the towns participate in the Umbrella's SACCO scheme to finance extensions and major repairs
- **Training:** All SWTWS towns have benefitted from management training
- **Regulation:** In the absence of operational regulation, the Umbrella is involved in setting tariffs and solving contractual issues for their member schemes; not always successful as described above
- **Reporting:** All Umbrella members report performance data to the Umbrella Organisation; this is the only viable channel of information for the sector.

Key role of the Umbrella Organisation confirmed

All but two SWTWS towns and one of the control towns are members of the Umbrella Organisation. 70% of the towns stated that they were satisfied with the support provided by the UO. If they were not, this of often related to

unrealistic expectations that the UO could provide free equipment or fall-back solutions for all types of operational problems.

Implementation approach and design assumptions

The beneficiary communities contributed to scheme implementation by land acquisition (in 86% of the towns), by providing labour or materials (not in all towns) and by meeting the sanitation commitment. The level of consultation and involvement was considered adequate by the local authorities and the community in most towns. Asked whether it had been difficult to fulfil the community obligations, the Water Boards answered in 84% (for land acquisition) and 88% (for sanitation) of the towns, respectively, that this was not difficult because people eagerly wanted the water. The strategy of introducing community obligations not only to create ownership, but also to ensure sustainable source protection and to achieve sanitation improvements, is apparently successful.

*Effective
community
participation*

From the available population estimates (reliable, up-to-date population data are not available) it appears that per capita consumption (piped water only) is of the order of 8 to 10 l per capita per day, much less than the design assumption of 25 lcd. However, this is compensated by a low assumed growth rate (3% per year). Extensions, growing population and increasing numbers of household connections lead to capacity constraints in many towns. The causes could not always be established but design assumptions do not seem to be too high.

*Demographic
growth and
design
assumptions*

Innovative technologies and approaches

The use of solar energy for pumping is very interesting to avoid high energy costs and make pumping schemes in small towns economically viable. However, of the originally 12 towns where a solar system had been installed, 3 have been converted to other energy sources and the remaining 9 (of which 3 rely exclusively on solar power) all say that solar pumping is insufficient and not reliable, especially in the rainy season. It could not be established, during this study, whether this is actually related to design problems, O&M problems or – in some cases – suspected commercial interest to prefer generator operation (however, only 3 of the existing solar schemes have generators installed). 5 of the 9 towns reported that technical support and spare parts for solar systems are available in the region.

Solar pumping

Ecosan toilets have been promoted by the project but there was no massive replication, mainly due to the high costs per toilet. A majority of the households (59%) said that an ecosan toilet was desirable but too expensive. Reluctance to handle faecal material is not a major issue (3% of respondents). Today about 10% of the households have ecosan toilets, from almost zero before the intervention, but half of these are concentrated in 4 towns where replication seems to have worked. In the majority of towns there has been no or very little replication.

Ecosan

The demonstration ecosan toilets constructed at the time of construction of the water scheme are said to be still in use in 37 of the 42 SWTWS towns (88%). Trained artisans who know how to construct ecosan toilets are said to be present in two thirds of the towns.

Impact

The present review can in no way replace a rigorous impact evaluation. The baseline information and the available resources were insufficient to make quantitative conclusions on the indirect, long-term impacts of the SWTWS programme. However, the views of the stakeholders – captured by household surveys and focus group discussions – give some qualitative insight.

The following impacts were substantiated by a majority of the respondents:

- **Time saved:** The average household saves about 35 minutes per day per jerrycan of water (20 litres) due to the piped water scheme. This mainly reduces the work burden of women and children, who have the task to fetch water in most households.
- **Gender:** 57% of the respondents agreed that “women have less work now and more time for themselves or for other work”. Women hold at least one key position (chair person, treasurer, general secretary) in 76% of the Water Boards, and there are no towns without any women in the Board.
- **Health:** 87% of the interviewed households saw an improvement of their health situation. They may tend to give the expected answer but at least this indicates awareness for the health relevance of piped water. Statistical health data were not available in the necessary resolution and reliability to prove health impact.
- **School attendance:** 89% of households agreed with the statement that children go more regularly to school because of piped water. As for health, this should not be overrated but indicates awareness.
- **New schools or health centres:** In 17 out of 42 SWTWS towns (40%) a majority of the respondents thought that piped water had attracted at least one educational or health institution.
- **Socio-economic development:** There has been significant socio-economic development in all (except one) towns since the commissioning of the piped water scheme. People from the surrounding rural areas move into these regional centres, many of which have attained the “Town Council” or “Town Board” status since the commissioning of the piped water scheme. Business development is significant. Water supply is important for certain businesses, including the many lodges and restaurants. While improved water supply and sanitation is an important aspect of this overall development process it is not possible to quantify the specific contribution as compared to other factors (such as roads, electricity etc.).

Key success factors

The key informants interviewed – Ugandan and Austrian senior officers who are or were directly involved in the SWTWS programme or its rolling out in the sector – fully agreed on the key factors for the success of the programme. These are:

Not an impact evaluation

Indications of impact

All key informants agree on success factors

All key informants agree on success factors

- **Continuity of support over a long time.** This created credibility and gave enough time to develop ownership and incorporate lessons learned.
- **National ownership from the beginning.** The technical leadership at MWE/DWD was always supportive and showed flexibility to test new institutional and implementation approaches. TA support was adequate but implementation responsibility was with Ugandan officers from the beginning.
- **A committed team.** High staff commitment was confirmed by all interviewees. There may have been an element of luck, but an important feature is that the Coordinator was free to recruit and manage his team which was based within the region.
- **The presence of a harmonised programme approach and joint sector funding.** The SWTWS programme was incorporated into the Joint Partnership Fund (JPF) in 2006. Implementation became initially more complicated but this opened the way towards mainstreaming the WSDF and Umbrella approaches as they were now much more present at the sector level (Sector Working Groups, Joint Sector Reviews etc.).
- **Participatory, demand-driven approach.** The programme responded directly to the demand of communities and this is reflected in high responsiveness to community obligations and high willingness to pay for water services. The transparent evaluation process of project proposals at the Steering Committee is an important feature of the approach.

The only aspect where views were diverging to some extent was the role of:

- **Innovative elements of the approach.** Certain elements of the implementation approach, such as water metering, have clearly contributed to the sustainability of the water schemes. On the other hand, the piloting and promotion of innovative technologies, in particular solar pumping and ecological sanitation, has clearly boosted them in Uganda but there is mixed experience (see above).

Lessons and Conclusions

The success factors outlined above are to some extent – though not in the sense of a blueprint – transferable to other situations. A particular feature is that the programme started with a high degree of flexibility, innovation and technical support, and was later – when the approach had shown to be promising – systematically incorporated into the joint sector framework. It was a favourable factor that the water sector SWAP and joint financing mechanism were being developed in parallel. It seems that the decision to move from project implementation to mainstreaming in a programme approach was taken just in the right time: The approach would probably have been less effective and innovative in the initial phases, had the support modality been joint sector funding from the beginning. Later it was decisive to take it to the national sector level through the joint sector mechanisms. This may lead to reflections regarding the right mix and sequencing of aid modalities.

Development cooperation perspective: From piloting to a joint sector framework

The findings of the review can help improving the sustainability of future water and sanitation interventions. A key feature is the strong emphasis on the development of nationally owned institutional models, with the following important aspects:

- WSDF: Demand-driven response to community requests for water projects based on transparent criteria;
- WSDF: Building of national implementation capacities at the regional level, i.e. between the local level (where it is difficult to create adequate capacities) and the central level (where implementation responsibilities tend to be in conflict with other mandates);
- Umbrella: Building of an institutionalised support mechanism to help local actors maintaining the functionality of their water schemes by providing guidance, training, a credit scheme, and hands-on support in case of problems;
- Development of formalised management arrangements involving Water Boards, private scheme operators, local authorities, the support of the Umbrella Organisation and – not yet implemented – effective regulation.

*Lessons for
water sector
interventions*

The review has essentially confirmed the effectiveness of the WSDF implementation approach, as well as the indispensable role of the Umbrella Organisation(s). It is very likely that the sustainability and financial viability of the piped water schemes in the South West would be much lower without the Umbrella.

*Ugandan water
sector
perspective*

The findings of the review lead to the following conclusions and recommendations to further improve the sector framework for small towns and rural growth centres, in particular the WSDF and Umbrella models:

- **Piped water is financially viable** for small towns and rural growth centres if the schemes are well managed and tariffs are adequately set. People are willing to pay for safe drinking water, even if they may use other sources of water for non-drinking purposes.
- **Umbrellas play a key role** in this and should become an institutionalised and sustainably financed part of the sector framework. The cost of Umbrellas is justified by the benefit to maintain the value of the investments made. However, the status, mandate and financing modalities of the Umbrella model need further clarification, and should be seen in conjunction with other regulatory mandates (see next bullet).
- It is urgent to develop **effective regulation on the ground**. The review has shown that the current lack of regulation leads to excessive tariffs, abuse of power and non-compliance with contractual obligations in some places whereas the arrangements work well in other places, depending on the local actors. In particular, there is urgent need for **guidance on recommended tariffs**, revenue sharing and amounts to be set aside for investments and repairs, depending on scheme type and O&M costs.
- **Need for pro-poor arrangements**: There are no arrangements in place to ensure that vulnerable households, who are not able to pay for water, get access to safe drinking water. It is recommended to

*Conclusions
and recommen-
dations for
Uganda's
sector
framework*

develop guidelines how access to a basic water quantity can be ensured while avoiding possible misuse of such an arrangement.

- **Ageing schemes and growing water demand** lead to increasing **need for reinvestment and extension**, including refurbishment of older or insufficient parts of the networks. It should be noted that the oldest schemes are coming to the end of the design period and infrastructure lifetime of 20 years. It is thus normal that the need for reinvestment arises, even for well managed schemes.
- **WSDFs should have sufficient operational autonomy** to build an effective professional team that is based within the region of intervention (as opposed to delegating staff from the centre). Key informants see this as a key factor for success in the South-West.
- **Solar pumping** is less reliable than originally expected. Several schemes have been converted to use other sources of energy and the others are said to be not reliable without exception. The precise causes could not be established through this review and should be investigated by a dedicated study.

1. INTRODUCTION

1.1 Rationale and Purpose of this Review

Building institutional structures and capacities takes time. Infrastructure investments in the water and sanitation sector tend to aim at immediate effects, such as the Millennium Development Goal of increasing access to safe water and sanitation. However, experience has shown that these improvements are only sustainable if the water sector is successful in creating an enabling institutional framework as well as adequate capacities to keep the infrastructure working. This review is meant to provide a “reality check” many years later, when some of the first completed water supply schemes are already coming close to their design life of 20 years.

Austria and Uganda have been implementing together a focused programme to develop water and sanitation infrastructure for small towns and rural growth centres in South-West Uganda, the South Western Towns Water and Sanitation programme (SWTWS). Despite various changes – in particular a change of aid modalities and the fact that substantial EU funding has allowed scaling up the scope of the programme – this programme is essentially ongoing since 1996 without interruption, and the main actors are still active - or at least accessible - both on the Ugandan and the Austrian side. This is hence a rare chance to check the sustainability of the results of this programme.

The overall objective of the review is twofold: to contribute to water and sanitation sector development in Uganda, and to inform Austrian Development Cooperation (ADC), by extracting the lessons to be learned from a long-term regional water and sanitation intervention. For Uganda the findings are relevant because the approaches and institutional structures that originated in the South-West – known as Water and Sanitation Development Facilities (WSDFs) and Umbrella Organisations - have become national models for implementing infrastructure in small towns, and for providing backup support for the operation and maintenance of this infrastructure. The review results can therefore help improving the water sector framework. Austrian Development Cooperation, on the other hand, commissioned this study to gain a better understanding of the factors that led to lasting results in a generally successful programme.

1.2 Scope of the Review

The specific objective is to review and analyse the results of the water and sanitation interventions supported by ADC in South-West Uganda, with particular emphasis on

- the sustainability of the immediate results: technical functionality, financial viability and management structures of the water supply schemes;
- the quality of current scheme operations and management, including backup support by the umbrella organisation;
- the appropriateness of the design assumptions made regarding demographic growth, per capita water consumption and revenue collection;
- the equity of the benefits (actual use of improved facilities by the poor, including the gender aspect and the human rights perspective);
- the sustainability of sanitation and hygiene improvements;
- development results in terms of improved health and poverty reduction/socio-economic impacts (without aiming for full quantification of such impacts);
- factors that contributed to success or failure in these various fields.

Each of these aspects was examined by combining several sources of information, including a technical and financial assessment, household surveys and focus group discussions.

The review covered 42 towns that were supplied by the SWTWS programme, plus 4 other towns with water schemes not constructed by the SWTWS. The latter were included for comparison. The number of non-SWTWS towns is too small to constitute a statistical “control group” but their inclusion provided qualitative insight into the distinctive features of the SWTWS implementation approach.

The 42 SWTWS towns include all the schemes constructed before 2007, plus a selection of those constructed later.

The review is not a scientifically rigorous impact analysis, as this would have required more detailed baseline information to establish the situation before the intervention, as well as a much larger “control group” of other towns. Certain aspects – such as socioeconomic or health impacts – are therefore captured in a rather qualitative manner, mainly by documenting the stakeholders’ views and perceptions.

Finally, the review aimed to capture the factors that have contributed to or can explain the observed results, for the practical purpose of further enhancing the approach and understanding the conditions for its replication elsewhere. To establish such factors, most of the key actors involved in the preparation, implementation and scaling up of programme – Ugandan implementation staff, those who were responsible for the project at the national level, expatriate technical assistants and staff of the Austrian Development Agency – were interviewed.

1.3 The South Western Towns Water and Sanitation Programme

The South Western Towns Water and Sanitation (SWTWS), also known as “Amaizi Marungi” (“good water”), originated in 1995 when an Austrian team of water experts was fielded to identify and formulate, in cooperation with the Directorate of Water Development (DWD), a water and sanitation programme for small towns and rural growth centres in South West Uganda. Very soon a close working relationship developed between the experts and officers involved, who developed an implementation concept with a number of new features (see below). It was interesting to note during this review that the constructive “spirit” of this pilot period is still very present among all the actors involved.

Among the important features of the approach were the promotion of appropriate, affordable and O&M friendly designs and technologies; protection of water sources; linking piped water supply to sanitation improvements; the use of drama shows for sensitisation; and the introduction of water metering and payment for water from the beginning. Very soon a demand-driven approach was developed for the selection of beneficiary towns, where the communities had to submit applications and fulfil a number of commitments (see next section), with a “first come first served” principle for those who had already fulfilled the commitments.

An initial phase covering 16 towns (SWTWS I: 1996-2002) was immediately followed by a second phase taking the programme to 2006, when two major changes occurred: A successful application for substantial co-funding from the EU Water Facility allowed to scale up the programme and extend the area of intervention, and the programme was incorporated into Uganda's joint sector programme as one of the components of the Joint Partnership Fund (JPF). In this context the programme office – which had always been managed by Ugandan officers – was moved from Kabale to Mbarara and was renamed to “Water and Sanitation Development Facility” (WSDF).

This change of name expressed the intention to move on from a project-type implementation unit to a permanent implementation structure that is to become part of the institutional sector framework. Later it has become the model for the establishment of three other WSDFs covering Northern, Eastern and Central Uganda. Today, all four WSDFs operate based on the same WSDF Operations Manual and are managed by a Branch Manager to whom the function of Accounting Officer has been delegated by the Permanent Secretary of the MWE.

In total, as of today, the programme has supplied 76 towns with a total population of about 550,000, for a total investment of about EUR 28 million (including the Kisoro water scheme as well as EU co-funding of EUR 8.7 million). The above population estimate is based on the sum of the initial population at the time of design (figures provided by WSDF-SW), assuming a moderate population growth of 3% for the time elapsed since construction and applying corrections for scheme extensions made after commissioning. For comparison, the sum of the “design population” of all towns, estimated for the end of the 20 years design period, is 683,000 according to WSDF-SW documentation.

An important “offspring” of the SWTWS programme was the concept of **Umbrella Organisations**. It soon became clear that the local capacities were not sufficient to ensure all aspects of sustainable scheme management – technical, financial, managerial, water quality surveillance etc. – without external support. Umbrella Organisations are regional membership organisations providing post-construction support to their members, the Water Supply and Sanitation Boards of the individual small towns and rural growth centres. This includes services such as technical advice and troubleshooting, procurement of water meters and spare parts, managerial and technical re-training, financial auditing, a savings and credit scheme (for funds to finance repairs and extensions) and last but not least regular water quality surveillance.

1.4 Key Features of the Implementation Approach

Distinctive features of the SWTWS implementation approach include:

- **Demand-driven, participatory approach:** Communities submit applications, fulfil a number of obligations to qualify for the piped water project, and participate in monitoring.
- **Water metering and payment for water:** All schemes constructed by the programme are metered to ensure revenue generation for sustainable O&M.
- **Piloting of innovative technologies:**
 - Use of solar energy for pumping (higher initial investment compensated by lower running costs)
 - Promotion of ecosan toilets.

- **Source protection and land acquisition:** One of the key community obligations is to acquire the land needed not only for the water supply infrastructure but also for the water source protection area.
- **Achievement of 100% latrine coverage:** Making sanitation improvements a community commitment to obtain piped water was initially a unique. All households had a latrine, normally with a sanplat (but this was not strictly enforced).
- **Use of drama shows** to sensitise communities on safe water, hygiene and why piped water needs to be paid for.
- **O&M backup support:** The Umbrella Organisation provides ongoing support to scheme O&M after commissioning, recognising the fact that local water and sanitation boards cannot cope with all technical and managerial challenges.

The questionnaires and interview guides used include questions to verify the long-term effectiveness regarding all these features (see respective sections below). This is relevant because by rolling out the WSDf model these features have now become mainstream implementation modalities in Uganda.

2. METHODOLOGY

2.1 Selection of Towns

The review covered 46 towns in South-West Uganda with a population of mostly between 2,500 and 20,000 people, including all the towns implemented by the SWTWS programme before 2007 (i.e. more than 6 years old). The average age (time since commissioning) is 9 years).

Four “control towns” in the same region but not implemented by the SWTWS were included for comparison.

The map below highlights the districts covered by the review.



