Tanzania

Management for Sustainability

Practical lessons from three studies on the management of rural water supply schemes

WaterAid Tanzania
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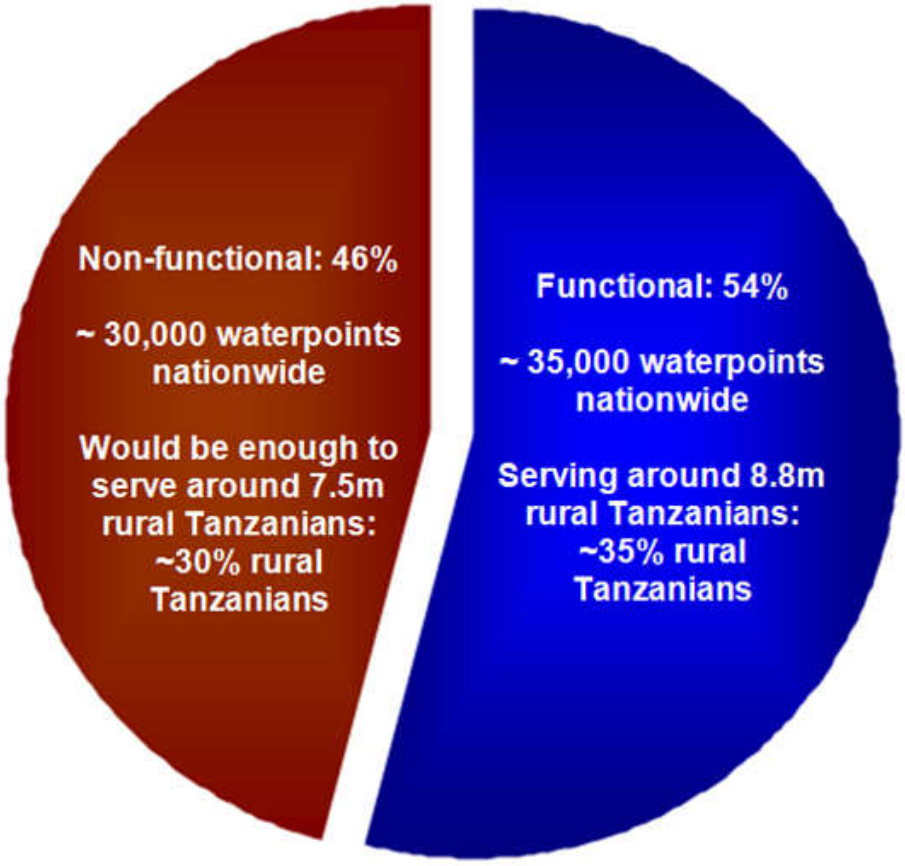

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Executive Summary

A major sustainability challenge threatens to undermine recent efforts to increase spending on rural water supply in Tanzania. Surveys have found that only 54% of existing rural waterpoints are functional, and that only two years after installation, already a quarter of waterpoints are no longer functioning. In the rush to spend new funds, there is a risk that the sustainability of new waterpoints could drop even lower if best practices are not followed and if standards are allowed to fall.

This booklet aims to address this risk. The main section (section 2) analyses the findings from three recent studies on sustainability in practice and uses this to recommend practical ideas for action by district water departments and other agencies. In sections 3-5, the findings of each of the three studies are presented in summary form. The full reports of the studies are also available from WaterAid's website: www.wateraid.org.

Key lessons from the studies

Balancing participation and ownership with good decision making

- Sustainability depends both on community participation in decision making and on good decisions being made. There is therefore a tension between effective participation and communities' limited understanding of technical and management options.

Management options: autonomy and private operators

- More autonomous entities – Water User Groups, Water User Associations and (especially) private operators – were found to be more successful at achieving sustainability. In particular, autonomy helped ensure that funds are available when needed for repairs by improving revenue collection and reducing mismanagement.
- The potential of private operators comes with a risk of excessive profiteering. A good contract, substantial bond and regulatory support from district level reduce this risk.

Water rights and COWSO registration

- For COWSOs to access and protect legal water rights requires that they are able i) to register as independent legal entities and ii) to apply for and receive water rights from Basin Water Offices (BWOs). These two processes have both been challenging, though with recent legislation and the growing capacity of BWOs they should become easier.

Monitoring and regulation

- Monitoring and regulation of COWSO by village government and district water departments is important. Primary responsibility for the sustainability of individual projects has to rest with the COWSO, but both village and district authorities can help reduce the risk of mismanagement.

Ongoing support roles of the district water department

- District water departments also have an important role to play in providing ongoing technical support. In particular, this includes supporting COWSOs to accessing spare parts and to conduct complex maintenance works.

Summary of Recommendations

Based on these lessons, we can recommend a package of simple measures for use by district water departments to improve sustainability. These are explained in more detail in section 2 of this booklet.

Get organised for sustainability:

- Use waterpoint mapping data to analyse local sustainability challenges, both by analysing the data directly and by identifying some challenges to be investigated in more detail.
- Collect data on existing COWSOs and VWCs, including the WPs they oversee, their income and expenditure and water fund balances.

Improve community participation in planning processes:

- Facilitators of new projects need to strike a careful balance between participation and decisions that support sustainability. This is a difficult skill that should not be sidelined in the rush to spend new money. Simple handouts with simple information on technological and management options as well as pricing guidelines can help, as can exchange visits to nearby schemes.

Capitalise on the potential of small scale private operators for rural schemes:

- Encourage private operators of rural water supply schemes, in order to create stronger incentives for sustainability. State the advantages and disadvantages of private operators during facilitation and take account of the interests of private operators during design.
- Develop standard contracts for private operators with terms that prevent excessive profiteering and encourage good management.

Consolidate progress on water rights and COWSO registration:

- Use the recently passed national Water Laws enabling registration of COWSOs at district level to register both new and older COWSOs. Encourage villages with VWCs to shift to COWSOs.

Improve monitoring and regulation mechanisms:

- Update Waterpoint Mapping (WPM) data for closer ongoing monitoring of sustainability.
- Collect data on COWSOs on a regular basis, including financial performance data.
- Develop a standard Memorandum of Understanding (MoU) between the district water department and each COWSO, outlining regulatory mechanisms.

Improve support services offered by district water departments:

- Publish a service charter covering technical support services provided by the district water department to COWSOs. Ideally this would become part of the MoU with COWSOs discussed above. It is recommended that the charter should include details of what technical support services the department promises to provide and who is responsible for covering which costs.

Authors' Acknowledgements

This booklet is based on the findings of the following three studies on sustainability of rural water supply schemes in Tanzania, all recently undertaken with financial support from WaterAid Tanzania.

> Haysom, Alexia, 2006. *A study of the factors affecting sustainability of rural water supplies in Tanzania*. Submitted as a thesis in partial fulfilment of the requirements for the Degree of MSc Water Management from Cranfield University. Published by WaterAid Tanzania
>
> Moon, Sam, 2006. *Private operation in the rural water supply in central Tanzania: Quick fixes and slow transitions.* WaterAid Tanzania
>
> Nkongo, Diana, 2009. *Management and regulation for sustainable water supply schemes in rural communities*. WaterAid Tanzania

These studies are summarised in sections 3-5 of this booklet. The full reports are available online, from WaterAid's website: www.wateraid.org.

Ben Taylor would like to thank Alexia Haysom, Sam Moon and Diana Nkongo, the authors of these studies, for their hard work and their permission to edit their much longer studies into the brief summaries included here. He would also like to thank the staff and partners of WaterAid Tanzania, particularly the participants in the meeting in early 2009 at which an initial outline of section 2 of this report was presented. The contributions made at that meeting have given this booklet its final shape.

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Acronyms

AHA	Asset Holding Authority
BWO	Basin Water Office
COWSO	Community Owned Water Supply Organisation
DP	Distribution Point (synonymous with Waterpoint)
DWE	District Water Engineer
DWST	District Water and Sanitation Team
HP	Hand Pump
MDG	Millennium Development Goal
MoU	Memorandum of Understanding
MoWI	Ministry of Water and Irrigation
NAWAPO	National Water Policy (of 2002)
O&M	Operations and Maintenance
ODI	Overseas Development Institute
PO	Private Operator
UK	United Kingdom
VWC	Village Water Committee
WATSAN	Water and Sanitation
WAMMA	Wawezeshaji Maji Maendeleo Afya (Facilitators for Water, Development and Health)
WP	Waterpoint
WPM	Waterpoint Mapping
WSDP	Water Sector Development Programme
WUA	Water User Association
WUG	Water User Group

1. Introduction

Sustainability of rural water supplies is a major challenge in Tanzania. Waterpoint Mapping (WPM) surveys conducted in 51 districts found that only 54% of all public improved waterpoints are functional. The same surveys found that just two years after project completion, already a quarter are no longer functioning. This has serious implications for recent increases in funding for investment in rural water supply.

The Water Sector Development Programme (WSDP) is a major step forward for the sector. It has increased funding for rural water supply from TZS 19bn/- in 2005/6 to TZS 93bn/- budgeted for 2008/9 and has made funding available nationwide for the first time. But if functionality rates remain as they are, around half of this money will end up being wasted.

This booklet aims to ensure that this doesn't happen, to ensure that sustainability of rural water projects in Tanzania can improve. It is based on three recent WaterAid-funded research projects looking at various aspects of sustainability – these are summarised in sections 3-5. It uses these studies to give answers to two main questions: what causes the sustainability challenge and what can we do about it?

Alexia Haysom of Cranfield University in the UK looked at how Community Owned Water Supply Organisations (COWSOs) are managing their finances and this affects sustainability (Chapter 3). Sam Moon of the Overseas Development Institute (ODI) focussed particularly on private operators, trying to understand the benefits and risks of small scale private sector participation (Chapter 4). And Diana Nkongo of WaterAid Tanzania looked at the links between sustainability and the regulation of rural water supply schemes (Chapter 5).