Fig. 1: Map showing the study area

Table 1 lists the 46 towns by district. The four “control towns” (not constructed by the SWTWS programme) are shown in *italic*.

| District | Towns included in the review |
|-----------|--|
| Bushenyi | Kyabugimbi |
| Ibanda | Ibanda, Kagongo |
| Kabale | Hamurwa, Kabirizi, <i>Keihumbi</i> , Muhanga, Muko, <i>Nyamabare</i> , Ryakarimira |
| Kanungu | Ishasha, Kambuga, Kanyatorogo, Katete, Kihihi |
| Kisoro | Bunagana, Kisoro, Rubuguri |
| Mbarara | Rubindi |
| Mitooma | Kabira, Kashenshero, Kyeibare, Mitooma |
| Ntungamo | Kagarama, Kitwe, Mirama Hills, <i>Ntungamo</i> , Omungyenye, Rubaare, Ruhaama, Rwashamaire |
| Rubirizi | Katerera |
| Rukungiri | Bikurungu, Bugangari, Buhunga, Buyanja, Kebisoni, Kisizi, Kiyenje, Nyakagyeme, <i>Rukungiri</i> , Rwenshama, Rwerere |
| Sheema | Bugongi, Kabwohe, Kitagata |

Tab. 1: List of towns included in the review by District

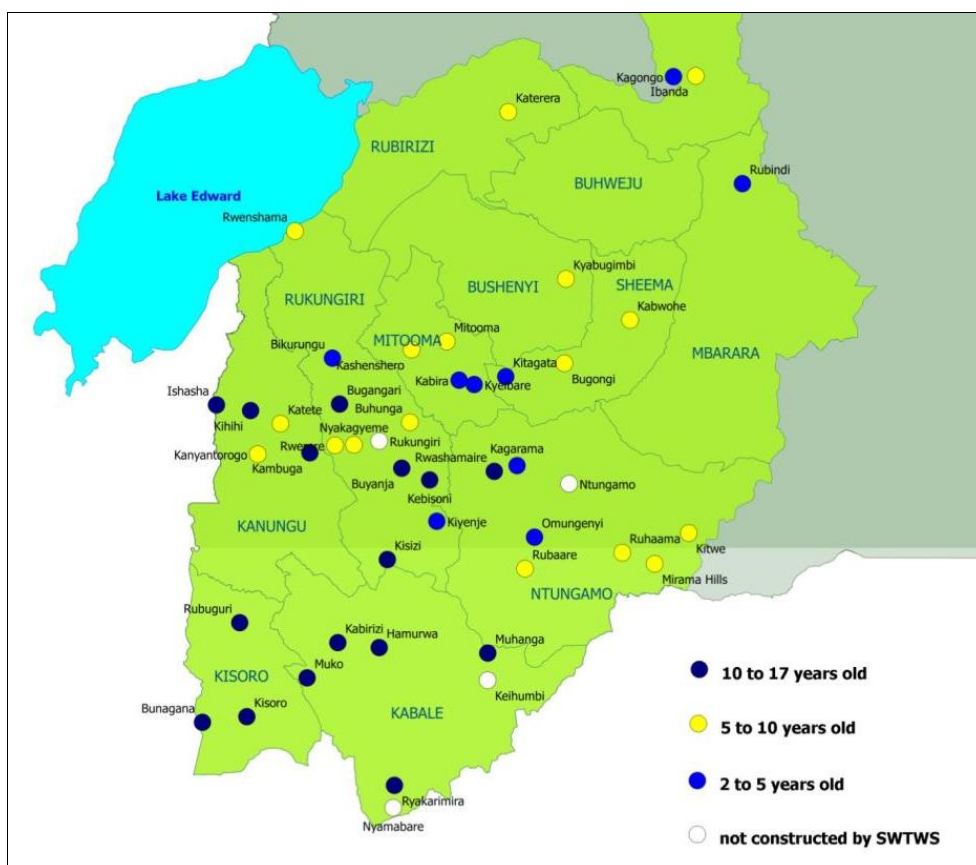


Fig. 2: Map showing the review towns classified by age

The towns were selected to include **all SWTWS towns constructed before 2007 and one third of the towns completed since 2007**; the latter were selected within the original area of intervention whereas many of the newer schemes are located further north, up to the area of Fort Portal (Kabarole).

The following table summarizes the key characteristics of the 42 SWTWS towns covered by the review.

| By age of the scheme: | | |
|------------------------------|----------------|-----------------------------|
| 10 to 17 years | 16 towns | |
| 5 to 10 years | 17 towns | |
| 2 to 5 years | <u>9 towns</u> | |
| | 42 towns | average age: 9 years |

| By administrative status: | | |
|----------------------------------|-----------------|---|
| Town Council | 16 towns | Current situation; many of the towns were still RGCs at the time of commissioning but have since been upgraded to TCs or TBs. |
| Town Boards | 9 towns | |
| Rural growth centres | <u>17 towns</u> | |
| | 42 towns | |

| By population served (estimated population of the service area today): | | |
|---|----------------|---|
| more than 20,000 | 4 towns | including Kisoro (80,000), where the supply area includes large rural areas |
| 10,000 to 20,000 | 7 towns | |
| 5,000 to 10,000 | 15 towns | |
| 3,000 to 6,000 | 11 towns | |
| less than 3,000 | <u>5 towns</u> | |
| | 42 towns | |

| By type of scheme & energy supply: | | | | |
|---|---------------|--|-----------------------------|---------------|
| Gravity schemes (spring) | 19 towns | of which (by source of energy): | | |
| Pumping schemes | 22 towns | | | |
| | | | - national grid supply | 12 towns |
| | | | - grid and solar supply | 3 towns |
| | | | - solar with diesel backup | 3 towns |
| | | | - solar supply only | 3 towns |
| | | | - diesel (originally solar) | <u>1 town</u> |
| | | | 22 towns | |
| Rainwater harvesting | <u>1 town</u> | | | |
| | 42 towns | | | |

| By management arrangement: | |
|--|---------------|
| Operated by a private company: | 6 towns |
| Operated by individual scheme operators: | |
| - based on a management contract: | 28 towns |
| - without contract or employed operator: | 7 towns |
| Currently without operator (not functional): | <u>1 town</u> |
| | 42 towns |

Tab. 2: Overview of town characteristics – 42 SWTWS towns

The town characteristics listed above were used to cluster and analyse the review results by type of town.

The 42 SWTWS represent a total population of about 390,000 people (see table below), about 70% of the total population served by the SWTWS project.

| | No. of towns | Initial population ¹ | Current population (est.) | Design population |
|------------------------------|-----------------|---------------------------------|---------------------------|-------------------|
| Towns included in the review | 42 | 234,000 | 389,000 | 422,000 |
| All SWTWS towns | 71 ² | 387,000 | 554,000 | 683,000 |

Tab. 3: Numbers of people within the service area of the SWTWS schemes

Population figures should be considered as indicative estimates, as there are no recent census data and the supply areas rarely coincide with administrative entities. The initial and design population figures were provided by WSDf-SW, based on the baseline survey made at the time of planning the scheme. The current population was estimated assuming a moderate population growth of 3%, with corrections for later extensions and with a plausibility check against the numbers indicated by the scheme operator or town council during the field survey.

2.2 Sources of Information

2.2.1 Overview

The review is based on the following sources of information:

1. **Field visits to 46 towns** by a team consisting of a socio-economist, an engineer and a team of trained enumerators. Essentially, the team visited each town together with
 - the engineer conducting a **technical and financial assessment** (combination of site inspection and information collection from the scheme operator and water board);
 - the socio-economist holding **focus group discussions** with Water Board members and water users;
 - the **enumerators** carry out a **household survey** covering on average 33 randomly selected households per town.
2. **Complementary interviews** were held with the WSDf-SW staff in Mbarara, with Umbrella Organisation staff in Kabale, and with the District officials of 6 Districts (Kabale, Kanungu, Kisoro, Mitooma, Ntungamo and Rukungiri).

Field visits to the South West were conducted during the period from 2 to 30 April 2013. All questionnaires and interview guides were tested and refined after the first two visits. However, as the adjustments were minor the information collected in the first two towns (Rubindi and Ibanda) could also be used for analysis.

¹ (Initial population at the time of commissioning.

² Excluding 5 towns that were still under construction by the end of 2012.

3. **Semi-structured interviews were held with key informants** at the national and development partner level, i.e. the Ugandan and Austrian officers involved in the design, implementation, management and backstopping of SWTWS as well as its replication and integration into the national sector framework; see Annex 1 for a list of the key informants interviewed.
4. **Documentary information** collected and analysed includes
 - **Water quality database** of the Umbrella Organisation (entire database reviewed and analysed);
 - **Baseline household surveys** conducted by SWTWS / WSDF-SW (selected towns);
 - **Health information** collected from Health Centres (selected towns);
5. Review of relevant studies conducted in the South West, including the
 - Master Thesis “Factors affecting the Sustainability of Urban Water Supply Systems in South West Uganda” by Herbert Nuwamanya, the former Manager of SWTWS / WSDF-SW (2009)
 - Evaluation of Water Supply and Sanitation Projects for Kisoro Town (2009)
 - Diploma Thesis “Participation and Empowerment in Development Cooperation. The Case of the Project ‘SWTWS’ in Uganda by Cordula Aigner (2011).See list of References for full details and for other documents used.



Fig. 3: Technical and financial assessment: Interview with the scheme operator in Bunagana



Fig. 4: Focus group discussion in Rwerere

2.2.2 Household Surveys

Household surveys were in particular the basis for assessing

- actual usage of the piped water, and reasons for not using it if applicable;
- affordability and willingness to pay for safe water;
- sanitation status: presence and type of latrine and handwashing facilities;
- water users' views of service quality
- water users' views of the benefits of piped water.

In general the surveys captures the responses of the person interviewed (61% female and 39% male respondents). However, the presence and status of the latrine and handwashing facilities were visually checked by the enumerator.

The total number of households interviewed was 1381 in 42 towns, i.e. on average 33 households per town. The number of around 33 households per town was maintained irrespective of the size of town.

The enumerators were using tablets for efficient data entry and processing and to avoid transcription errors.

Households were selected in the following way: Local authorities were asked to guide the enumerators to the cells/wards connected to the piped water scheme. In settlements structured along the main road(s) enumerators selected every n^{th} household, depending on the size of the town. In settlements with a more circular or rectangular shape the "spin the bottle" method was used to select a random direction for sampling.



Fig. 5: Enumerators during a household visit, Buhunga

Assessing poverty was a problematic issue to be resolved. It was crucial to obtain information on poverty in order to assess whether the poor are using piped water and are willing and able to pay for it – one of the important research questions of the study. On the other hand, there is no established methodology to capture poverty in a simple way during a household survey, where questionnaire length is limited and the focus is on other aspects. Direct questions about income are unreliable. Poverty definitions and scorecards used in Uganda use many indicators.

As a pragmatic solution for this review, the following approach was used:

Four categories of poverty – “wealthy”, “average”, “poor” and “very poor” were defined.

The following three sources of information were combined for this classification:

- the main source of household income, from “formal employment” to “no regular source of income”;
- the monthly cash expenditure of the household (on items such as sugar, soap, health treatment etc.), from “more than 60,000 UGX” to “less than 15,000 UGX”
- the subjective impression of the enumerator; enumerators were asked to tick one of the four poverty categories based on their overall impression of the household (type of housing, clothing etc.).

A household was considered as “very poor” if two of the three criteria were in the lowest category; the same procedure was applied for “poor” and “average”. The

remaining households, i.e. those where at least two indicators indicated wealth, were considered as “wealthy” – of course relative to the local living standard in rural towns of South West Uganda.

As a result, 22% of the households were categorised as “wealthy”; 63% as “average”; 13% as “poor”; and 1% as “very poor” (17 households only).

3. KEY FINDINGS: SUSTAINABLE ACCESS TO PIPED WATER

3.1 Functionality of the SWTWS Piped Water Schemes

Of the 42 SWTWS towns visited, **39 water schemes (that is, 93%) were operational at the time of visit**, including 14 of the 16 schemes (88%) that were constructed more than 10 years ago. The map below visualises this encouraging result.

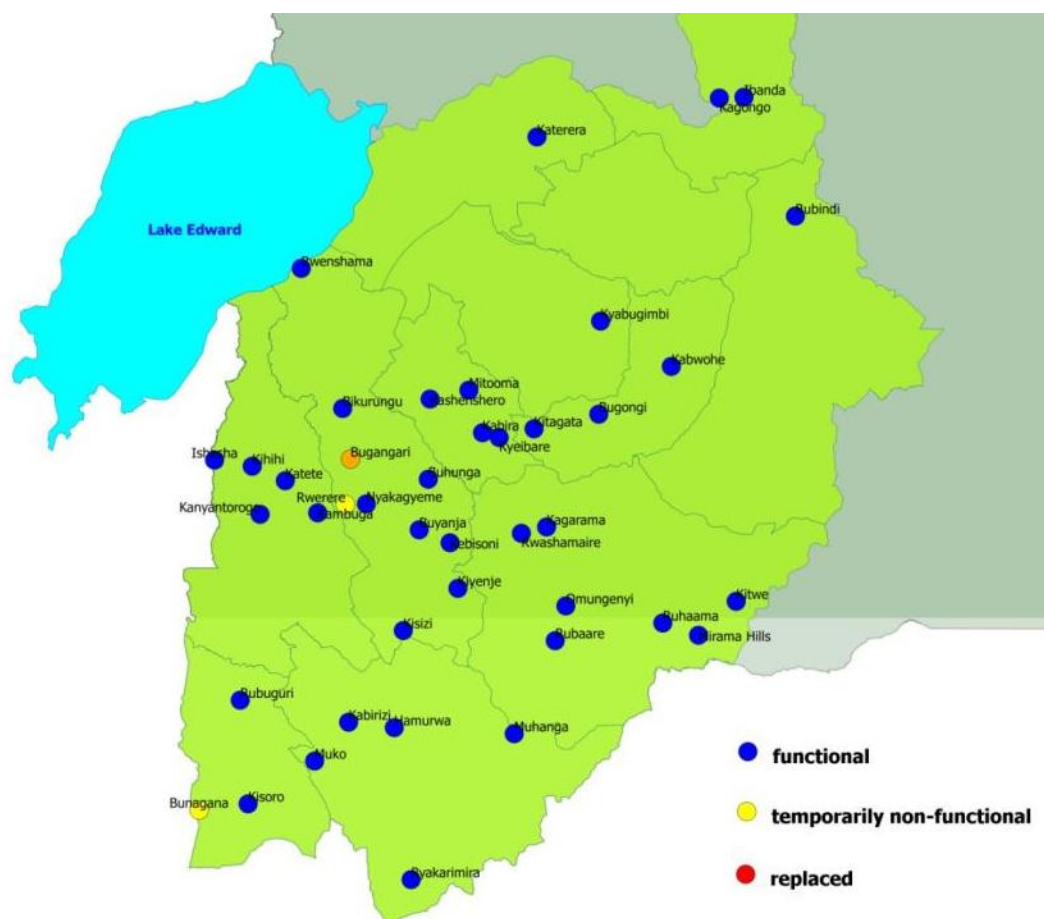


Fig. 6: Map of SWTWS towns by functionality status

Of the remaining 3 schemes, 2 were temporarily out of order (since 2 weeks and 8 months, respectively) but had active Water Boards in place, working to restore the service.

The last scheme – Bugangari – had never become fully operational due to management problems that occurred at the very time of commissioning. It is today replaced by a new scheme constructed by the District Local Government.

3.2 Actual Use of Piped Water

This section examines to which extent people are actually using piped water, whether they are using other (unsafe) water sources as well, and whether they had access to an “improved” water source (as defined for the Millennium Development Goals) before the intervention.

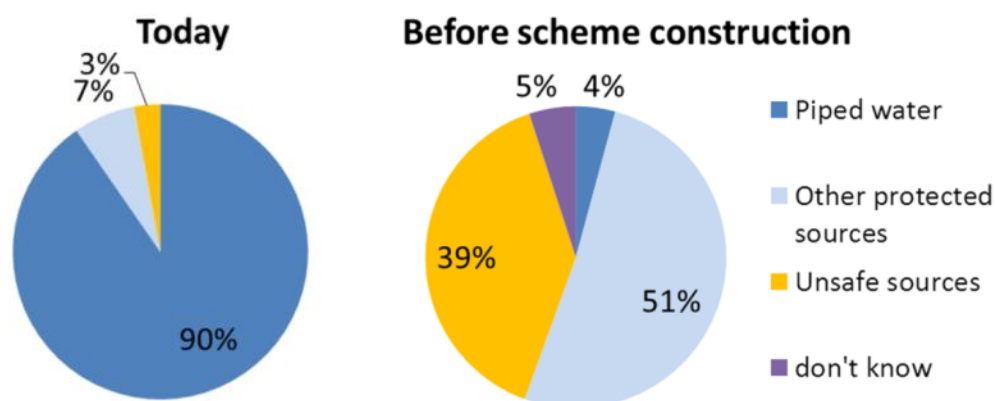


Fig. 7: Household response to the question: "What is your main source of drinking water?"

On average, **90% of the households said to be using piped water as their main source of drinking water**, even though most confirm to be using other sources as well (see below). 7% use other protected sources (protected springs, boreholes or protected wells equipped with handpumps, or rainwater). Only 3% use unprotected sources (mainly unprotected springs or open wells).

This is in sharp contrast with the situation before the construction of the piped water scheme, when 55% were using protected sources (as defined above) and 39% were using unprotected sources. These figures are based on a question "where did you collect water before the piped water scheme was constructed"; only 5% of the respondents said that they didn't know or were not present at the time of construction.

From the difference between the situation before and after it appears that 42% of the residents of the towns gained access to an improved water source (in the sense of the MDG definition) through the piped water scheme. In reality many more people gained access to safe water because

- the "protected" water sources used before were often wells and springs within the built-up area, and therefore often contaminated;
- many of the people who moved to the fast-growing towns from rural areas after the construction of the scheme also gained access to safe water;
- typically the "protected" sources used before were at unacceptable distances to consider people as served.

Today, 97% of the households using piped water said to have drinking water at less than 200 meters, which is the Ugandan standard for the maximum acceptable distance for urban areas.

64% of the households use other water sources than piped water for certain purposes, in particular for washing clothes and bathing, mainly to save on the cost of piped water. More surprisingly, 57% also indicate to be using other water sources for drinking, even though most of them (89%) had stated that their main source of water was piped water. From the reasons given and from the focus group discussions it becomes clear that this is mainly because of insufficient supply: Two thirds of those using other than piped water for drinking said that this was because of problems such as low pressure, long

queues and breakdowns (see section 3.7 for a discussion of the service reliability problems). In these cases they fall back to the sources used in the past.

3.3 Time Saved and Reduced Workload

Saved time and reduced workload are direct benefits of having piped water near the homestead. Resulting indirect impacts – such as the use of the time gained, the views of women or improved school attendance – will be discussed in chapter 8.

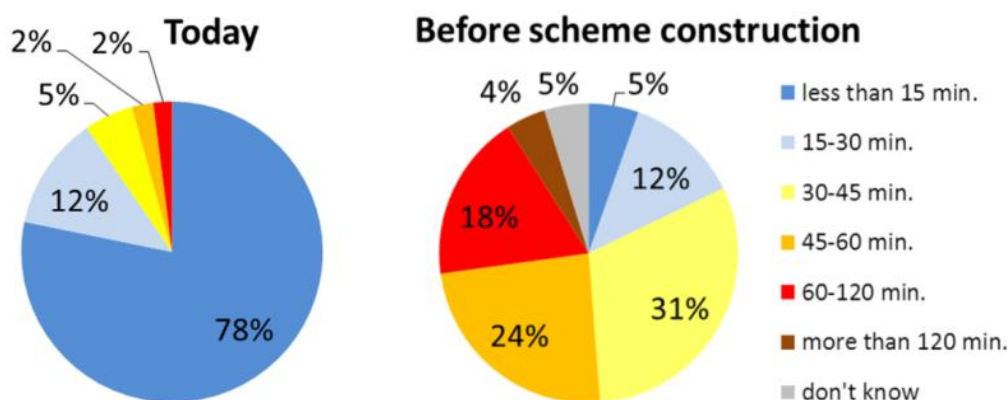


Fig. 8: Household response to the question: “How much time do you spend to collect drinking water (1 round trip, including queuing)?”

Today, 78% of the households spend less than 15 minutes and 90% less than 30 minutes for collecting a jerrycan of water. The improvement is obvious compared to the situation before the piped water scheme, when the median time to collect water was around 45 minutes.

In an attempt to quantify the time gain the mass curves of the household responses were compared in the chart below.

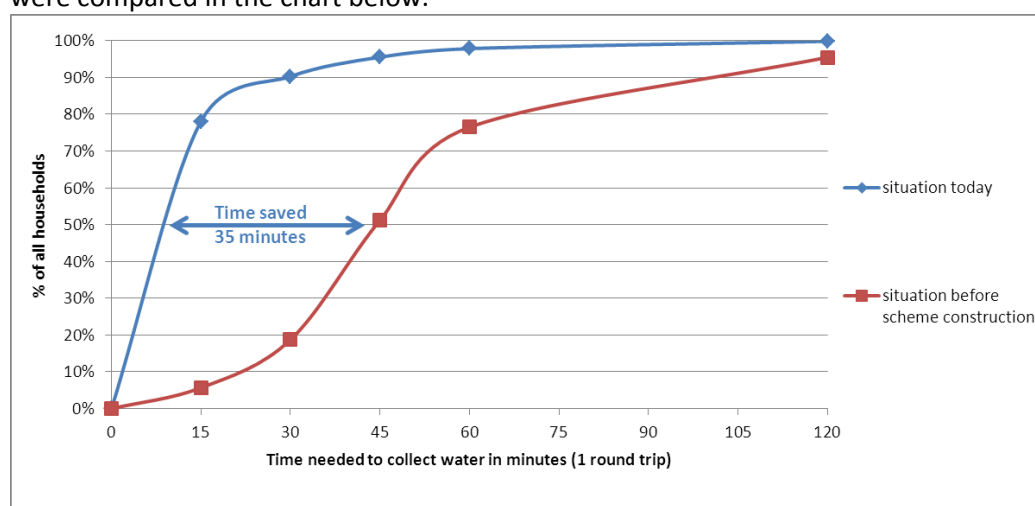


Fig. 9: Time saved due to access to piped water

It can be seen that a typical (median) household gained about 35 minutes per day per jerrycan of water.

The main beneficiaries of the time saved and reduced workload are women and children. The well-known fact that fetching water is traditionally a responsibility of women and children is reconfirmed by the household survey.

| Members of household | Female respondents | Male respondents |
|----------------------|--------------------|------------------|
| Women | 82% | 60% |
| Men | 3% | 30% |
| Children | 37% | 54% |
| Other ³ | 22% | 26% |

Tab. 4: Household response to the question: “Who collects the water for your household usually?” More than one answer was possible.

The “perception difference” between the answers given by women and men is quite interesting: According to male respondents, men fetch water in 30% of the HHs, while according to female respondents this is only the case in 3% of the HHs. This might be indicating that at least awareness is growing that fetching water is not necessarily a responsibility of women and children only.

3.4 Affordability: Are the Poor Using Piped Water?

73% of the households classified as “poor” or “very poor” said to be using piped water. This is below average but a clear majority of the poor is benefitting from the piped water schemes.

It should be noted that a local definition of poverty has been used where only 14% of the households were classified as “poor”, while many of the “average” households are also poor by international standards (see section 2.2.2 for a description of the classification method used).

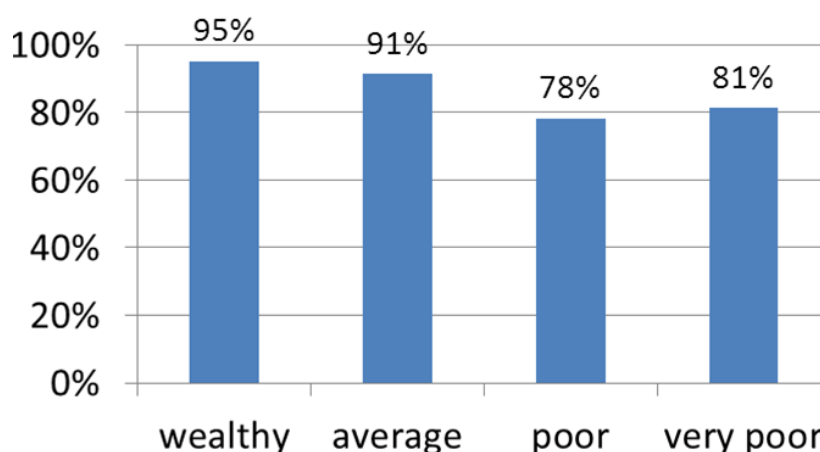


Fig. 10: Percentage of households using piped water

³ Either water is in the house or water through vendor.

This is consistent with the responses to the question whether the households are paying for the water:

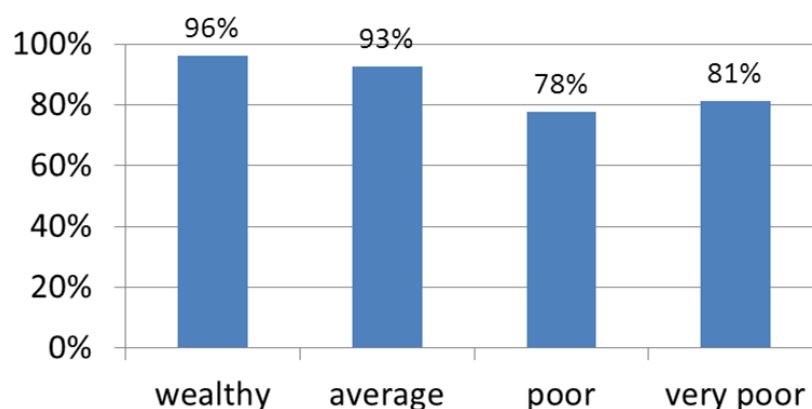


Fig. 11: Percentage of households paying for safe piped water

The scheme operator’s records confirm that payment for water is being enforced.

A majority of the interviewed households also says that **water is affordable** (59%), that **it is fair to pay for good water** (58%), and that **the money is well spent and used to maintain the water supply system** (52%). Not surprisingly this varies from town to town, according to service quality. In towns with reliable supply up to 87% of the respondents said that it was fair to pay for water.

The typical (median) HH in South-West Uganda spends about 2000 UGX (0,6 EUR or 0.8 USD) per week on water, with variations according to HH wealth as shown in figure 12. Compared to the HH’s indications on expenditure, this is of the order of 10% of the total cash expenditure.

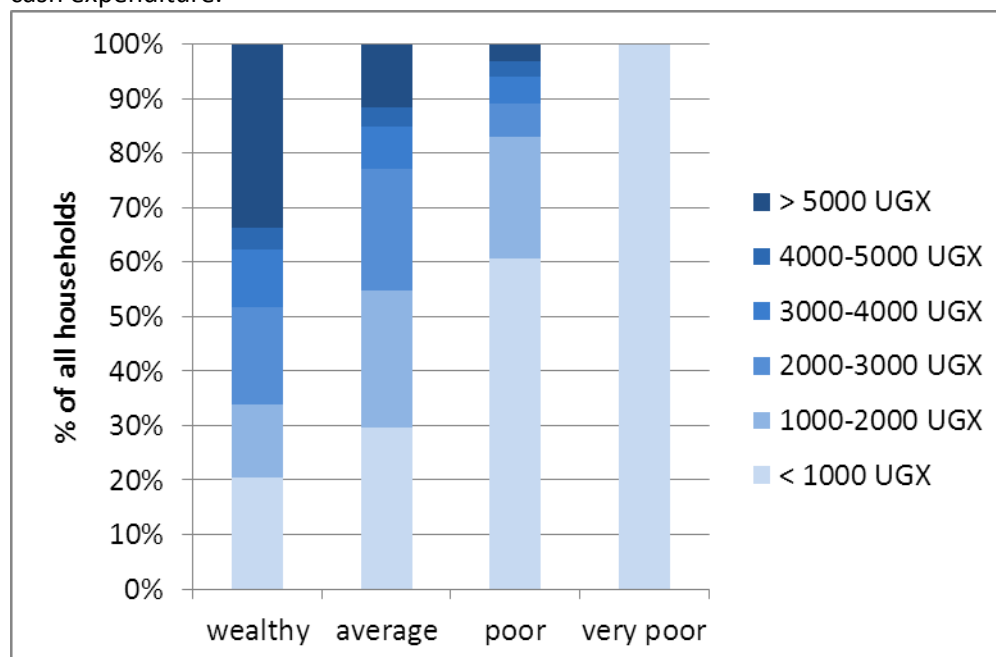


Fig. 12: Weekly household expenditure on water

On average, 59% of the HH said that water is affordable. Piped water is even perceived as cheap by those people who used to buy water from water vendors.

Not surprisingly, poor households find it more difficult to afford the cost of water and tend to state that water should be free. The following charts visualise the answers by HH level of poverty (note that “poor” and “very poor” households together constitute only 14% of the total).

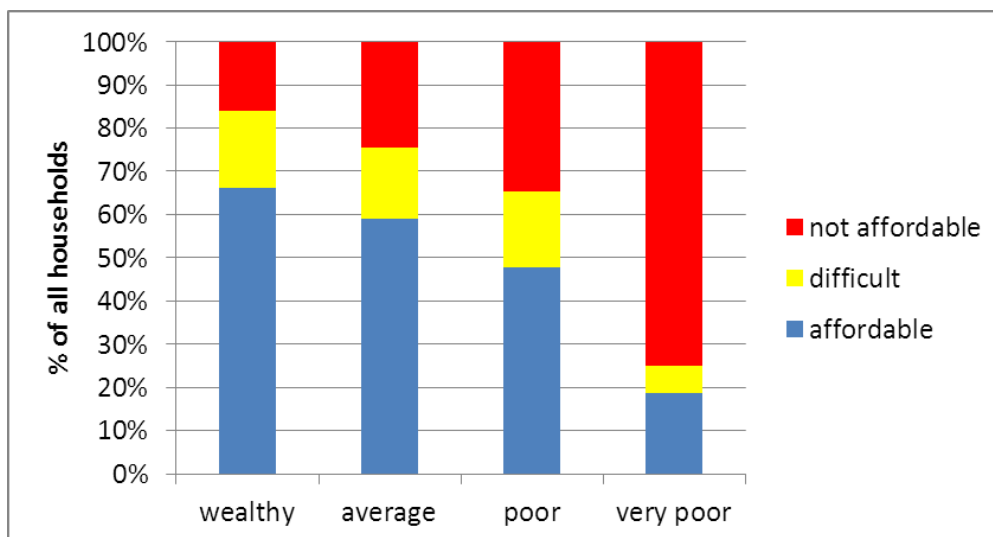


Fig. 13: Household response to the question: “Do you think the tariff you pay for water is affordable?”

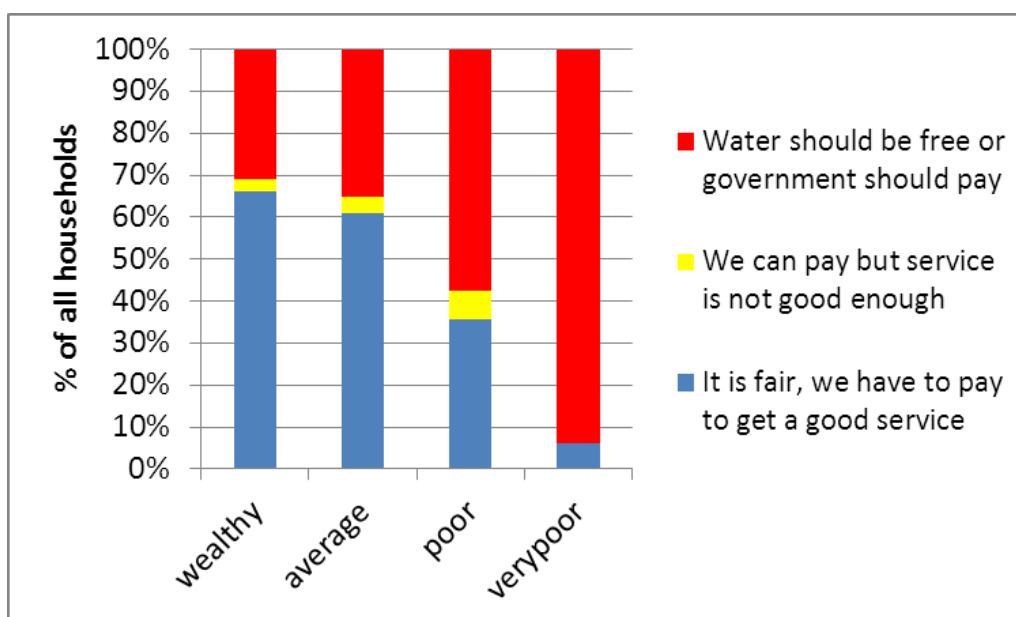


Fig. 14: Household response to the question: “Do you think it is fair to pay for drinking water?”

Whether piped water is considered as affordable obviously depends on the water tariff. The chart below indicates that a tariff of up to 50 UGX per jerrycan is considered affordable by about two thirds of the people, while a majority is still ready to accept a tariff of up to 200 UGX per jerrycan. There is only one scheme with a tariff of 500 UGX.

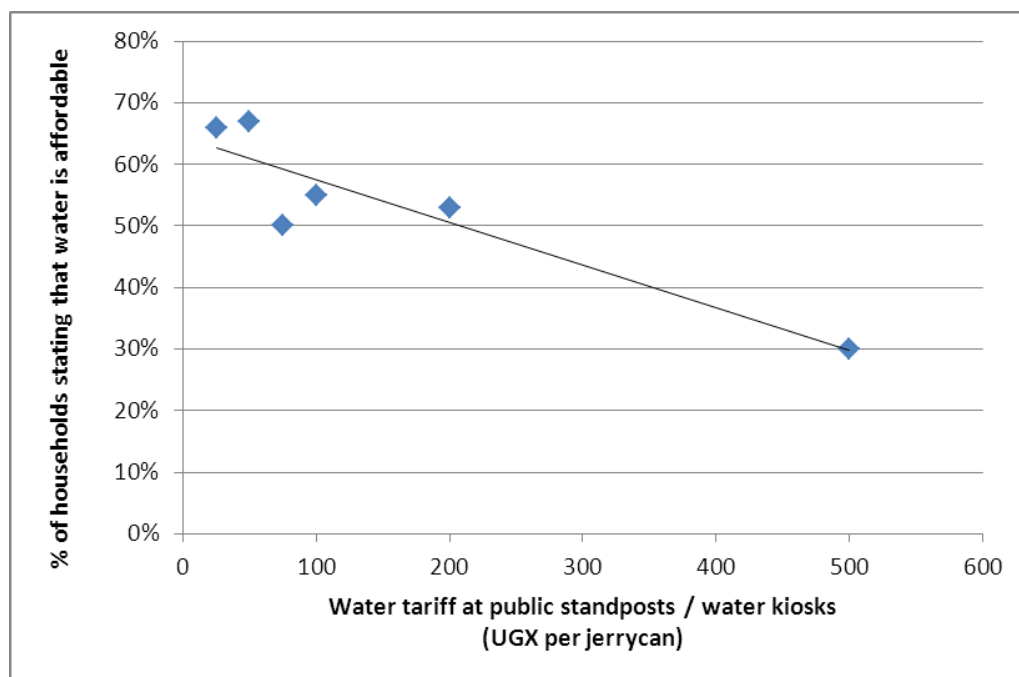


Fig. 15: Percentage of households considering piped water as affordable as a function of water tariff

In most towns there is a small percentage of vulnerable, extremely poor households (e.g. households headed by widows, aged or disabled people) who cannot pay for water. In the sense of a human rights approach it is desirable to provide access to safe water to these households as well.

However, this review clearly showed that **there are no mechanisms in place to provide safe water to vulnerable households.**

This is confirmed by:

- Household surveys – 89% of the respondents said that there is no arrangement
- Focus group discussions, where all participants agreed that HHs who cannot pay for piped water use traditional water sources .

Depending on the situation the locally available alternative water sources may be protected sources (springs, boreholes) or unprotected sources (“they go to the swamps/the stream” was a response received in FGDs in 6 towns).

Sometimes neighbours seem to give a small quantity for free, and a few water boards seem to offer support (e.g. by keeping old boreholes going) but these are individual cases.

Any solution to this situation has to make sure not to undermine the general willingness to pay and hence the sustainability of the water scheme, as allowing exceptions might be soon misused.

3.5 Service Level and Service Quality

Of the 90% of the population using piped water, the majority (61%) gets water from a public tapstand or water kiosk; 33% use a yard tap shared with neighbours, and only 7%

have a private household connection. However, this percentage is growing, as the growing number of HH connections shows (see section 0). For wealthy households the percentage of HH connections has already reached 14% (see chart below).

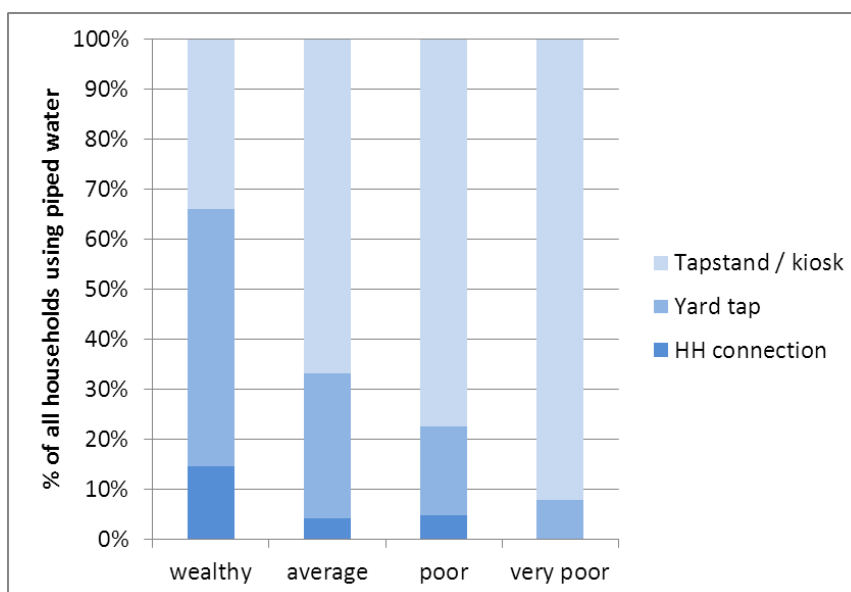


Fig. 16: Service levels as % of all households using piped water

Service quality is generally not yet satisfactory. Only 39% of the households reported to have permanent supply in sufficient quantity and without major service interruptions. Another 21% have permanent supply but pressure at the nearest tap is (often) low. 12% said that they are served only for a few hours per day, 20% reported frequent breakdowns and 8% suffered from both or from long-lasting service interruptions.

The situation varies considerably from town to town. This will be discussed in detail in section 3.7, along with the reasons for poor service quality.

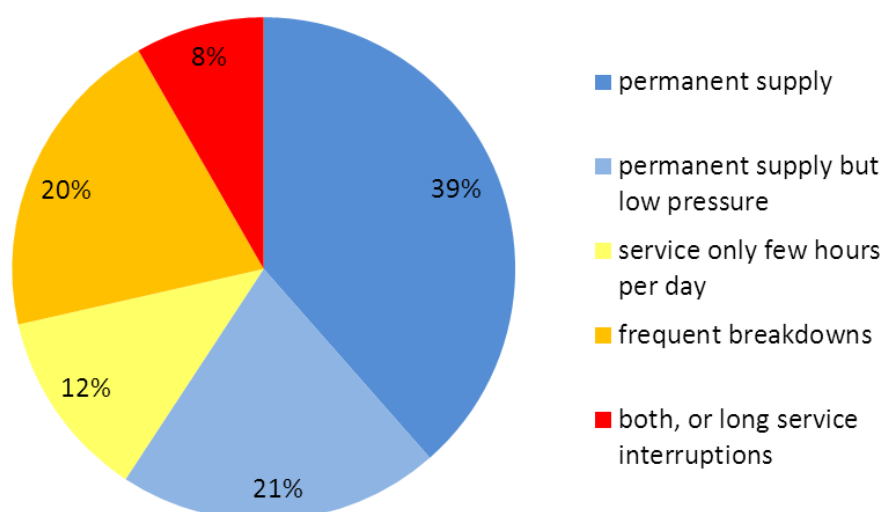


Fig. 17: Service quality as perceived by households (all SWTWS towns combined)

3.6 Dynamics of Scheme Extensions after Completion

Many of the SWTWS water schemes show a dynamic development.