Before these summaries, in section 2, key lessons are extracted from these three studies and turned into practical ideas for how local government and other implementing agencies can address sustainability. Practitioners from local government and agencies are encouraged to focus on section 2 as this where the lessons and practical ideas are most clearly summarised. The research summaries in sections 3-5 can then be referred to in order to understand where these lessons and ideas come from.

Defining functionality and sustainability

For the purpose of this booklet and the three studies on which it is based, sustainability and functionality are defined as follows:

A waterpoint is described as being *functional* if it is actually in use by the local community at a particular point in time. A poorly sited waterpoint that still technically works but which the community has decided not to use is therefore considered non-functional. Functionality rates are the percentage of all waterpoints in a particular area or of a particular type that are functional.

Sustainability is a slightly broader idea. A waterpoint can be considered *sustainable* if all the necessary components that keep a waterpoint functional are in place – i.e. if the technology, management, finances, technical expertise, availability of spare parts, dependable water source, etc. are all in place. A broken down waterpoint can be considered sustainable (though not functional) if the finances, expertise and spare parts are available and work in progress to repair the problem. And a functioning waterpoint can be considered unsustainable if there are no funds available (or parts or expertise) to undertake repairs if it is ever to break down.

The two concepts are clearly closely related: good sustainability should keep functionality rates up, and poor sustainability will cause low functionality. In some contexts they can be used interchangeably.

Monitoring sustainability of individual waterpoints is more difficult than monitoring functionality, though this is not a serious problem since functionality rates are a very good indicator of overall sustainability.

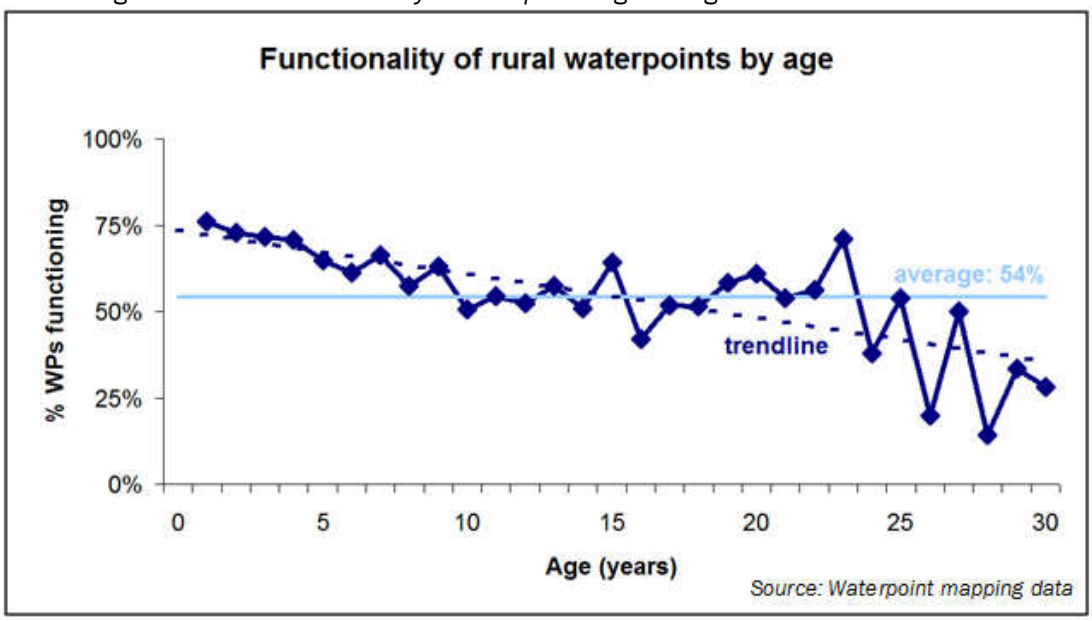
2. Lessons and Ideas to Help Solve the Sustainability Challenge

2.1 Introducing the Sustainability Challenge

This section of this booklet extracts key lessons from the three studies on sustainability that are summarised in the next three sections. It then uses these lessons as the basis for some practical ideas for how practitioners in local government and other agencies can help address the sustainability challenge. Before this, however, a short introduction to the sustainability challenge is needed.

Waterpoint Mapping (WPM) surveys conducted in 51 districts in Tanzania have very clearly shown the true extent of the sustainability problems facing rural water supplies. Nearly half (46%) of public improved waterpoints were found to be non-functional. Even very new waterpoints (WPs) have a problem: 25% of 2-year-old WPs are already non-functional – see figure 2.1.

Figure 2.1 – The functionality of waterpoints against age



An obvious starting point when looking at sustainability is to ask why waterpoints become non-functional. And the most obvious answers are technical ones: pumps, engines and pipes all break down from time to time, thefts are relatively common, and sometimes water sources dry up or become contaminated.

However, it is rarely as simple as a technical problem with a technical solution. We also need to ask why the person or people responsible for keeping a waterpoint functioning have not done so? In many cases, an initial technical problem remains unsolved because of a management problem. If a pump breaks down, it is usually possible to repair it, so why has it not been repaired? Looking at sustainability from the perspective of management and governance – generally known in the sector as "software" issues – can help us gain a better understanding the problems of sustainability, and can help us understand how they can be solved.

Two aspects of management and governance are widely seen as the keys to sustainability. First, community participation during project selection, design and installation can help achieve an increased sense of ownership on the part of the community. Communities that feel they own a handpump are more likely to look after it.

Second, the institutional arrangements for managing the water project are also important. If responsibilities are clear and there are no conflicts of interest, the management entity (in whatever form it may take) will take its responsibility for sustainability seriously. This was the basis behind the

policy changes in the 2002 National Water Policy (NAWAPO), moving away from Village Water Committees (VWCs) set up as part of the village government system and replacing them with a variety of more autonomous entities known as Community-Owned Water Supply Organisations (COWSOs) that are less vulnerable to interference by village government. Different types of COWSOs allowed by NAWAPO include Water User Groups (WUGs), Water User Associations (WUAs), trusts, societies and private companies.

The three studies that form the basis of this booklet all explored these management and governance issues further. This includes looking at how new policies are working in practice – do more autonomous COWSOs shows signs of performing better than VWCs, for example? It also includes looking at the practical challenges of good software – what are the challenges associated with participation and ownership, for example? And the studies go further, to look at other aspects of software such as regulation and the introduction of private operators.

2.2 Key Lessons from these Studies

The first overall conclusion from these studies is that a comprehensive approach to sustainability is essential. The bad news is that there isn't any single action that can be taken that would solve the problem quickly – no magic bullet. Instead, a package of different measures are needed that can support each other and collectively contribute to improving sustainability. The good news is that a collection of some fairly simple measures could together make a big difference. Lessons can be drawn from field experience that can guide us towards creating the kind of comprehensive package of measures that is needed.

These lessons will be discussed here under five headings, as follows:

- Balancing participation and ownership with good decision making
- Management options: autonomy and private operators
- Water rights and COWSO registration
- Monitoring and regulation
- Ongoing support roles of the district water department

Balancing participation and ownership with good decision making

Two of the studies included here uncovered challenges with how the principle of community participation in planning is put into practice. First, both Haysom (see section 3) and Moon (section 4) asked how realistic it is to expect community members to make good decisions about the type of technology that is most suitable in their community without knowing what the various options are or what funding is available. Second, they also asked how realistic it is for community members to make good decisions about the management of water projects, without having experience of seeing different options in practice. And third, they asked how communities are able to decide on payment systems and prices, again without knowing what the operation, maintenance and replacement costs will be. Both studies concluded that in practice, this type of decision ends up being made by facilitators rather than by the community.

Technology choices, management options and pricing are all questions that affect sustainability in a big way. Technology that is too complex and/or too expensive to run or replace undermines sustainability. Inappropriate management systems can do the same. And pricing plays a key role: the price being charged for water need to be sufficient to cover at least operations and maintenance costs, and ideally to cover eventual replacement costs as well. All three studies emphasised how important these decisions are to sustainability.

Sustainability depends both on community participation in decision making and on good decisions being made. There is therefore a tension between the principle of participation and communities' limited knowledge and understanding of technical and management options.

There are several suggestions for how this could be improved. First, the role of facilitator is critical. A good facilitator can create a sense of ownership in a community while also "guiding" the community towards decisions that are appropriate for their particular situation. Second, good sharing of information on the different technological, management and pricing options would also help. This should include information on the type of situation where different types of arrangements are well suited and less well suited. Third, exchange visits between communities where they are able to see different management options in practice can be very beneficial. Although this would increase costs slightly, the amounts would be small compared to the overall investment costs and could potentially bring big rewards if more informed choices lead to more sustainability.

Management options: autonomy and private operators

The National Water Policy of 2002 shifts the management of rural water projects away from Village Water Committees (VWCs) and towards more autonomous entities, collectively known as Community Owned Water Supply Organisations (COWSOs). The idea is that more autonomy will help ensure that funds collected for operating, maintaining and eventually replacing a scheme will not be used for other purposes and will therefore be available for repairs when they are needed.

All three studies looked at this issue, reaching similar conclusions although they approach the issue from different angles. In all three cases, there was evidence that increased autonomy of water service providers can contribute towards sustainability. Sam Moon's (section 4) analysis of waterpoint mapping data found that waterpoints managed by more autonomous entities (Water User Groups, Water User Associations, trusts and private operators) were statistically more likely to achieve sustainability than those run by village government though a water committee. He also found that waterpoints run by small scale private operators achieved very high functionality rates even with older schemes.

Nkongo (section 5) found that strong separation of roles between different actors in community water supply helps avoid conflicts of interest. There are two main potential conflicts of interest in rural water supplies. First, people would rather not pay for water, but these payments are needed for sustainability. Strong separation between consumers who pay and providers who collect money is therefore important. And second, when revenues are collected, they need to be safeguarded against corruption and profiteering, so that they are available when needed for repairs. People with a long term interest in sustainability (the community) need to be protected from people who have responsibility to collect and spend revenues (the provider). The case study in box 2.1 demonstrates how these conflicts of interest arise, and how they can be solved.