Since the commissioning of the water schemes, the majority of the schemes has been extended, many considerably. This is the case for 24 out of 42 visited towns, including all the towns above 10,000 inhabitants but also 40% of the small RGC schemes.

About 85,000 additional people were served by the various extensions, that is, 41% of the population at the time of construction or 20% of the original design population. Extensions were funded from various sources including local government and internally generated revenue.

The number of private household connections (including yard taps) has increased by 147% since the commissioning of the schemes. These are positive signs of a dynamic development of the piped water schemes.

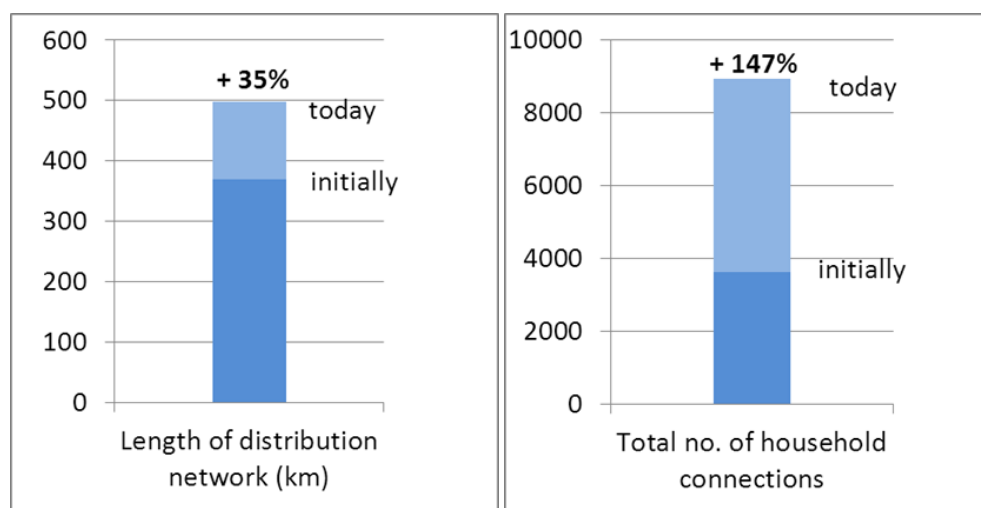


Fig. 18: Development of the SWTWS water schemes since commissioning

Usually extensions were either initiated by the Water Board / Water Authority or requested by communities through the Board. Boards often contacted Umbrella Organizations (mentioned in 7 cases); implementation is typically done by the Private Operator. Two extensions were initiated by District Water Officers.

3.7 Functionality and Service Reliability

The reliability of service provision remains a challenge, despite all efforts to set up adequate management structures and to provide backup support through the Umbrella Organisations. Population growth and scheme extensions have contributed to this as some well-managed schemes encounter capacity constraints, but this combines with a variety of technical and managerial problems, many of which are common in comparable regions as South-West Uganda. It is obvious from the interviews held that the Umbrella Organisation plays an important role in fixing problems. As a result, the schemes remain functional but nonetheless only a minority can claim to provide reliable, 24-hour service in the entire distribution network and without any prolonged breakdowns.

The water supply schemes were classified by combining the results of the household surveys with complementary information from focus group discussions and the technical assessment. The following 6 categories of schemes were defined on this basis:

| | |
|--------------------------------------|---|
| Reliable service | More than 85% of the HH respondents say to have permanent supply; few breakdowns, normally fixed within short time |
| Reliable service with minor problems | At least 75% of the HH respondents say to have permanent supply, but a minority reports problems, in particular low pressure in parts of the network |
| Partially reliable service | More than 50% of the HH respondents say to have permanent supply, but more than 50% also report problems (low pressure, intermittent supply at their tapstand/connection, or frequent breakdowns) |
| Unreliable service | As above, but less than 50% of the water users say to have permanent supply at their nearest tap; in most cases, prolonged system breakdowns have occurred |
| Very unreliable service | Less than 25% of the HH respondents say to have permanent supply, more than 80 % report problems (typically intermittent supply and/or frequent breakdowns) |
| Not functional at the time of visit | System was not working at the time of visit but a Water Board is in place and service is likely to resume as soon as the current problems are fixed. |

Tab. 5: Categories of service reliability

The figure below illustrates the service reliability of the SWTWS schemes according to these categories.

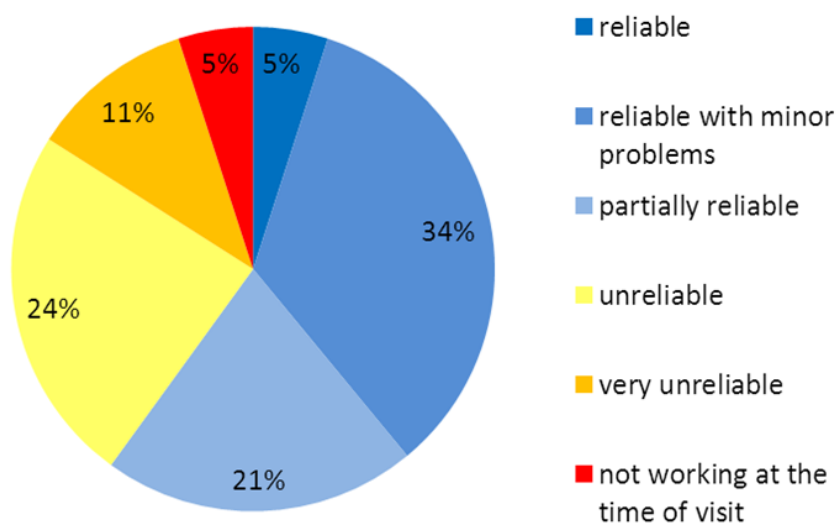


Fig. 19: Categories of service reliability in SWTWS towns (% of towns)

In at least 7 towns the observed service quality problems are mainly related to the fact that demand exceeds supply: capacity problems lead to insufficient pressure, intermittent supply or water rationing in parts of the network. In 3 towns energy supply is the main problem (insufficient solar energy, high fuel costs, or a combination of both). In most towns there is a combination of various factors.

There is no correlation between the **age of the scheme** and service quality. 40% of the schemes constructed more than 10 years ago provide “reliable service” or “reliable service with minor problems”, according to the categorisation above. This is very close to the overall average of (5% + 34% =) 39%.

There is also no correlation with the **management model**. The percentage of schemes providing “reliable service” or “reliable service with minor problems” is close to 40%, irrespective of the management arrangement (operated by a company, by a contracted individual, or by an individual without a contract)..

There is however a clear correlation with the **type of scheme**. The percentage of schemes providing “unreliable service” or “very unreliable service” is 47% among the pumping schemes but only 17% for gravity schemes. 74% of the people supplied by a gravity flow scheme reported to have permanent supply, compared to only 46% of the people supplied by pumping schemes. Of the pumping schemes, those supplied by a hybrid system (solar + grid supply) were the most reliable.

On the other hand, many of the towns have quite favourable performance indicators. For example, the average water loss (difference between gross water production and metered water distribution to consumers) is 17% for those towns having a functioning bulk water meter; a good value by international standards for conditions as found in South West Uganda. **Non-revenue water** (the abovementioned losses plus water distributed but not billed) is of the order of 20% in these towns.

Good practice case study

Rwashamaire, Ntungamo District

The Rwashamaire water supply scheme was completed in 2002. Since then:

- Population has doubled from about 5,000 to 10,000 inhabitants
- Rwashamaire has become a Town Council; 7 new schools were constructed
- Businesses based on piped water include a slaughterhouse and a washing bay
- 97% of the households use piped water and pay for it
- The scheme was extended to serve another 2000 people
- During 11 years the scheme provided continuous service (except two weeks for repairs)
- No water sample exceeded water quality standards since 2006
- Financially the scheme is breaking even, one third of the annual revenue is kept on a savings account



There is no single factor or pattern to explain the relatively high percentage of schemes with unreliable services. There is a variety of management and technical problems combined with scheme capacity problems (demand exceeding supply), unreliable power supply (power cuts, unreliable solar systems, lack of funds for fuel for the generator), and incidents such as damages by road works and vandalism. Improving the situation means developing managerial, technical and financial capacities in the same time and investing in schemes that are coming close to their lifetime or encounter capacity problems. It should be noted that most schemes manage to re-establish service within reasonable time, often with support from the Umbrella Organisation.

There is a wide variety of causes for breakdowns. The most common technical problems include:

- Frequent pipe bursts/leakages (76% of SWTWS towns), including in particular pipe damages by vandalism (reported by 21% of towns) and road works (14% of towns).
- Tank leakages (21%), including damaged tank valves
- Water pumps (21%)
- Air locks and air valve problems (19%)
- Inadequate pumping energy, power disruptions (12%)
- Damages to the solar system (7%)
- Generator problems (5%)
- Damages due to landslides, erosion (7%)
- Faulty or damaged water meters (21%)
- Gate valves damaged or broken (12%)

Damaging/theft of taps (and pipes) is a problem in majority of the towns: 50% of the SWTWS towns and all control towns; on the other hand, 45% of the SWTWS towns stated that there was no such problem. Of the 13 schemes that have or had solar energy supply, 7 declared that theft of solar panels was a problem whereas in the 6 others it is not a problem.

Repairs. All but 3 schemes have undertaken major repair works since the commissioning of the scheme. The most common interventions included major pipe repair (48% of the schemes, often related to damages due to road construction works), pump replacement/repair (19%; i.e. one third of the pumping schemes) and reservoir repair (17%). Solar panels had to be repaired/replaced in 3 cases (i.e. one third of existing solar schemes).

In the SWTWS towns, the repairs were paid from local revenue in 49% of the cases (usually by the Water Board, in 1 case by the private operator).

In another 14% of all cases local revenue was used but a significant contribution was made by the Umbrella Organisation; typically, the Umbrella provided the pump whereas the Water Board paid for the installation and other expenditure.

3.8 Water Quality Surveillance

Drinking water quality is generally good, as confirmed by regular testing.

The Umbrella Organisation has an almost exclusive role in water quality surveillance. It takes an average of 7-8 samples per town per year. The graphics below, produced from an analysis of the Umbrella’s water quality database, visualises that sampling is comprehensive and that the number of cases of bacteriological contamination is very limited.

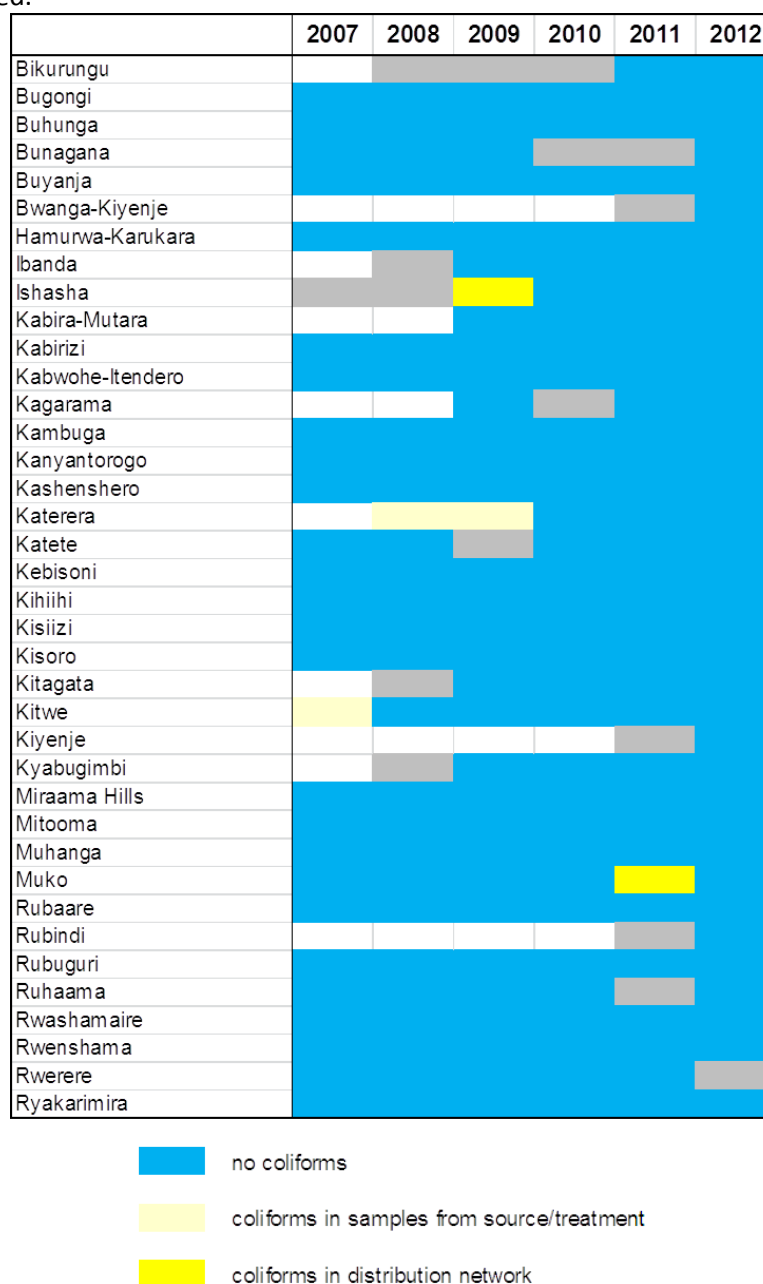


Fig. 20: Results of water quality sampling conducted by the Umbrella Organisation

The physical-chemical water quality parameters regularly being monitored are iron content, conductivity, pH and turbidity.

In Ishasha, a very small RGC with a filtration plant for **iron removal**, the treatment process is not fully controlled by the operator. Iron content and turbidity therefore often exceed standards. This is not a health concern but it affects the acceptability of the drinking water, as confirmed by the household survey (83% of HHs complain about water quality here). In the two other towns where iron removal plants were installed (Katerera and Ryakarimira) the filtration process is working satisfactorily.

Conductivity is slightly above the recommended limit (1000 $\mu\text{S}/\text{cm}$) in two towns, Rubaare and Rwenshama, with averages of 1098 and 1123 $\mu\text{S}/\text{cm}$ respectively. Here and in a third town (Kiyenje, 703 $\mu\text{S}/\text{cm}$) customers complain about “salty and hard” water. Again this is not a health concern and WHO does not propose a health-based guideline value.

Finally, **low pH** values are a common feature in the majority of towns. The average pH is 6.6 but there are 6 towns where values below 5.5 have been measured. This has no direct impact on consumers but has technical implications, in particular regarding the choice of materials.

3.9 Water Source Protection

Source protection areas – land to be purchased by the community as a condition for the scheme construction to start – is one of the important features of the SWTWS/WSDf approach.



86% of the SWTWS towns have a source protection area that is free of buildings and agricultural use or other sources of contamination. The SWTWS policy of requiring the community to purchase the land around the water sources has apparently been largely

successful. In the “control towns”, where this policy was not followed, only 1 out of 4 towns has an adequate source protection area.

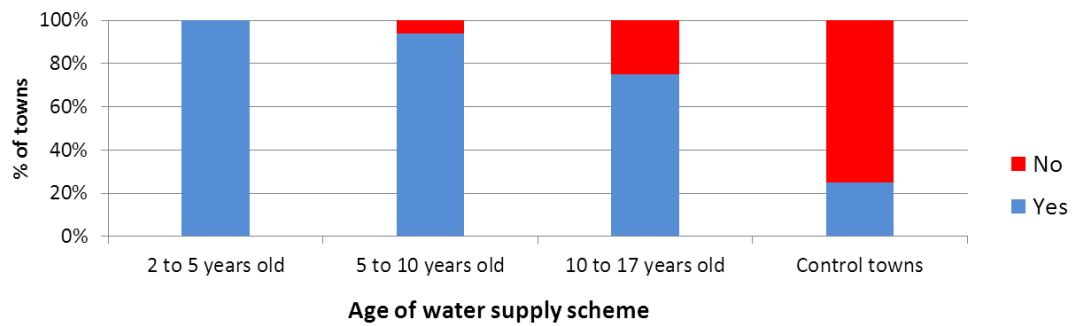


Fig. 21: Percentage of source protection areas that are free of sources of contamination, by age of scheme

4. KEY FINDINGS: SANITATION AND HYGIENE AWARENESS

Sanitation activities of the SWTWS – and today WSDF – approach include the community obligation to achieve 100% latrine coverage; a hygiene sensitisation campaign; and the promotion of ecosan toilets through the construction of demonstration toilets and at least one public toilet, and training of local masons. Each of these aspects will be discussed in the following sections.

4.1 Access to Safe Sanitation / 100% Latrine Coverage

As a result of the SWTWS / WSDF community obligation all the towns served by a SWTWS piped water scheme had 100% sanitation coverage at the time of commissioning. In practice this means that every households had at least a proper pit latrine. This had been confirmed in by a “household sanitation follow up survey” conducted around the time of commissioning.

The key question is whether this is still the case today, many years after commissioning. With population growth and many people moving into town from rural areas this is not necessarily the case. The Umbrella Organisation is not directly involved in follow-up on household sanitation, apart from limited monitoring. Essentially the responsibility for sanitation and hygiene extension work is being handed over to local authorities working together with the Health Assistants.

Latrine coverage was 97% among the 1255 households visited.

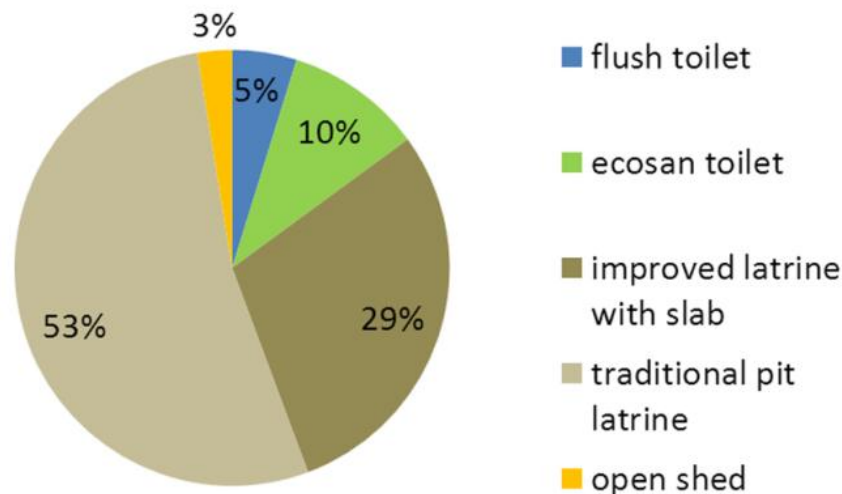


Fig. 22: Toilet types in SWTWS towns – household survey 2013

Latrine coverage was 97% among the 1255 households visited. However, the majority of households (53%) use traditional pit latrines rather than “improved” sanitation facilities according to international definitions (minimum standard: pit latrine with a slab). 10% of the interviewed households had an ecosan toilet (see section 4.3 for details).

Improved sanitation” coverage – counting ecosan toilets, flush toilets and improved pit latrines with a slab only – is 54% in the four large SWTWS towns (> 10,000 inhabitants) and 39% in the smaller towns. For comparison, in the two small “control towns” (RGCs) improved sanitation coverage is only 21%.

28% of the households (those who could remember) said that they had constructed (11%) or improved (17%) their toilet at the time of construction of the water scheme. The others had a toilet/latrine before. This is roughly in line with the findings of the sanitation baseline surveys made by the SWTWS prior to scheme construction.

There is a surprisingly high percentage (40%) of shared latrines, i.e. latrines used by more than one households.

In conclusion, while many households have improved their sanitation situation many of the facilities are traditional or shared. Therefore, sanitation coverage depends very strongly on the definitions used. This is generally the case in Uganda.

4.2 Hygiene Awareness

Hygiene education was not very effective in promoting handwashing. Only 25% of the households had handwashing facilities at the latrine at the time of visit.

This was the case in 48% of the wealthy households but only 11% of the poor and 0% of the (few) very poor households.

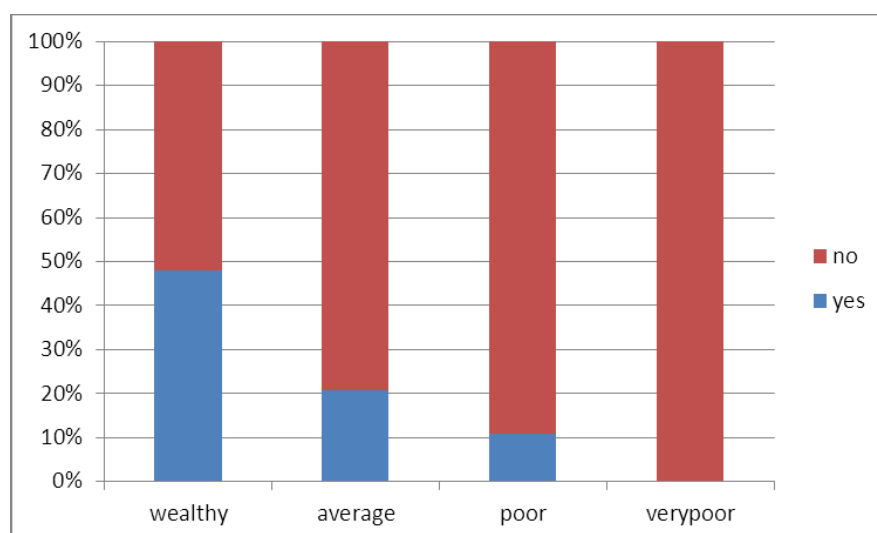


Fig. 23: Presence of handwashing facilities by level of income

A similar social differentiation appeared in the cleanliness of toilet facilities: 79% of the wealthy households but only 35% of the poor households had clean toilets.

4.3 Ecological Sanitation

Ecosan toilets have been promoted by the project but there was no massive replication, mainly due to the high costs per toilet. A majority of the households (59%) said that an ecosan toilet was desirable but too expensive. Reluctance to handle faecal material is not a major issue (3% of respondents). Today about 10% of the households have ecosan toilets, from almost zero before the intervention, but half of these are concentrated in 4 towns where replication seems to have worked. In the majority of towns there has been no or very little replication.

The demonstration ecosan toilets constructed at the time of construction of the water scheme are said to be still in use in 37 of the 42 SWTWS towns (88%). Trained artisans who know how to construct ecosan toilets are said to be present in two thirds of the towns.



Fig. 24: An example of replication of an ecosan toilet

| | No. of towns | % of towns | % of HHs with ecosan toilet |
|---|--------------|------------|-----------------------------|
| No replication | 11 | 26% | 7% |
| Minimal replication (<10 HHs) | 19 | 45% | 5% |
| Some replication (10 to 30 HHs) | 4 | 10% | 7% |
| Considerable replication (30 to 50 HHs) | 4 | 10% | 32% |
| information unclear | 4 | 10% | |
| All SWTWS towns | 42 | 100% | 10% |
| Control towns | 4 | - | 6% |

Tab. 6: Replication of ecosan toilets

Of the 40 confirmed public Ecosan toilets, most (87%, i.e. all but 5) are still in use. However, in most cases (20, i.e. 61% of the functional ones) they are only used by water office staff and visitors, and maintained by the scheme operator.

The HH level demo ecosan toilets seem to be mostly still in use in 76% of the towns, and only partly or not used any more in the remaining towns (FGD information is not always clear).

5. MANAGEMENT STRUCTURES AND O&M PERFORMANCE

5.1 Overall Findings

All towns have active management structures in place. Most towns have an active Water Board which has a management contract with a private scheme operator, which may be a company (6 larger towns) or an individual (28 towns). In the remaining cases (7 towns) the scheme operator has no contract or is directly employed by the Town Council or Water Board. Staffing is not always adequate with 15 towns having no technical staff or only a plumber trained on the job.

Of the 41 swtws towns with functional schemes,

- 6 are operated by a local company under a management contract (Ibanda-Kagongo, Kabwohe, Kihih, Kisoro and Nyakagyeme, the latter together with Rukungiri MC)
- The remaining 35 are operated by individuals under the supervision of the Water Board. Of these individuals, 28 have a formal management contract and 7 don't. Four of these are employed by the Water Board or Town Council whereas most scheme operators receive a percentage of the revenue for their services.

The responsibilities – as seen by the interviewees, not necessarily according to contracts or legal requirements – are as shown in the table below. The percentages indicate the percentage of SWTWS towns where each answer was given.

Reading example (fifth row): The Water Boards in 88% of the towns said that setting the water tariff is their responsibility; in 20% they stated that the Water Authority (Town Council) would be responsible or involved; 24% of the Water Boards said that the Umbrella would have a role, whereas only 2% said that the Ministry (central level) would be involved.

| | Scheme operator ⁴ | Water Board | Water Authority | Umbrella | MWE/DWD |
|---------------------------------|------------------------------|-------------|-----------------|----------|---------|
| Day-to-day O&M | 100% | | | | |
| Collection of fees | 100% | | | | |
| Fixing minor problems | 100% | 2% | | | |
| Major repairs (e.g. pump) | 100% | 44% | 7% | | |
| Setting tariff | | 88% | 20% | 24% | 2% |
| Response to customer complaints | 85% | 78% | 10% | | |
| Water quality surveillance | 5% | | | 100% | 2% |

Tab. 7: Operation & maintenance responsibilities according to Water Board

⁴ Can be a company or an individual, with varying contractual or employment arrangements.

5.2 Scheme Management

Staffing ranges from one single person (in Ishasha) to 26. On average, SWTWS scheme operators have 10.6 staff, consisting of 1.2 management/ accounting staff, 1.3 technical staff (plumbers), 6.9 kiosk/tap attendants and 1.2 support staff (watchmen etc.). Kiosk/tap attendants are sometimes counted and sometimes not as they work as private individuals who are simply billed for the water used/sold.

However, **in 13 towns there is no plumber/technical staff**, and in 4 other towns it has been stated that the scheme operator also works as plumber.

The Water Boards of all SWTWS towns have received management training. In at least 26 towns (63% of the operational schemes) this was full training covering the key aspects of scheme management/O&M, financial management, and customer care. In the remaining towns the scope of training is not entirely clear from the responses.

5.3 Water Metering

All connections (public or private) are metered in all SWTWS towns (even though a certain percentage of faulty meters is reported). This is not standard in rural areas, as demonstrated by the two small control schemes constructed by local government and an NGO, respectively, which have neither metering nor payment for water.

23 (55%) of the visited SWTWS schemes had a functional bulk water meter at the source and/or at the reservoir. For the remaining schemes it was not always clear whether there had been a bulk water meter before (not all the sources could be visited) but it is likely that – in line with implementation policies – bulk water meters had been installed.

5.4 Support by the Umbrella Organisation

Throughout the study it was obvious that the Umbrella Organisation plays a key role – and often an exclusive role – in several important areas. These are

- Water quality surveillance (exclusive role of the Umbrella, nobody else is taking samples except two of the largest towns)
- Auditing: Umbrella is involved in auditing of all member schemes
- Credit scheme (SACCO) for scheme extensions and reinvestments: Two thirds of the towns participate in the Umbrella's SACCO scheme to finance extensions and major repairs
- Training: All SWTWS towns have received management training
- Regulation: In the absence of operational regulation, the Umbrella is involved in setting tariffs and solving contractual issues for their member schemes; not always successful as described above
- Reporting: All Umbrella members report performance data to the Umbrella Organisation; this is the only viable channel of information for the sector.

All but two SWTWS towns and one of the control towns are members of the Umbrella Organisation. 70% of the towns stated that they were satisfied with the support provided by the UO. If they were not, this is mainly related to the fact that the UO has

stopped distributing free water meters or that response time was considered as too long. In some cases there are probably unrealistic expectations that the UO could provide fall-back solutions for all types of operational problems.

The following type of support were mentioned by the 38 member towns of the Umbrella:

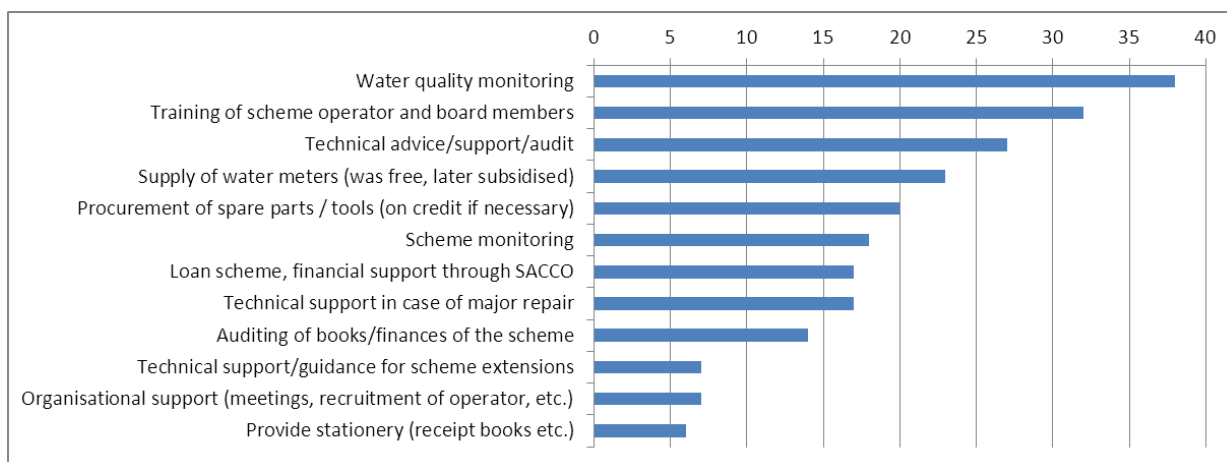


Fig. 25: Types of support provided by the Umbrella Organisation, according to Water Boards

Statement by the District Water Officer of Kanungu:
As a result of strict guideline by the umbrella organization, some of the schemes are now saving money for O&M. There are also soft loans and in case the scheme breaks down the Umbrella gives a helping hand. Other important area where the Umbrella is providing support are water quality monitoring and technical support in extension and new connections. All this is pertinent in sustainability of these schemes.

6. FINANCIAL VIABILITY

6.1 Overall Findings and Conclusions

The financial situation of the SWTWS piped water schemes is generally encouraging. Together with other components of the enabling framework – in particular contract-based management structures, support by the umbrella organisation and regulation – this is a key factor to ensure the sustainability of the investments made.

The overall financial viability of piped water is highlighted by the facts that:

- **90% of the population use piped water and effectively pay for it** (see section 3.4), mainly as a result of the SWTWS/WSDF policies that all connections are metered.
- **87% of the schemes generate internal revenue exceeding the running operation & maintenance costs.** All gravity flow schemes and two thirds of the pumping schemes have a revenue of more than 120% of the O&M costs and are hence able to use or save a part of the revenue for repairs and extensions.

Further facts will be provided in the following sections.

However, there are two important reservations despite these overall positive findings:

- **Major reinvestments cannot be covered from internally generated revenue alone.** Affordable tariffs do not – and are not meant to – include the depreciation cost of the infrastructure. Therefore, as the oldest schemes are nearing their design life there is **need for external financing for reinvestment.** This is also true for well-managed schemes, where despite adequate maintenance the existing infrastructure needs rehabilitation towards the end of the design life.

In most towns the water tariffs and accumulation of funds is not sufficient to cover capital maintenance expenditure, i.e. the costs for the replacement or substantial rehabilitation of major infrastructure assets (depreciation). **This is in line with Ugandan policies** (MWE Tariff Setting Guidelines for Small Towns, 2008) where tariffs have to include a “CAPEX buffer” as a “contribution to future capital investments” but are not expected to cover full depreciation costs.

- **Regulation is not satisfactory.** While in some towns tariffs are too low to cover the O&M costs others create very high monthly excess revenue because water is being sold at several times its production costs.

While a majority of towns has plausible tariffs and cost recovery ratios it is important to note that:

- The ratio between revenue and O&M costs is very variable;
- The average tariff per m³ of water is twice as high at public kiosks than at private connections (but this is extremely variable); in other words, half the price of the water is paid for the service of the kiosk owner / tap attendant.
- The formulae how the revenue is shared and the percentages set aside in a savings account are very variable.

In some cases tariffs seem to follow a logic of “supply and demand” rather than reflect the true production costs of drinking water.

More guidance and regulation is therefore needed, based on best practice from the well performing towns. The Umbrella Organisation provides some regulatory guidance and auditing but – as a membership association – does not have the role and power to enforce. Therefore, a majority of the schemes has reasonable tariffs and financial management arrangements but there is no effective control or enforcement mechanisms for those cases where this guidance is not embraced by the local water board and scheme operator.

6.2 Tariffs

Water tariffs vary in an extremely wide range – from 800 UGX/m³ to 9,000 UGX/m³ (general tariff) and from 25 UGX to 500 UGX per jerrycan (water kiosk tariff). These differences cannot be explained by differences of technology alone, but are partly due to a lack of guidance and regulation.

Some tariffs are too low to cover the O&M costs while others create very high monthly excess revenue.

The average water tariff of all SWTWS schemes is 2456 UGX/m³ (about 0.74 EUR/m³). Tariffs in large towns are significantly lower, apparently due to economies of scale. In the towns operated by companies (all except one above 20,000 users) the average tariff is about 1400 UGX/m³ (4 STWTS towns: 1393 UGX; 2 control towns: 1450 UGX/m³). In the small non-SWTWS schemes there are no tariffs as fees are only being collected on an ad-hoc basis, otherwise water is free.

Most towns have a uniform tariff for all types of users. Kiosk owners add their profit margin by reselling the water at a higher price per jerrycan (average price for the SWTWS towns: 102 UGX per jerrycan).

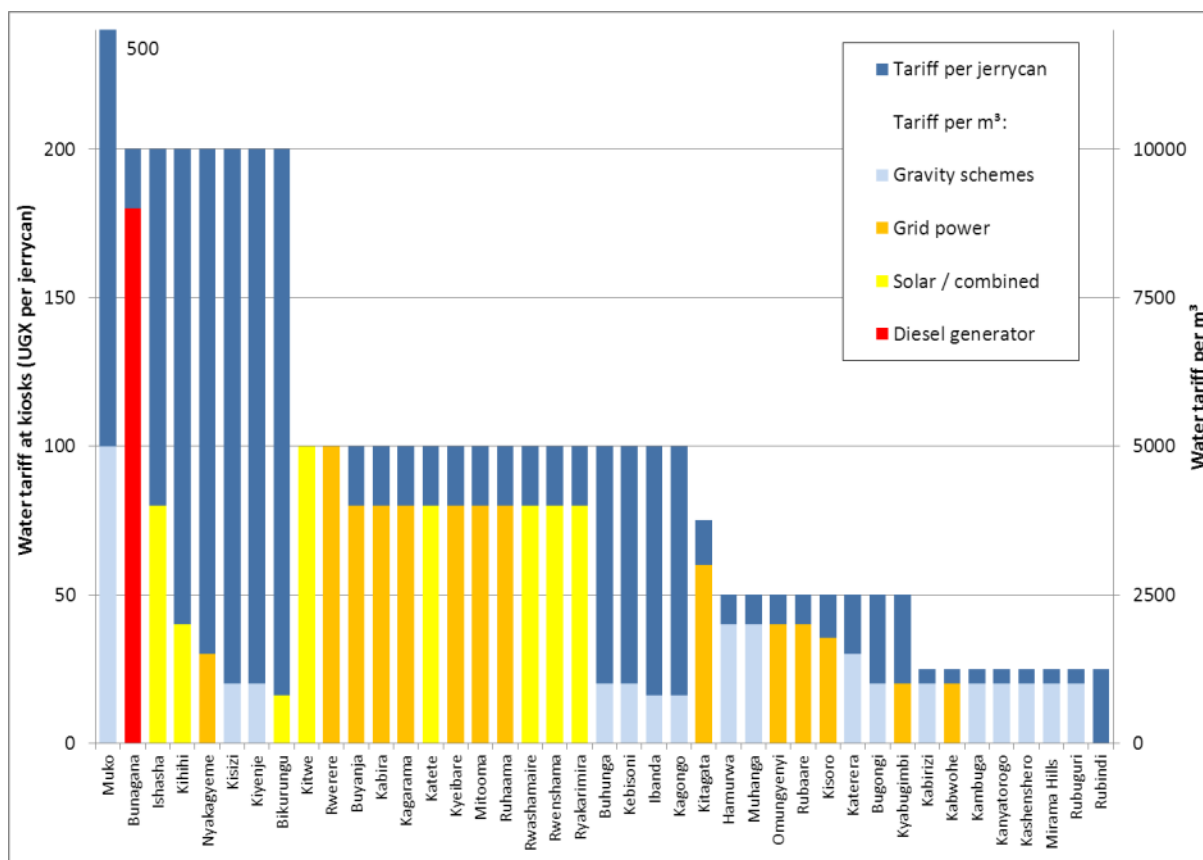


Fig. 26: Range of water tariffs, ranked by water price at public water kiosks

Fig. 26 above shows both the tariff people pay at public water kiosks (dark blue background columns) and the tariff per m³ (coloured foreground columns), using the same scale. One m³ is the equivalent of 50 jerrycans of 20 litres each.

It can be seen from Fig. 26 that

- generally gravity schemes (bright blue colour) tend to have lower tariffs but
- several gravity and rainwater harvesting schemes (without energy costs) have excessively high water tariffs
- pumping schemes using solar energy (yellow) do not have cheaper tariffs than those using grid power (orange)
- The ratio between the tariff to be paid at public kiosks and the standard water tariff (per m³) is extremely variable.

On average, people pay twice as much at the water kiosk than they would pay per m³, but this varies extremely: In the majority of towns kiosk/tapstand attendants charge only up to 25% above the price they pay themselves. On the other hand, 9 towns charge more than 5 times and 3 charge more than 10 times the normal tariff. Users in several towns complained about tap attendants arbitrarily raising the prices per jerrycan.

The tariff to be paid at the water kiosks is most relevant for the majority of the population as 62% of the households – those who fetch water from public kiosks – pay per jerrycan whereas only 38% - those using yard taps or having a private connection – pay a monthly bill.