One way of thinking of this is by looking at the cutting of a cake: if the same person who cuts the cake also has first choice of slices, they have an incentive to cut one big piece that they will be able to take for themselves. If one person cuts the cake and another has first choice, then the person cutting the cake is more likely to cut fair slices. If a lot of people are getting away without paying for water, or if money that has been collected is mismanaged, this is like the cake being cut unfairly.

Nkongo (section 5) and Haysom (section 3) both found that more autonomous providers are better able to ensure reliable collection of payments for water. This is particularly true when the provider depends on these payments for their own income, as is the case for private operators. Haysom found that revenue collection "dramatically improved" under private operators.

Protecting the community's long term interest in sustainability from mismanagement is more complicated, but again the involvement of private operators can help. In particular, where a private operator provides a fixed monthly payment into a water fund account that is owned by the community, this is a transparent and reliable way of ensuring that funds for repairs (and even replacement) are being protected. A clear contract stating the responsibilities of the private operator and the amount of their monthly payment is essential here. A bond, paid by the private operator at the start of their contract and returned if the contract is successfully completed, can protect the community against non-payment of the monthly payment.

Though all three studies found that private operators had a lot of potential, they did also raise some concerns. Sam Moon (section 4) noted that the relative success of schemes run by private operators could be a result of private operators running only the most profitable schemes, which would have a good chance of sustainability under any arrangements. Large pump and engine schemes were found to be most well suited to private operators, since the community could easily see what they were paying for (diesel and minor repairs). Smaller schemes, hand-pumps and gravity-fed schemes also had potential, though could face challenges from community members that are not happy for someone to be extracting a profit when the running costs appear to be very low (though this typically ignores replacement costs) – as was the case in Dabalo village (see section 4). All three studies noted the risk of excessive profit taking by private operators, and found some cases where this appeared to be taking place. Well-designed contractual arrangements, a substantial bond, and regulatory support from district level can reduce this risk.

Water rights and COWSO registration

One reason for introducing more autonomous COWSOs in place of Village Water Committees (VWCs) is that independent legal entities would be better able to protect their water rights. The studies presented in this booklet did not focus on this issue directly, but during presentation and discussion of initial findings two main challenges relating to protection of water rights were raised repeatedly.

For COWSO's to be able to access and protect legal water rights requires that i) they are able to register themselves as independent legal entities and ii) they are able to apply for and receive water rights from Basin Water Offices (BWOs). Unfortunately, both these two processes have been challenging for COWSOs.

Registration of COWSOs has been with the Ministry of Water and Irrigation (MoWI) at national level, making this a costly and time consuming process. However, some councils established by laws to allow for district level COWSO registration and recently passed national legislation enables this nationwide. COWSO registration is therefore expected to become a much simpler process in the near future.

The main obstacle to accessing water rights has been the weak capacity of Basin Water Offices in many parts of Tanzania. This situation is now also improving, though it remains to be seen how easy it will be for COWSOs to access and protect water rights through BWOs.

Monitoring and regulation

There is an important role for village government and district water departments to play in improving sustainability through monitoring and regulation. Primary responsibility for the sustainability of individual water projects has to rest with the COWSO, but without monitoring and regulation of these COWSOs, there is a risk of mismanagement. All three studies included here noted how valuable the role played by district water departments is in monitoring the technical, management and financial performance of COWSOs. This role is important whether or not private operators are responsible for service provision. Diana Nkongo's study (section 5) also proposes regulatory functions at village level.

Waterpoint mapping (WPM) surveys provide a very valuable dataset to identify and understand specific local sustainability challenges. If this data was being kept up to date by district water departments, this would ensure water departments are aware of emerging technical and financial management problems. Supplemented with data on the financial performance of each COWSO, this would allow water departments to identify possible problems before they occur.

For example, if a particular COWSO is supposed to collect monthly contributions from the community and yet their water fund balance remains low, this could be a sign that the community's payments are not being collected or that they are being collected and mismanaged. Either way, it is unlikely that funds will be available if a breakdown occurs.

District water departments can also play a more active role in regulating the management of water funds. Alexia Haysom (section 3), for example, suggested that District Water Engineers (DWEs) could act as one signatory for water fund bank accounts, alongside a representative of the COWSO, to protect the funds against mismanagement. Diana Nkongo suggested a number of regulatory roles that water departments could play, including facilitating external assessments and audits of COWSOs, preparing league tables of schemes. She suggested that water departments should establish a Memorandum of Understanding (MoU) between village government, COWSOs and the district water department to clarify these mechanisms and the roles and responsibilities of each actor.

Nkongo also identifies possible village level regulatory mechanisms, either under village government or the community as a whole. Some of these, such as initial decision making over management systems, contracts for service providers and price setting are already part of the software component of project development. Ongoing village level regulation is less common and less formalised, though also has an important role to play. This includes mechanisms such as regular price reviews, audits of COWSO accounts, public posting of income and expenditure statements, and some mechanism to enable community members to vote out COWSO managers and/or private operators. These could be built into the MoU between the district water department, village government and each COWSO, alongside district level regulatory measures discussed in the previous paragraph.

Ongoing support roles of the district water department

Finally, district water departments have an important role to play in providing technical support. Supporting COWSOs to accessing spare parts and to conduct complex maintenance works are two such services that water departments are well placed to provide. Diana Nkongo's study (section 5) found that communities had little confidence in their own ability to access spares or conduct repairs. Water departments should clearly state what technical support services they are able to provide and how these COWSOs can access these services. This could be built into the MOUs mentioned above, and/or could be in the form of a service charter issued by the water department.

Box 1 – Missing Funds in Village A

Missing Funds in Village A

Background

Village A has piped scheme with a submersible pump. It's estimated to be serving 270 households. Payment is Tshs 20/- per bucket collected. The community has been paying this way for four years.

Daily expenditure is estimated to be around 4000/= (this covers diesel and allowance for a person in charge). There is also Tshs 10,000/= being given to a watchman on a monthly basis. Let's look at these accounts in more detail:

Expected annual income and expenditure

Income:	270 households x 3 buckets per day x 20/- per bucket:	16,200/- per day
	x 365 days:	5,931,000/- per year
	Total expected annual income:	5,931,000/-
Expenditure:	Daily costs: 4,000 per day x 365 days:	1,424,000/-
	Monthly costs: 10,000 per month x 12 months:	120,000/-
	Total expected annual expenditure:	1,544,000/-
Expected profit /loss each year:		*4,369,000/- profit*
Less maintenance costs in past four years (none)		0
Expected bank balance after four years:		*17,088,000/-*

Actual bank balance

Actual bank balance after four years:	*300,000/-*

Over 16 million shillings is "missing"!
This would be enough to pay for some pretty substantial maintenance works if the scheme were to break down – to replace the pump, repair the pipes, etc. Or it could be used to expand the network to other parts of the community. But the money is not there, so when the scheme breaks down – as it certainly will at some point – there will be nothing available for the repairs. And the amount missing is so high that even if some of our assumptions are inaccurate, there is still a lot of money missing.

Where has the rest of money gone?
There are two main possibilities. First, it could be that the missing money was never actually collected – that a lot of people were not paying for the water they collected. But this seems unlikely because it would have to be almost nobody paying for water for the bank balance to be as low as it is.

Second, the missing money could have been collected and then used for something else. In some cases, money collected for water supply is used for other purposes such as building a village office or a school classroom. Although this might seem like a good idea, it means that when the water scheme breaks down there are no funds available to repair it. Alternatively, it could be that the person or people responsible for looking after the money have used it for their own purposes – that it has been stolen. In this particular case, this seems like the most likely explanation.

How could this have been prevented?
The problem here is that the same group of people were responsible for collecting money and for looking after it, and there were no checks and balances to make sure they performed their job properly. If the people responsible had to publish monthly details of how much money they have collected and how much they have spent, this would make it harder for so much money to go missing.

Even better would be for them to put their monthly "profit" into a bank account so that it can only be accessed with the approval (and signature) of several people, including the district water engineer. The paying in slips can be made public, and the district water department can monitor the bank balance so that any problems are noticed early. This kind of monitoring and regulation can make a big difference to ensuing that funds are available when needed.

A step further would be to appoint a private operator to run the scheme. They would collect payments at the same agreed rate, be responsible for running costs and minor repairs and make a fixed monthly payment into a bank account that they cannot access. Based on the figures above, a 300,000/- monthly payment would leave the operator with a monthly profit of 64,000/-, a good income in a rural community. And the water fund bank balance would have been steadily increasing by 300,000/- per month, so that after four years there would be 14,400,000/- available for repairs.

2.3 Practical Ideas for Improving Sustainability

Based on these lessons, we can recommend a package of simple measures to improve sustainability, under the following headings:

1. Getting organised for sustainability
2. Improving community participation in planning processes
3. Capitalising on the potential of small scale private operators for rural schemes.
4. Consolidating progress on water rights and COWSO registration
5. Improving monitoring and regulation mechanisms
6. Improving support services offer by district water departments

These ideas are aimed mainly at district water departments. They may well also be useful to other local government staff and other local level implementing agencies (such as NGOs and engineering firms), and to national level policy makers, particularly those involved in community water supply, performance monitoring, water resource management and/or institutional strengthening.

Getting organised for sustainability

- Understand the nature of the local sustainability challenge. All three of the studies included in this booklet drew on waterpoint mapping data for part of their analysis of sustainability. This data is already available in 51 districts and is expected in all districts by mid-2010. It can be used as the basis of more detailed local investigations into specific sustainability challenges faced in a particular area.

- Collect data on existing COWSOs and VWCs, including which WPs they are responsible for, their income and expenditure and water fund balances. This information will be very useful in developing many of the tools mentioned below.

- Review project planning in light of understanding the factors that determine sustainability. Analyse local factors that are likely to affect sustainability, including need, demand articulation, clarity in ownership, appropriate management model, pricing, and most importantly, operations and management. These all need to be thought through by engineers during the design.