An extreme case demonstrating the need for regulation

In Muko, the only town with a rainwater harvesting scheme, people pay 500 UGX per jerrycan, by far the highest tariff in South West Uganda. At the same time 96% of the interviewed households stated that service is poor. During the focus group discussions people said that land owners have “personalised” the water tanks, acting as water attendants and selling water at their discretion.

This exceptional case is in no way representative for other towns but it clearly illustrates the need for effective regulation.

In half of the towns (21 out of 42 SWTWS towns) tariffs have not been raised since the commissioning of the scheme. Where tariffs have been adjusted this resulted from consultations between the Water Board, usually the town council/local authorities and often (but not always) the Umbrella Organisation. There is no standard procedure for determining and approving tariffs. Four water boards said to have used the Ministry’s business planning tool for guidance.

6.3 Revenue and cost recovery

Financial data were provided by 40 towns (38 SWTWS towns and the two large control towns). Of the 38 SWTWS towns, 33 also provided water distribution data (“metered consumption” according to IWA terminology) but only 21 had a functional bulk water meter to measure gross water production and the available production and financial data are not always referring to the same period. It is therefore not possible to calculate the common performance indicator “**non-revenue water**” – the percentage of water produced that is not sold – for the majority of towns (see section 3.7 regarding water losses).

However, the available data on water volumes distributed, amounts billed and revenue collected are sufficient to state that **the revenue collection system is essentially working**. The total revenue collected by the 33 towns with adequate data – approximately 100 million UGX per month – is 89% of the revenue that would be expected by multiplying the distributed water volume with the water tariff in the respective town.

39 of the 42 SWTWS towns (93%) indicated that their revenue had increased since the commissioning of the scheme; however, detailed historical financial records were not available to quantify this.

Asked whether they received any other support or subsidies apart from local revenue, **all towns stated that they were currently not receiving any financial support**.

One town had received a free diesel generator in 2012 from the Umbrella, but no subsidy on running costs. Two towns had received limited support from the LG (District/Sub-county) in the past. Three towns mentioned that they had been receiving grant subsidies in the past, but this has stopped. Several towns mentioned that they had been receiving free water meters in the past but this had also stopped.

Despite a high variability of O&M costs, the vast majority of the SWTWS schemes is able to cover these costs without subsidies.

79% of the SWTWS schemes have a revenue exceeding 120% of the regular O&M costs. However, the situation varies significantly as show in Fig. 27 below. In 50% of the towns (19 of the 38 SWTWS towns for which financial data were available) revenue exceeds 200% of the direct O&M costs. Direct O&M costs as defined here include staff, energy, administrative costs and the Umbrella contribution but not depreciation or major repairs.

This compares to a situation in the two small non-SWTWS schemes that were studied for comparison, where there is no regular revenue at all as water is free. In these cases, there are no energy costs (gravity flow and solar system, respectively), the scheme operator is not or not adequately paid and the Water Board relies on ad-hoc money collection or on external support for any maintenance costs or repairs. The two large non-SWTWS schemes, on the other hand, are managed by private operators (companies) and have a similar revenue collection system as the SWTWS towns.

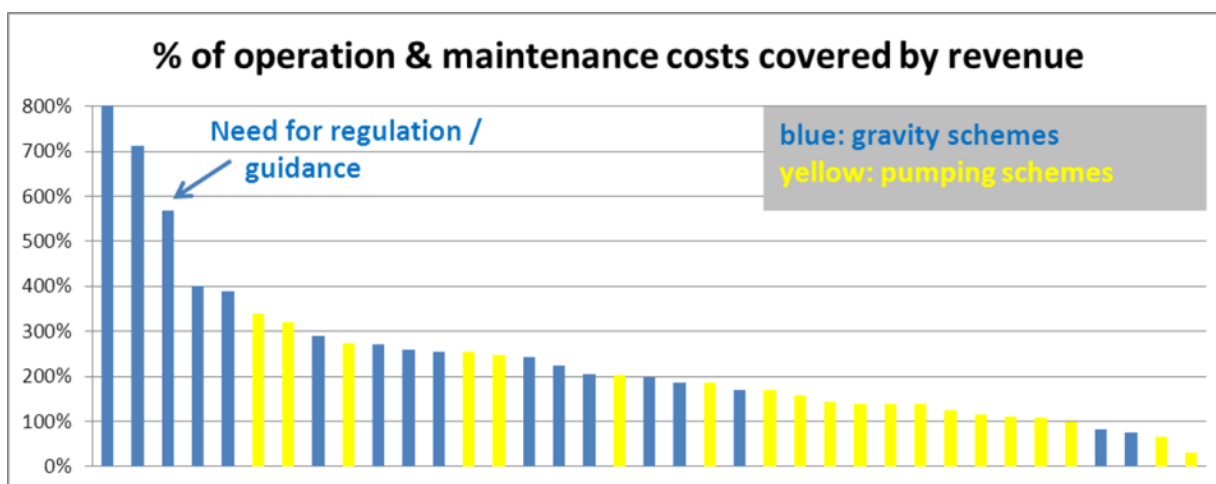


Fig. 27: Percentage of operation & maintenance costs covered by revenue

6.4 Savings

Most towns manage to save a percentage of their regular revenue for future investments and repairs. For 38 towns where this data was provided the average amount saved is 23% of the annual revenue. These funds are kept in the Umbrella's credit scheme, in a bank account, or both.

The signatories of the account are usually

- the chairperson, the treasurer and (in most cases) the secretary of the Water Board
- The town clerk or sub-county chief (in 13 towns)
- The private operator / scheme operator (in 3 towns only).

6.5 Auditing

All Umbrella member schemes (i.e. all except two of the SWTWS towns) are being audited, in the sense of their accounts being reviewed by an independent body or person on a regular basis.

In 27 out of 38 Umbrella member schemes (71%) the Umbrella Organisation is the only institution conducting such external reviews. Some schemes have additional internal

auditing arrangements (Town Council/ Town Board) in addition but only 5 schemes – the largest towns – have external audits (Auditor General’s office).

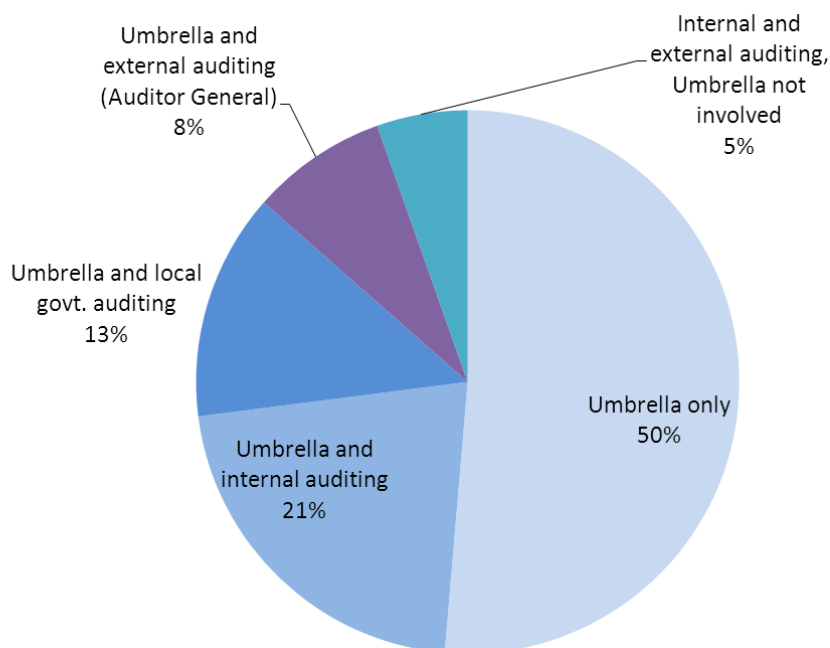


Fig. 28: Auditing arrangements of Umbrella member schemes

It should be noted that what is known as “audits” by the Umbrella organisation has important functions in terms of guidance, capacity building and independent review. However, these audits, usually done by Umbrella staff, cannot replace formal external auditing. The auditing arrangements should be part of the larger regulatory framework to be developed.

7. IMPLEMENTATION APPROACH AND DESIGN ASSUMPTIONS

7.1 Community Participation and Demand-driven Approach

The beneficiary communities confirmed to have been contributing to scheme implementation by land acquisition (in 86% of the towns), by providing labour or materials (not in all towns) and by meeting the sanitation commitment (all towns).

Land acquisition was usually done by negotiating with the land owners to provide the necessary land for free, and/or contributing money to compensate them. In some towns this was not necessary because the land was government owned or was provided by the sub-county or by the church. In about two thirds of the towns communities also participated by providing labour for excavating trenches and by providing or transporting construction materials. In a few cases labour seems to have been paid but in the majority of cases not.

Asked whether it had been difficult to fulfil the community obligations, the Water Boards answered in 84% (for land acquisition) and 88% (for sanitation) of the towns, respectively, that this was **not difficult because people eagerly wanted the water**.

This is an indication, that, on the one hand, a demand-driven approach was effectively followed in selecting the schemes, and on the other hand that it is very convenient to capitalize on the wish for water to achieve sanitation improvements.

Sections 3.9 and 4.1 showed that the objective to keep the source protection area clear of sources of contamination and sustainably achieving high sanitation coverage were essentially achieved.

The strategy of introducing community obligations to create ownership, but also to ensure sustainable source protection and to achieve sanitation improvements, is apparently successful.

The level of consultation and involvement was considered adequate by the Water Boards (where local authorities are represented) in most towns (77% fully satisfied). When households were asked this question 59% of those who were present and remembered the construction time stated that they were adequately involved (*"there were meetings and we could give our opinion"*). The locations of kiosks and tapstands seems to have been decided in consultation with the community in most towns. By providing land for the infrastructure the communities were automatically involved in decision making on locations and technical options.

The selection process of towns to be supplied is generally seen as fair. During the district level interviews, all the district officials interviewed (6 districts) confirmed that they selection of towns was fair and that those towns that most lacked the service had been served. A majority of the district officials also stated that the district had been adequately involved in project identification and implementation. Four said that, because of this, they didn't see a conflict with the principles of decentralization whereas the remaining two stated that there should be better coordination with the district workplans.

Visibility of the SWTWS programme: In the SWTWS towns, 60% of the population stated that they didn't know who constructed the water scheme; 22% knew that it was SWTWS or WSDF and 5% said it was Government (Ministry of Water); the remaining 15% gave wrong answers ("Local government" or "an NGO").

7.2 Appropriateness of Design Assumptions

Standard design criteria in the South West are to assume a population growth of 3% over a design period of 20 years, with an average household size of 6 members and a per capita consumption of 25 litres per capita per day.

This section shall briefly review these assumptions in the light of the review findings. Unfortunately, reliable, up-to-date population data were not available for supply area of the piped water schemes.

From the available population estimates and from the qualitative information on town growth it seems clear that demographic growth is higher than the assumed growth rate of 3%, which does not take migration effects into account. A more realistic growth rate seems to be 5%, but this should be confirmed by more detailed analyses for a sample of towns. The average household size of the 1381 households visited was 5 rather than 6 members.

On the other hand, this is partly compensated by the fact that actual per capita consumption seems to be lower than assumed. According to the household survey, the average daily use of drinking water is 19.4 lcd. However, this includes the portion of water need covered by other sources than piped water, which varies seasonally. From comparing water distribution figures with the estimated population figures it can be estimated that the actual use of piped water is of the order of 8 to 10 lcd. This is in line with the experience elsewhere in situation where the majority of the households carry water home from a public water source. On the other hand, per capita water consumption is likely to grow significantly with the growing number of household connections.

Extensions, growing population and increasing numbers of household connections lead to capacity constraints in many towns. In general design assumptions do not seem to be too high but it is recommended to conduct a detailed assessment, per type of supply (household connection versus public standpost) for a small sample of towns for which reliable population data are available.

7.3 Solar pumping

The use of solar energy for pumping is very interesting to avoid high energy costs and make pumping schemes in small towns more economically viable. Even where grid power supply is available it reduces operation costs and dependency on often unreliable grid supply. Where there is no electricity the advantages are even more obvious as the use of diesel generators is expensive and often unreliable while diesel tends to be embezzled for other purposes.

Unfortunately, this review found that the experience of solar energy supply in the South West is not without problems.

Of the originally 12 towns where a solar system had been installed, 3 have been converted to other energy sources and the remaining 9 (of which 3 rely exclusively on solar power) all say that solar pumping is insufficient and not reliable, especially in the rainy season. The table on the following page provides a detailed overview of the installed solar systems installed between 1996 (Kihihhi) and 2009.

Of the 3 converted schemes, one (Bunagana) replaced the solar system by a diesel generator but pays a very high price for this. One (Ruhama) was connected to the national grid while the third system (Bugangari) had never become operational as it was vandalized soon after commissioning.

As each case has its particular features it could not be established, during this study, whether the unsatisfactory results are actually related to design problems, O&M problems or – in some cases – suspected commercial interest to prefer generator operation (however, only 3 of the existing solar schemes have generators installed).

5 of the 9 towns reported that technical support and spare parts for solar systems are available in the region.

| Town | Installed | Situation in 2013 | Reliability of supply (reasons as given by Water Board / scheme operator) | Is theft of solar panels a problem? |
|--|-----------|--|--|-------------------------------------|
| Solar only | | | | |
| Ishasha | 2003 | Working 1 panel damaged | Supply unreliable, depending on weather | No |
| Katete | 2007 | Working 6 panels are damaged (cracks) | Supply unreliable, depending on weather | Yes |
| Rwenshama | 2006 | Working | Supply reliable during dry season but unreliable during rainy season | No |
| Solar and grid | | | | |
| Kihihi | 1996 | Using both solar and national grid. Grid supply is not reliable, standby generators broken down. | Solar supply unreliable, depending on weather ("only works when sun is overhead") | No |
| Kisoro | 2000 | Main source of energy is national grid (not reliable). Solar contributes about 4% of total pumping energy. | Solar supply inadequate and unreliable, depending on the weather | No |
| Rweshamire | 2002 | Connected to national grid and solar system. 8 solar panels cracked. | Solar supply unreliable during the rainy season, depending on weather | Yes |
| Solar and diesel | | | | |
| Bikurungu | 2009 | Solar system washed away by landslide. Diesel generator supply is not reliable due to high fuel costs. | Solar supply was not reliable, took 3 days to fill the tank even with clear weather. | No |
| Ryakarimira | 1999 | Solar system supplemented by diesel generator | Solar supply not reliable during the rainy season | Yes |
| Kitwe | 2003 | Solar system and standby generator | Solar supply not reliable, depending on weather | Yes |
| Solar replaced by GFS | | | | |
| Bugangari | 2000 | Original solar system vandalized and abandoned in the first year; today replaced by gravity flow scheme constructed by the District. | Solar system was never fully operational. | Yes |
| Solar replaced by diesel | | | | |
| Bunagana | 2003 | Original solar system has been replaced by diesel generator. Fuel cost is now the main concern. | Solar supply is said to have been insufficient and unreliable. | Yes |
| Solar replaced by grid connection | | | | |
| Ruhaama | 2004 | Original solar system has been replaced by connection to the national grid after pump had burnt | Solar supply is said to have been unreliable. | No |

Tab. 8: Overview of the situation and functionality of solar pumping systems

7.4 Tank Types

The most common tanks are twin masonry tanks (40% of the towns) and overhead steel tanks (36%), followed by concrete (17%) and – more recently – plastic tanks (7%).

Twin masonry tanks had higher percentages of tanks with damages or leakages. For the schemes that are more than 10 years old, 80% of the steel tanks but only 50% of the twin masonry and concrete tanks were found to be in good general condition.

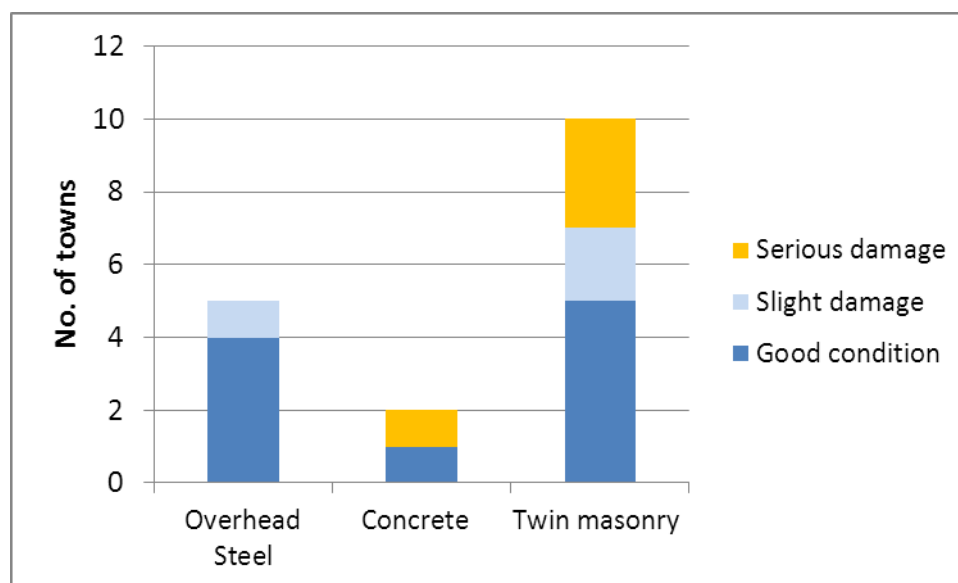


Fig. 29: Number of towns (older than 10 years) with damaged tanks, by type of tank

Even though the sample is small (5 steel and 10 twin masonry tanks of more than 10 years) this is a significant difference. One likely explanation is the fact that water is aggressive (very low pH) in the majority of towns. However, a detailed technical assessment of the causes was not possible during this review.

The designers apparently reacted to the experience my moving from twin masonry tanks to steel tanks; twin masonry tanks were installed in two thirds of the older schemes (> 10 years old) but in only 22% of the recently constructed schemes (< 5 years ago).

8. INDIRECT IMPACT

The present review can in no way replace a rigorous impact evaluation. The baseline information and the available resources were insufficient to make quantitative conclusions on the indirect, long-term impacts of the SWTWS programme. However, the views of the stakeholders – captured by household surveys and focus group discussions – provide some valuable qualitative insight.

8.1 Time Saved

The time used to fetch water diminished from 45 minutes to 10 minutes for a typical (median) household (see chapter 3.3). This means that every day 35 minutes time are saved. With an average number of 4 jerrycans used per HH per day this means that the typical HH saves 140 minutes per day (mainly women and children) that can be used for other purposes.

When asked how they the time gained was used, the interviewees answered as follows (several answers were possible):

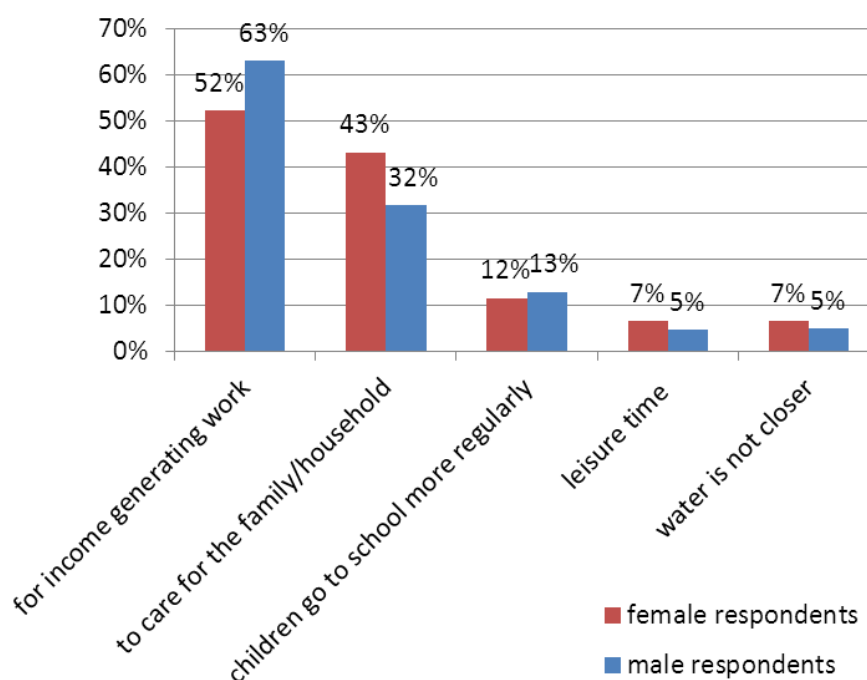


Fig. 30: Household response to the question: "If drinking water is now closer, how do you use the time saved?"

8.2 Health

It was not possible to obtain sufficiently long and reliable time series of historical data from the local health centres to substantiate the health impact of piped water based on health data. Even were such data were made available they are too sporadic for statistical analyses. Furthermore, it is difficult to interpret data on disease prevalence as (i) health centres do not only care for patients from the supply area of the piped water scheme, and (ii) data of a particular year depend on other factors such as the occurrence of cholera epidemics in the region.

However, the results of the surveys and interviews indicate the perception of households and water boards whether the piped water scheme has changed the situation in their town. Respondents may tend to give the expected answer if asked for the benefits of the water scheme, but certainly these answers indicate awareness for the health relevance of piped water.

87% of the interviewed households see an improvement of their health situation (43%: “much less problems”; 44% “some improvement”).

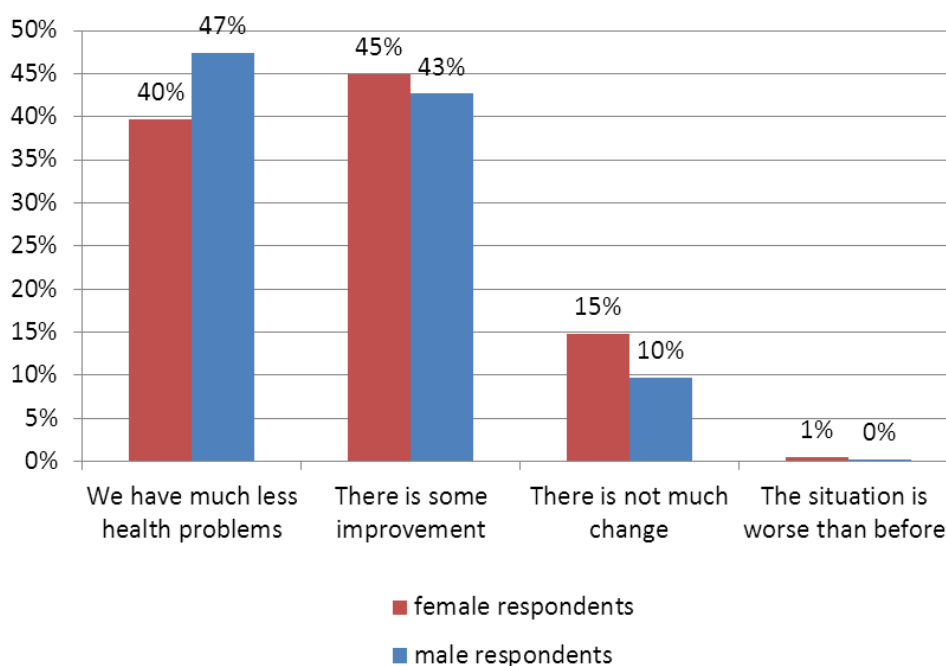


Fig. 31: Household response to the question: “How do you think that the health situation of your household has changed since piped water came?”

This result was clearly confirmed by the focus group discussions. All water boards and the user groups in all (except one) towns believed that the overall health/hygienic situation in their town had improved. Water board members and user groups stated in 33 and 36 (out of 42) towns, respectively, that a reduction of water-related diseases had been observed.

Only 2 towns still had cholera cases after commissioning of the piped water scheme (“few”, “have reduced drastically”) whereas the water boards in 9 towns said that there had been cholera before but not since the construction of the water scheme.

Quote from Kabwohe-Itendero, Women Users FGD:
Previously one spent 3 hours to have water due to queuing at the borehole, but now one spends only 5 minutes to get water. The time saved is used to wash clothes and clean the home, people have enough time to operate their shops and attend more to their family especially babies.

8.3 School Attendance

Households were also asked whether they thought that children go to school more regularly since there is piped water. Ticking several answers was possible.

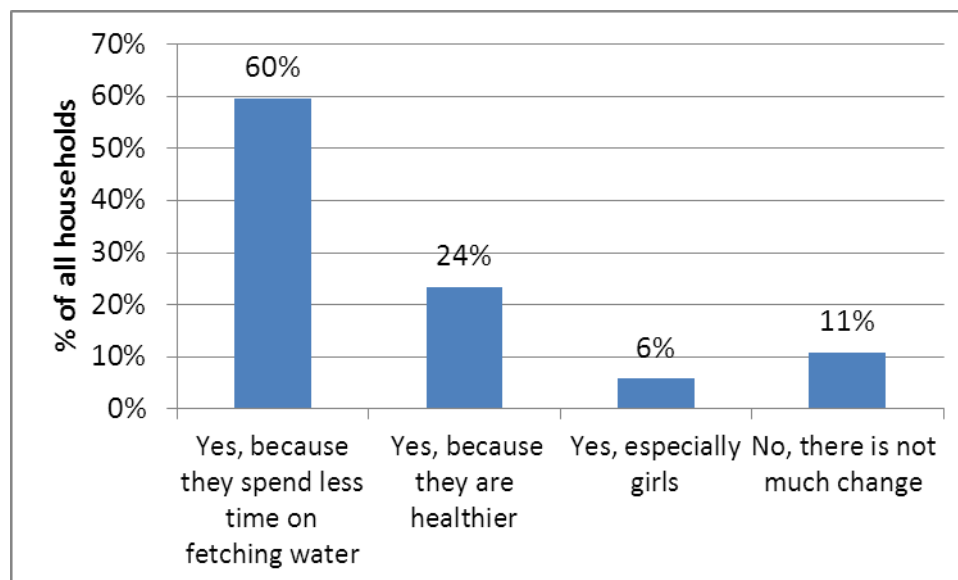


Fig. 32: Household response to the question: “Do you think that children go to school more regularly since you have piped water?”

As for health impact, this result is a clear indication of awareness but should not be overrated as the alternative answers were suggested and respondents tend to take the expectation of the interviewers into account.

Again this is confirmed by the results of focus group discussions. All user groups indicated that school attendance had increased. The reasons given were that children now go to school on time, as they spend much less time on fetching water (35 towns); children go more regularly to school as they are more healthy (14 towns); and that there are more children in boarding schools now due to the presence of water supply there (4 towns).

8.4 General and Economic Development of Towns

There has been significant socio-economic development in all (except one) towns since the commissioning of the piped water scheme. This is a very clear – and not quite expected – result of the interviews and focus group discussions.

Interviewees in all but one town (Ishasha, a remote rural growth centre at the border with DR Congo) stated that their town had grown significantly since the commissioning of the piped water scheme. 85% said explicitly that it had grown “very much”. People from the rural areas move into these regional towns. This overall picture is confirmed by the Districts and the WSDf management team. District officials state that piped water had a favourable role in the overall development of the towns.

At least 10 of the 16 town councils have reached this status since commissioning of the water scheme. Only 17 of the 42 towns are still rural growth centres administrated by

the sub-county. Of these, 10 are asking to be upgraded because population has reached a level to be eligible.

It seems very likely that population growth is significantly higher than the 3% growth rate on which scheme designs are based. There is a high rate of migration from rural to these regional towns where services such as water and electricity are available. Unfortunately, there are no reliable demographic figures to quantify this effect.

In all focus group discussions (again with the exception of Ishasha) it has been agreed that there was a lot of business development in town. This referred to new shops and commercial buildings in all towns and more specifically:

- New hotels and restaurants (mentioned in 15 towns, mostly “many” new lodging and eating places)
- New markets (mentioned in 5 towns)
- Water vending as a business exists in the majority of the towns
- Water as a production factor for washing bays (7 towns), brick making (3 towns), fish washing for export (1 town), dairy industry (Kisoro milk processing plant).

These were spontaneous statements, not suggested by a questionnaire.

To which extent this general development is related to the water supply scheme cannot be safely established. Other factors such as roads, electricity and socio-economic factors are involved. But water supply and sanitation is certainly an integral part of this overall development.

Quote from the focus group discussion with the WSDf-SW implementation team:
If you don't provide facilities, then people move to places where there are facilities.

8.5 Educational and Health Institutions

When Water Boards were asked about their (at least three) major institutional water customers, this resulted in a list of **4 hospitals** (plus many health centres) and at least 10 health centres **124 schools with a total of 68,769 students**, including at least 67 secondary schools, high schools, polytechnical colleges and vocational institutes. This list is certainly not complete because the larger towns did not report all their primary schools.

27 of these schools (13 of the secondary schools etc.) had not existed at the time of commissioning of the water scheme.

While there is no doubt that many educational and health institutions benefit from piped water, it is difficult to evaluate to which extent piped water has attracted such institutions. Often both piped water and the establishment of educational and health institutions can be seen as interlinked aspects of the overall development of the towns.

Figure 33 below shows the households' perception of the issue. In 17 out of the 42 SWTWS towns (40%) a majority of the respondents thought that piped water had attracted at least one educational or health institution.

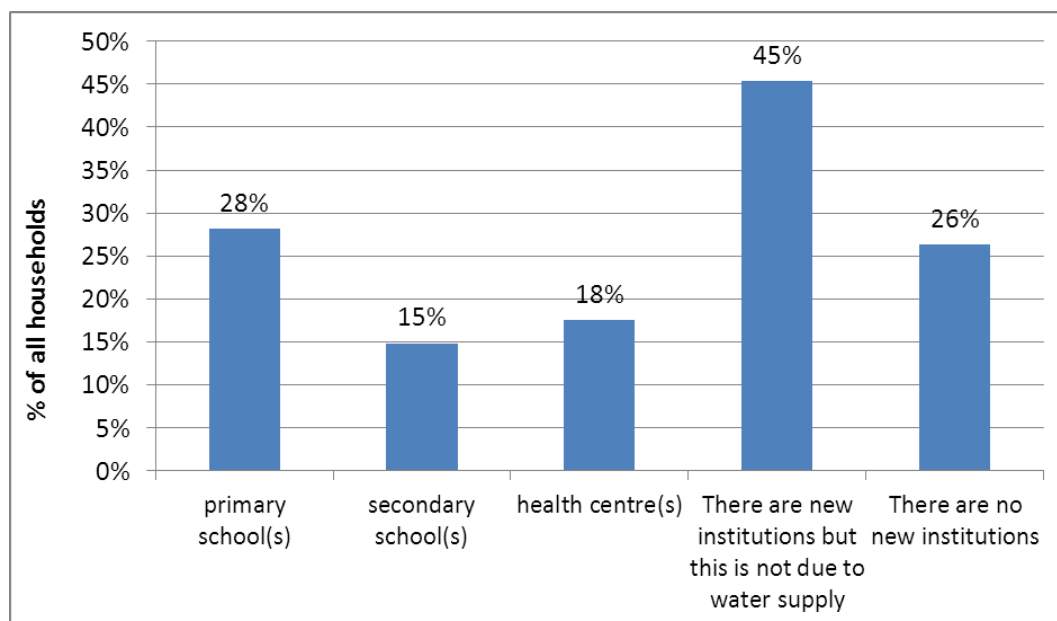


Fig. 33: Household response to the question: “Do you think that schools or health centres have been constructed in this town because there is piped water?”

In 17 out of 42 SWTWS towns (40%) a majority of the respondents thought that piped water had attracted at least one educational or health institution. In 25 of the towns the Water Boards said that new schools (often: “many” new schools) had been constructed and in 11 towns that new health centres and dispensaries had been constructed, without necessarily claiming that this was due to piped water. However, several Boards stated that piped water had attracted boarding schools.

Examples of Water Board statements during focus group discussions:

Rwerere: “Boarding schools have also been established and enrol many students due to existence of services such as water.”

Bugongi: “Boarding schools operation has boomed due to clean water.”

8.6 Effects on Women’s Role and Workload

The most significant benefit for women is reduced workload, as quantified in section 3.3. In the household surveys, 56% of the female respondents agreed that “women have less work now and more time for themselves or for other work”. Only 8% said that “women depend on men who are in charge of managing the piped water scheme”.

In all user focus group discussions the female respondents confirmed, often quite enthusiastically, that piped water had made life easier.

Quote from Kitagata Womens’ Focus Group Discussion:

“Women can now fetch water from nearby. Before, women would accumulate dirty clothes to wash at the source but now they wash in time, cook in time, irrigate cabbage and green during the dry season. They can regularly bath. The sick in hospitals and health centres have access to clean water.”

Women are adequately represented in Water Boards, and hence in decision making. 35% of all Board members are female. Only two towns had less than 20% women in the Board, and there are no towns without any women.

Women hold at least one key position (chair person, treasurer, general secretary) in 76% of the Water Boards. Two thirds of the schemes have female treasurers.

9. RELEVANCE AND KEY SUCCESS FACTORS

This chapter summarises the views of the key informants interviewed. While the interviewees place emphasis on different aspects the overall picture is consistent and not controversial.

9.1 Overall Relevance

The key informants generally see the SWTWS approach as highly relevant and successful in responding to the growing demand for piped water in small towns and rural growth centres. Success is in particular demonstrated by

- High functionality many years after completion;
- Modest per capita investment and affordable tariffs due to appropriate designs;
- Strong role in developing appropriate approaches and implementation methods that have become good practice in the national sector framework;
- Full national ownership and successful mainstreaming of the model once it was recognised as successful.

The good reputation of the programme was a key factor for its credibility and rolling out. It can be seen as an example of a pilot that worked, because the successful pilot experience produced convincing evidence, created demand and was eventually rolled out.

The operational teams (WSDF-SW, Umbrella) and those involved in the past are highly committed to the approach and tend to worry whether all the positive features can be preserved in the process of rolling out.

The WSDF team sees service provision in small towns as strategically important as the growing population tends to move to places where there are facilities, such as piped water supply. Most of the rural growth centres supplied during the first SWTWS phases have today become town councils or at least town boards. This demonstrates the relevance of providing infrastructure for public services. In the South West a good coverage of rural towns has been achieved.

Finally, the programme is seen as a success story in terms of achieving full national ownership and mainstreaming a successful model in the sector through joint sector funding.

9.2 Key Success Factors

The key informants interviewed – Ugandan and Austrian senior officers who are or were directly involved in the SWTWS programme or its rolling out in the sector – fully agreed on the key factors for the success of the programme. These are:

- **Continuity of support over a long time.** This created credibility and gave enough time to develop ownership and incorporate lessons learned.
- **National ownership from the beginning.** The technical leadership at MWE/DWD was always supportive and showed flexibility to test new institutional and implementation approaches. TA support was adequate but implementation responsibility was with Ugandan officers from the beginning.

- **A committed team.** High staff commitment was confirmed by all interviewees. There may have been an element of luck, but an important feature is that the Coordinator was free to recruit and manage his team which was based within the region.
- **The presence of a harmonised programme approach and joint sector funding.** The SWTWS programme was incorporated into the Joint Partnership Fund (JPF) in 2006. Implementation became initially more complicated but this opened the way towards mainstreaming the WSDf and Umbrella approaches as they were now much more present at the sector level (Sector Working Groups, Joint Sector Reviews etc.).
- **Participatory, demand-driven approach.** The programme responded directly to the demand of communities and this is reflected in high responsiveness to community obligations and high willingness to pay for water services. The transparent evaluation process of project proposals at the Steering Committee is an important feature of the approach.

The only aspect where views were diverging to some extent was the role of:

- **Innovative elements of the approach.** Certain elements of the implementation approach, such as water metering, have clearly contributed to the sustainability of the water schemes. The piloting and promotion of innovative technologies, in particular solar pumping and ecological sanitation, has clearly boosted them in Uganda but there is mixed experience (see above). Some interviewees doubt therefore that this was a decisive factor for success.

9.3 Factors for Sustainability

The key informants were asked what were, according to them, the main factors for the high level of functionality and sustainability of SWTWS piped water schemes. The following factors were mentioned:

- **Schemes are well anchored in the communities** due to demand driven project selection, with strong community involvement in planning and through community obligations and sensitization during the project preparation phase.
- **Continuous follow-up and support by the Umbrella Organisation** is clearly an important factor, also contributing to making Water Boards more effective and to promote accountability.
- **Water metering / payment of water as you fetch** is seen as a key factor because it creates much-needed revenue (payment is much more difficult to enforce if there is lumpsum payment) and reduces water wastage. Before most systems implemented in the region were free of charge but not sustainable
- **Appropriate designs and technologies** have led to affordable and manageable schemes, sometimes accepting higher initial investment for lower O&M costs. Diesel generators were completely avoided, not only because of high fuel costs but also because there is a high likelihood of fuel being used for other purposes.

Essentially the findings of this review support and confirm the above views.

9.4 Strengths of the Implementation Approach

Strengths:

Those involved in development and implementation of the SWTWS programme at the technical level highlight the following strengths of the implementation approach:

- **A strong focus on sustainable O&M**, with the main elements of
 - Payment for water (water metering)
 - Appropriate designs and
 - Post-construction support by the Umbrella Organisation.
- **A strong element of community mobilization and sensitization.** By being involved and fulfilling a number of obligations (land acquisition, sanitation) the beneficiary communities developed ownership and see it much more as their project than a government water supply. The “First come first serve” system helps to motivate communities and politicians to fulfill obligations quickly
- **Linking improved household sanitation to piped water supply** (100% sanitation policy)
- **Source protection** and land acquisition as a community obligation. This helps to keep the water source area effectively free of sources of contamination, and reduces the chance of having problems related to land ownership during or after construction.
- **Promotion of innovation** by piloting ecosan and solar pumping. There was room for experimenting and research, including external input, rather than doing business as usual.
- **Transparent selection process of towns:** All key informants felt that the project selection criteria (allocation of funding) were applied in a fair and transparent way. As a result, there was very little room for political interference. Funding decisions are made by a Steering Committee in a transparent way, based on evaluations prepared by the SWTWS/WSDF team.
- **Regional implementation approach**, as opposed to spot interventions in towns that are far from each other; this has the advantages of efficiency, dialogue and agreements with local government, creating a spirit of competition among candidate towns (first come first serve principle), and the fact that requirements are well-known in the region.

Most of these features are reflected in today’s national WSDF operations manual. However, there is less room today for piloting and research.

The WSDF team also considers **in-house work**, rather than contracting out all steps of work, is a strength of the original implementation approach as it contributed to keeping per capita investment costs low. In-house staff costs are low compared to contractors’ fees and reduces procurement efforts. Other positive effects mentioned were that the engineers and other professionals spent more time in the field and thus

- had better control of implementation progress
- had a high exposure to practical work experience, resulting in capacity building and better designs.

This has changed to some extent because during the first programme phases schemes were designed and supervised in-house and often even implemented by direct labour.