Improving community participation in planning processes

- Facilitators of community-level planning for new projects need to strike a careful balance between participation and decisions that support sustainability. This is a difficult skill that should not be sidelined in the rush to spend new money.

- Distribute simple handouts during project facilitation processes that provide community members with easy-to-understand information on technological options, pricing guidelines and the advantages and disadvantages of different management systems.

- Arrange exchange visits for representatives of communities with limited experience of water scheme management to nearby schemes, in order to understand management and pricing issues in more detail.

Capitalising on the potential of small scale private operators for rural schemes

- Encourage private sector participation as private operators of rural water supply schemes, in order to create and capitalise on stronger incentives for sustainability. This should include clearly stating the advantages (and disadvantages) of private operators during community planning and taking account of the interests of private operators during design (such as by installing simple meters, for example).

- Develop standard contracts for private operators. Terms of the contract should include at least the following:

    - Fixed monthly payments at an agreed amount paid on an agreed date each month into a COWSO-managed water fund. (The amount should ideally be calculated so that it is sufficient to cover large scale maintenance costs and eventual scheme replacement.)
    - A substantial bond paid by the operator and refunded on successful completion of the contract. The amount should be at least three months' payments into the water fund.

- Clearly stated roles and responsibilities of the service provider including service delivery standards (e.g. minimum opening hours, free water for the most vulnerable, protection of the water source, etc.).
- Price setting and price review mechanisms.
- Accounting and reporting requirements, such as quarterly reports to the village assembly including income and expenditure statements.
- Details of regulatory roles of village and district government, including a mechanism for community members to vote out the operator. This is discussed further under monitoring and regulation below.

Consolidating progress on water rights and COWSO registration

- Put into practice the recently passed national Water Laws enabling registration of COWSOs at district level. This should include ensuring all newly established COWSOs are able to register themselves as soon as they are established and encouraging older COWSOs to register.

- Encourage villages with older schemes that are managed by Village Water Committees to dissolve the VWC and replace it with one of the COWSO types as stated in NAWAPO and the new Water Laws.

- Encourage BWOs to speed up the process for COWSOs to access water rights for community water supply.

Improving monitoring and regulation mechanisms

- Keep data from Waterpoint Mapping (WPM) surveys up to date as the basis for closer ongoing monitoring of sustainability. This data is already available in 51 districts and is expected soon to be available for all districts.

- Collect additional data on COWSOs at district level on a regular basis, including financial performance data such as income, expenditure and water fund balances. This can be used alongside WPM to enable early identification of financial management problems.

- Develop a Memorandum of Understanding (MoU) between district water departments and each COWSO, outlining regulatory mechanisms and the roles and responsibilities of each actor. Village government should also be a party to the agreement. It is suggested that each district should develop a standard MoU that includes the following recommended terms:

    - COWSOs to provide water departments with regular (e.g. quarterly) data on the status of waterpoints and accounts of their financial performance.
    - The water department has the right to conduct external assessments of COWSO performance and simple audits of COWSO accounts. Village government should have the right to request the water department to conduct such an assessment or audit.
    - Village-level price setting and review mechanisms.
    - COWSOs to post regular public statements of income and expenditure and report to the village assembly on a regular basis.
    - A mechanism by which community members can vote out COWSO management on the basis of poor performance.
    - The District Water Engineer to act as a signatory on each COWSO's water fund account, alongside a representative of the COWSO. Any withdrawals on the account must be justified with explanations of why the funds are required.
    - Responsibilities of the water department and village government, including non-interference with COWSO matters except as specifically stated in the MoU.
    - Technical support services to be offered by the district water department, together with details of how COWSOs can access such support. This is discussed in more detail below.

Improving support services offered by district water departments

- Publish a service charter covering technical support services provided by the district water department to COWSOs. Ideally this would become part of the MoU with COWSOs discussed above. It is recommended that the charter should include the following:

    - Details of what technical support services the department promises to provide, such as support with accessing spare parts and conducting complex maintenance works.
    - Details of who is responsible for the costs of these services. Ideally, the COWSO should cover the cost of spare parts while the water department should promise to provide a specified amount of time on sourcing parts and backstopping maintenance works at no cost to the COWSO.

Three priority actions for district water departments

The measures suggested here would be most effective if conducted together. However, each suggestion would have some impact even without others. The lists above should be seen as an ideal situation for each district to work towards over 1-2 years, with the following three simple actions recommended as initial priorities for district water departments:

1. Understand the local detail of the sustainability challenge using waterpoint mapping data and by collecting basic data on all existing COWSOs and VWCs.

2. Develop a service charter for technical support services offered to COWSOs by the district water department.

3. Develop a standard Memorandum of Understanding between the water department, village government and each COWSO that outlines the roles and responsibilities of each actor and regulatory mechanisms.