Today this is no longer the case and much more is contracted out, even though WSDF-SW still has a relatively large technical team and hence technical in-house capacities, compared to the number of administrative, procurement and financial management staff.

Essentially this review confirms the appropriateness of these implementation principles. However, the innovative technologies – ecosan and solar pumping – cannot be confirmed as full success (see below – section on weaknesses).

9.5 Weaknesses of the Implementation Approach

This section reports weaknesses and lessons raised by the key informants. These are essentially in line with the findings of the field review. Please refer to the individual sections and to the “lessons learned and recommendations” (chapter 0) for other weaknesses identified by the field review.

The following weaknesses were brought forward:

- **Institutional framework for O&M backup support (Umbrella Organisation)** took time to develop and is still not entirely clarified today. The mandates and financing modalities of the Umbrella could have been clarified earlier. The original approach of a membership association was not financially viable and is in conflict, to some extent, with the need for decentralized regulation. At the sector level, the Umbrella model was possibly not explained well enough as it took a long time to be accepted.
- **Weaknesses of contracts, lack of regulation and lack of guidance on use of funds.** The need to conclude serious contracts and agreements and supervise and enforce compliance became more and more clear. Even today, regulation is insufficient and there is insufficient guidance on the use of accumulated funds.
- **Ecosan:** The programme was not successful in achieving massive replication of ecosan toilets at the household level. There was little ownership for demonstration toilets (subsidized at 100%) and the programme failed to promote an truly affordable “hardware” model. Ecosan toilets at public places were often not successful as user were not trained and not used/not ready to pay for use.
- **Solar pumping** was mentioned as a strength, not a weakness by the key informants. This review indicates that, despite the inherent advantages, the technology is not yet reliable enough (see section 7.3)

9.6 Reasons for Rolling out the WSDF and Umbrella Institutional Models

The key informants were also asked why, according to them, it had been decided to roll out the WSDF and Umbrella models at the national level.

For the Ministry, the **WSDF model** offered a suitable and demonstrably effective solution for funding and implementing a large number of piped water projects in rural areas. It was a convenient “midway” solution between direct implementation from the centre and full decentralization, which were both not desirable options due to a number of reasons. These reasons are essentially logistical challenges, insufficient involvement of the local stakeholders and the desirable separation of institutional roles (policy

making, regulatory and implementation roles) in the case of central implementation; insufficient local capacities and high fiduciary risks in the case of fully decentralized implementation.

The **Umbrella Organisation**, on the other hand, offered a solution how to ensure sustainable O&M of existing piped water systems without continuous involvement of the Ministry and without operational subsidies. With the growing number of small piped schemes it had become clear that the Ministry cannot cope with supporting and even communicating with hundreds of small schemes in order to solve the numerous problems arising.

Clearly, the fact that funding had been channelled through joint financing (and hence joint reporting and decision making mechanisms) has strongly contributed to create acceptance in the sector, both on the government and development partner side.

Stakeholders in the South West emphasize, and regret, that when replicating both the WSDF and the Umbrella a more government-centered approach has been followed. Even though the replications have received a degree of autonomy in terms of financial management, procurement and decision making. However, staff is essentially nominated and delegated from the centre. This reduces the WSDF manager's ability to recruit and build an effective and committed team within the region, as this is the case in the South West, and reduces the availability of people on site who have their families in Kampala.

The Umbrella model had been developed from the practical experience that it was not realistic to expect local authorities and Water Boards to assume all O&M responsibilities without support. The completed towns kept coming back to the SWTWS implementation for assistance and advice. The background is that small towns cannot afford to have highly skilled engineers in each town, hence certain tasks have to be sourced out and on-demand support is needed for others. Furthermore, the Umbrella introduces an element of independent supervision and thus contributes to transparency and accountability.

The original idea that the Umbrella Organisation could gradually become financially autonomous by collecting sufficient subscription fees from its members turned out to be unrealistic in the near future. Government funding for O&M support will therefore needed for an extended period of time.

Today, the rationale and need for the Umbrella Organisation is widely accepted and seen as successful. However, the process of clarifying its institutional status – currently a private membership organisation that receives substantial public funding and partly assumes regulatory and monitoring functions – is still underway. The Umbrella Organisation will have to find a balanced role that

- provides support without taking over the responsibilities of the scheme operators;
- assumes supervisory and monitoring functions and handles public funds without becoming a government field office;
- preserves its operational autonomy and represents the Water Boards' interests;
- cooperates with the independent regulator in a synergetic way.

9.7 From Project Modalities to Integration into the Joint Sector Framework

The SWTWS programme had two distinctive phases with a gradual but nevertheless clear transition. It is an interesting outcome of this review that the key stakeholders brought up the advantages of each phase very clearly.

Those who are directly involved in implementation and knew both phases tend to emphasise the advantages of the “project modality” phase: There was strong technical support and a spirit of jointly developing and testing solutions (see quotes from the WSDF team in the box below). There was a high degree of flexibility, straightforward communication and monitoring and prompt fund transfer. Today structure have become heavier and there is less attention to the implementation level.

On the other hand, it is also clear that the WSDF model had to become a component of the joint sector framework and basket funding mechanism (JPF) in order to integrate it into the sector. This made things more complicated in the beginning but the model was widely discussed and became a part of the institutional sector setup. These discussions helped to create acceptance both at the level of government authorities and development partners. Today there are 4 WSDFs and 5 Umbrella Organisations in Uganda, with a funding from 5 different donors channelled through joint mechanisms, in addition to GoU budget allocations.

Excerpts from the Focus Group Discussion with the WSDF-SW Team

The research aspect was so important: this should be done by indigenous consultants outside the government sector. Government institutions should allow for innovation and research.

Good organizational culture was instilled from the beginning, for example team work, and marriage to the project yet we were paid peanuts.

We received advice, backup, expertise – nowadays it is only funding.

10. LESSONS LEARNED AND RECOMMENDATIONS

10.1 Overall Effectiveness and Sustainability

The above analyses have shown that the programme and its implementation approach were largely successful and sustainable, and are perceived as such by the main stakeholders.

The constructed water supply schemes are essentially still functional, after an average period of 10 years, and piped water is being used as main source of drinking water by the vast majority of the population, including the poor. The burden of fetching water has been sustainably reduced, in particular for women and children. Water quality is good as confirmed by regular testing. Piped water has become an important element of the development of the towns, as witnessed by substantial extensions. The management structures are essentially in place, including an effective approach for backstopping support (Umbrella Organisation). Most of the schemes generate enough revenue to cover running O&M costs and save a proportion for future repairs and extensions.

The main remaining challenges are service reliability and better regulation of tariffs and financial management. Many schemes suffer from either insufficient supply (not permanent in all parts of the network) or rather frequent service interruptions.

An additional challenge is to provide resources for reinvestment: The oldest schemes come close to the design lifespan of 20 years and need rehabilitation or replacement of system component. Reinvestment and depreciation were never meant to be included in the water tariff, and can hence not be expected to be paid from the generated revenue of the schemes. Furthermore, there is need and there are plans for scheme extensions in many towns, due to rapid population growth.

10.2 Lessons: The Development Cooperation Perspective

The SWTWS programme represents an interesting case of a long-term undertaking that started with a pilot character, under project modalities, and was later integrated into the joint sector framework which was developing in parallel.

The success factors outlined above are to some extent – though not in the sense of a blueprint – transferable to other situations. A particular feature is that the programme **started with a high degree of flexibility, innovation and technical support**, and was later – when the approach had shown to be promising – **systematically incorporated into the joint sector framework**. It was a favourable factor that the water sector SWAP and joint financing mechanism were being developed in parallel.

It seems that the decision to move from project implementation to mainstreaming in a programme approach was taken just in the right time: The approach would probably have been less effective and innovative in the initial phases, had the support modality been joint sector funding from the beginning. Later it was decisive to take it to the national sector level through the joint sector mechanisms. This may lead to reflections regarding the right **mix and sequencing of aid modalities**.

The findings of the review can help improving the sustainability of future water and sanitation interventions. A key feature is the strong emphasis on the development of nationally owned institutional models, with the following important aspects:

- **WSDF:** Demand-driven response to community requests for water projects based on transparent criteria;
- **WSDF:** Building of national implementation capacities at the regional level, i.e. between the local level (where it is difficult to create adequate capacities) and the central level (where implementation responsibilities tend to be in conflict with other mandates);
- **Umbrella:** Building of an institutionalised support mechanism to help local actors maintaining the functionality of their water schemes by providing guidance, training, a credit scheme, and hands-on support in case of problems;
- Development of **formalised management arrangements** involving Water Boards, private scheme operators, local authorities, the support of the Umbrella Organisation and – not yet implemented – effective regulation.

10.3 Lessons: Uganda's Water Sector Perspective

The review has essentially confirmed the effectiveness of the WSDF implementation approach, as well as the indispensable role of the Umbrella Organisation(s). It is very likely that the sustainability and financial viability of the piped water schemes in the South West would be much lower without the Umbrella Organisation.

More specifically, the findings of the review lead to the following conclusions and recommendations to further improve the sector framework for small towns and rural growth centres, and in particular the WSDF and Umbrella models:

- **Piped water is financially viable** for small towns and rural growth centres if the schemes are well managed and tariffs are adequately set. People are willing to pay for safe drinking water, even if they may use other sources of water for non-drinking purposes.
- **Umbrellas play a key role** in this and should become an institutionalised and sustainably financed part of the sector framework. The cost of Umbrellas is justified by the benefit to maintain the value of the investments made. This is fully in line with the findings of the “Feasibility Review of the Umbrella Organisations Model” of 2008 which concludes that
 - The umbrella organizations model has been largely efficient and effective especially the SWUWS.
 - The benefits of operating an umbrella organizations model are far greater than the costs involved as demonstrated by the high functionality of the member water supply schemes especially those under SWUWS.

The findings, conclusions and recommendations of this review report are still valid and should be considered when fine-tuning the Umbrella model. The status, mandate and financing modalities of the Umbrella model need further clarification.

- **Management structures** are satisfactory in many but not all towns. The roles and responsibilities of Water Authority, Water Board, scheme operator and the Umbrella need further clarification as well as **regulation** to ensure compliance with the contractual obligations.
- It is therefore urgent to develop **effective regulation on the ground**. The review has shown that the current lack of regulation leads to excessive tariffs, abuse of

power and non-compliance with contractual obligations in some places whereas the arrangements work well in other places, depending on the local actors. The current setup can work well but there is no effective framework to adjust and enforce if it doesn't.

- In particular, there is urgent need for **guidance on recommended tariffs**, revenue sharing and amounts to be set aside for investments and repairs, depending on scheme type and O&M costs.
- **The Umbrella partly assumes a regulatory and auditing function** even though it does not have the official mandate for this nor the means to enforce. It is unlikely that the future regulator can fully replace these functions (as this would create expensive double structures) but a carefully balanced model of cooperation between the Umbrella and the regulator needs to be developed.
- **Need for pro-poor arrangements:** There are no arrangements in place to ensure that vulnerable households, who are not able to pay for water, get access to safe drinking water. It is recommended to develop guidelines how access to a basic water quantity can be ensured. There is however an inherent risk that this might be abused and thus undermine the willingness to pay or the financial viability of the schemes. Any solution has to be transparent and based on clear criteria and should be linked to existing social systems rather than making this a responsibility of the Water Board or scheme operator.
- **Ageing schemes and growing water demand** lead to increasing **need for reinvestment and extension**, including refurbishment of older or insufficient parts of the networks. It should be noted that the oldest schemes are coming to the end of the design period and infrastructure lifetime of 20 years. It is thus normal that the need for reinvestment arises, even for well managed schemes.
- **WSDFs should have sufficient operational autonomy** to build an effective professional team that is based within the region of intervention (as opposed to delegating staff from the centre). Key informants see this as a key factor for success in the South-West.
- The SWTWS / WSDF implementation model includes human resources for **in-house technical services** (design and mobilisation). Interviewees stressed that this is not only an efficient implementation model but also contributes to capacity building in the public sector. It is therefore recommended to maintain a balanced, pragmatic approach regarding in-house services versus outsourcing.
- **Water quality monitoring is essentially working** in the South West. Both sampling frequency and compliance with drinking water quality standards are satisfactory and the sampling programme can be considered as "good practice" of water quality surveillance in small towns.
- **Solar pumping** is less reliable than originally expected. Several schemes have been converted to use other sources of energy and the others are said to be not reliable without exception. The precise causes could not be established through this review and should be investigated by a dedicated study.
- The **sanitation component** has been successful in achieving sustainable latrine coverage close to 100%, but many of the existing latrines do not have a slab (are not "improved") or are shared and handwashing facilities are often lacking. The ecosan concept could not be established as a "mainstream" solution for raising sanitation standards. It is therefore important to establish operational guidelines for the implementation of the ISH (Improved Sanitation and Hygiene) strategy for small towns in the WSDF context.

10.4 Lessons: Sustainable Piped Water Supply for Small Towns

Successful concepts are never entirely transferable to other situations. It is obvious that any solution has to be developed for the institutional and socio-economic context of the target region or country.

However, the following messages may be of general relevance, in particular in the context of the current discussion on sustainability checks and “water services that last”.

Despite the various weaknesses found it can be stated that **the conditions for technical, institutional and financial sustainability are essentially in place**. The schemes essentially remain functional for their design life and finance operation & maintenance without subsidies. However, the level of service reliability needs to be improved.

The vast majority of the poor are using piped water and accept the need to pay for it.

The two institutional models developed in the South West have essentially demonstrated their effectiveness.

The **Water and Sanitation Development Facility (WSDF)** is an implementation unit that

- Is fully nationally owned and part of the institutional sector framework (i.e. not a temporary implementation unit), and as such contributes to the development of harmonised national standards and good practices;
- Provides funding for piped water projects based on clear criteria, with funding decisions being made in a transparent way in a Steering Committee; the process of discussion and evaluation of project proposals in the Steering Committee is an important element.
- Provides water specific technical and socioeconomic planning capacities that cannot be expected to be created at the local government level;
- Operates at the regional level, in order to keep distances reasonable and ensure adequate involvement of local governments in decision making, implementation and monitoring
- Ensures adherence to policies and quality standards, such as those introduced in the South West (e.g. water metering, community obligations in terms of sanitation and land acquisition, etc.)

The **Umbrella Organisation** is essentially a follow-up model to cope with the weaknesses of small water supply service providers, by creating a permanent, regional

- Assisting with technical support and guidance when problems arise;
- Provide continuous (re-)training of Water Boards and scheme operators
- Ensuring supervision and auditing of contractual and financial management (although this needs further strengthening in conjunction with regulation)
- Monitoring water quality as well as service quality
- Offer credit schemes to finance major repairs and extensions that cannot be funded from current revenue
- Ensure liaison, reporting and performance monitoring to the Ministry.

In Uganda the Umbrella is established as a non-government member association even though – de facto – it assumes certain regulatory, auditing and monitoring functions. Status and responsibilities should be reconsidered in conjunction with establishing the independent regulator.

Please refer to the section 10.3 (Uganda specific lessons) for recommendations how these models could be further improved.



11. REFERENCES

Aigner, Cordula (2011): Participation and Empowerment in Development Cooperation. The Case of the Project 'South Western Towns Water and Sanitation' in Uganda. Thesis, University of Vienna. 2 Volumes.

Koestler, L., Lieshout, R. van (2012): Piped schemes : evolution of management models require improved accountability while rural communities in Uganda climb the ladder of rural drinking water services. IRC International Water and Sanitation Centre, The Hague. <http://www.waterservicesthatlast.org/content/download/922/5801/file/20120403%20Piped%20schemes%20in%20Uganda.pdf>

Kwikiriza, L., Asiimwe, A. Nuwamanya, H., and Schattauer, H. (2012): Large-scale peri-urban and rural sanitation with UDDTs, South Western region, Uganda. Case study of sustainable sanitation projects. <http://www.susana.org/lang-en/case-studies?view=ccbctypeitem&type=2&id=1558>

Nuwamanya, Herbert (2009): Factors affecting the Sustainability of Urban Water Supply Systems in South Western Uganda. Master Thesis, Uganda Management Institute.

Operations Manual for the Water and Sanitation Development Facility. Ministry of Water and Environment, Directorate for Water Development, 2009.

Feasibility Review of the Umbrella Organisation Model of Operation and Maintenance of Small Towns and Rural Growth Centres Water Supply and Sanitation Systems. Final Consultancy Report, Socio-Economic Data Centre Ltd., Kampala, 2008.

Evaluation of Water Supply and Sanitation Projects for Kisoro and Kitgum Towns. Draft Evaluation Report, COWI Uganda, 2009.

Mid-term Evaluation of the Water and Sanitation Development Facility Southwest (WSDF – SW). Prime Solutions, 2011.

Evaluation of Austria's Development Cooperation and Assistance to CEECs/NIS in the Water Sector (Water Supply and Sanitation). Skat Consulting, 2003.

Ofumbi, Mathias (2010): Draft Countrywide Baseline Survey Report on Ecological Sanitation Coverage, Use and Extent of Integration of Sustainability Issues. NETWAS Uganda and Stockholm Environment Institute.

Carter, R. and Rwamwanja, R. (2006): Functional sustainability in community water and sanitation – A case study from South-West Uganda. Tearfund.

Sustainable Management of Small Water Supply Systems in Africa. Practitioners' Workshop Report, October 6-8, 2010. WSP Field Note, Water and Sanitation Program.

Public-Private Partnerships for Small Piped Water Schemes – A review of progress in seven African countries. WSP Field Note, Water and Sanitation Program, 2010.

European Court of Auditors: European Union Development Assistance for Drinking Water Supply and Basic Sanitation in Sub-Saharan Countries. Special Report No 13, 2012.

ANNEX

Annex 1: List of Key Informants Interviewed

in alphabetical order

| Name | Role in SWTWS | Position today |
|---------------------------------------|--|---|
| Sottie Bomukama | Commissioner, then Director, Directorate of Water Development; Director for 7 years until 2011/12, i.e. during the period of integration and scaling up of SWTWS | retired |
| Robert Burtscher | ADA Water Sector Officer based in Kampala from 2005 to 2009, during the integration of the SWTWS into the joint sector framework | ADA Water Sector Officer based in Vienna HQ |
| Julius Byamugisha | Staff of Umbrella Organisation SW since its creation | Head of Umbrella Organisation SW, Kabale |
| Helmut Jung | Long-term water sector advisor to ADC from Vienna's BOKU university, involved in SWTWS preparation and backstopping from the beginning in 1995 | Technical Advisor for O&M at MWE/DWD, Kampala |
| Hillary Matabazi and his WSDF-SW team | Currently in charge of WSDF-SW operations; several staff members (including Hillary Matabazi) were involved since the beginning of SWTWS | Hillary Matabazi – WSDF-SW Branch Manager; Gilbert Mukesha – Dpty. Manager; Clare Weijahe, Elizabeth Kobusingye and Loyce Kwikiriza - Social Scientists; Judith Asiimwe – Accountant; Jolly Barigye – Comm. Devt. Specialist TSU8 |
| Herbert Nuwamanya | SWTWS / WSDF-SW Project Coordinator from 2002 to 2012, was Deputy from 1996 | WSDF coordinator at MWE/DWD |
| Hans Schattauer | Technical expert involved in the preparation and implementation backstopping of SWTWS during the initial phase; later ADA Water Sector Officer based in Kampala | Water supply & sanitation advisor |
| Austin Tushabe | SWTWS Project Coordinator and Senior Engineer during the initial phase of SWTWS (1996 to 2000) | retired |