3. Financial Management of Rural Water Supplies: Opportunities and Obstacles – Alexia Haysom

3.1 Introduction

This study was commissioned by WaterAid to explore the reasons behind non-functionality of distribution points in central Tanzania. The research was initiated after water point mapping surveys revealed average functionality rates among public distribution points of just 45%. This is compared to a 67% functionality rate of WaterAid funded distribution points across the same areas. Low rates of functionality haunt development practitioners the world over, despite the use of technologies and social strategies purported to increase sustainability.

To explore the causes of non-functionality of distribution points, a purposive survey was undertaken covering 38 villages in six different districts in Dodoma and Singida regions. It captured both quantitative and qualitative data. A range of factors were examined: technological, management, demand and socio-economic status across a range of hydro-geological and policy environments. Initial analysis indicated that poor financial management was the primary correlate of non-functionality. Therefore the study focussed in most detail on financial management for sustainability. Orthodoxy surrounding concepts of participation are challenged, inviting a re-examination of the responsibilities of implementing agencies and donors in achieving sustainability.

3.2 Methodology

The purpose of this research was to explore the causes of non-functionality of rural water schemes in Tanzania. In order to define the research hypothesis the results from a water point survey were analysed for trends in functionality. This revealed that functionality most highly correlated with the age of the scheme; the newer the scheme, the more likely it was to be functional. This observation gave rise to the following research hypothesis:

> *It is assumed that older schemes are more likely to have experienced breakdown than new schemes. Villagers do not recover their village water schemes from breakdown, and so failures in the village water scheme result in its abandonment.*

Fieldwork was carried out to test this hypothesis, and further, to explore possible reasons why villagers are not recovering their schemes from breakdown, in order that targeted steps can be taken to increase sustainability.

The limited time available for the study precluded the use of a randomised sampling approach as it would be difficult to visit a sufficient number of villages to make results statistically valid. This approach could also have led to the exclusion of villages known to display features of particular interest. Therefore a purposive sampling strategy followed by a qualitative research methodology was adopted.

38 villages across six different districts in Dodoma and Singida regions were visited. Three different interviews were held in each village: one on the technology, conducted with the pump attendant or person experienced with the technology; one on management, financial and installer issues held with a representative of the management entity and one on demand, held with a female villager.

3.3 Analysis

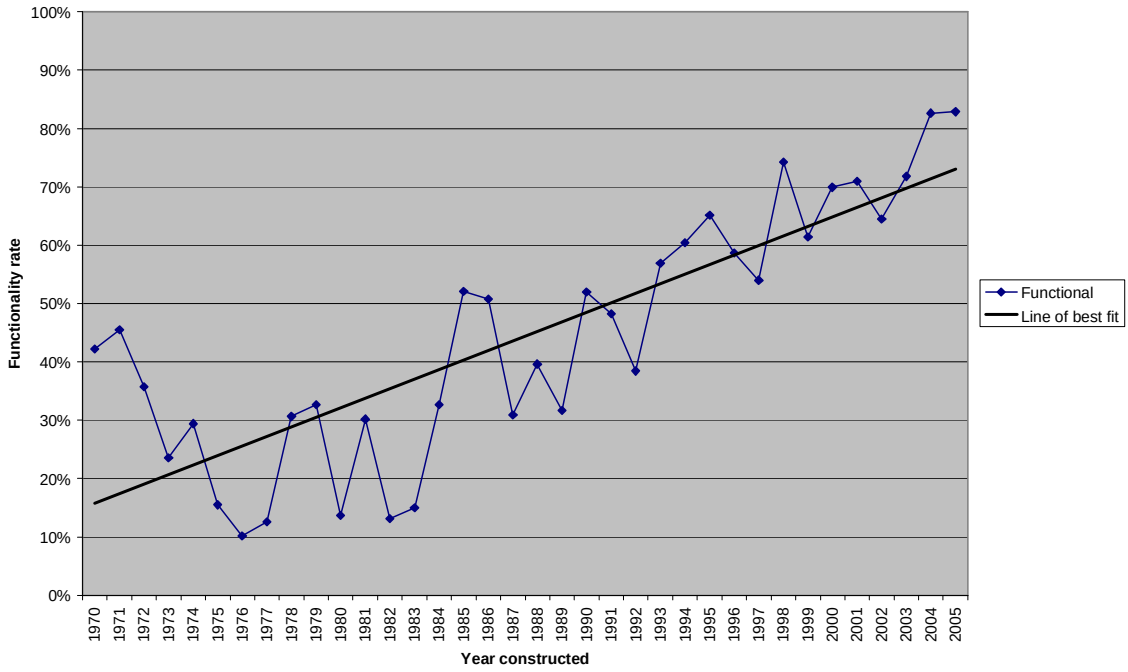
Gravity flow anomaly

The hypothesis above is based on the observed correlation between the age and functionality of water distribution points. The study showed one exception to this correlation. Figure 3.1 below shows an anomaly in the early 70s when functionality rates increase relative to the 1976 low. This is most likely accounted for by the large number of gravity schemes installed between 1970 and 1974. In the absence of any moving parts the functionality of gravity schemes is not correlated with time. However, because of their significance as an extraction system, some gravity schemes were also included in the sampling for comparison.

Village selection

Information on breakdowns was not available and so for the purposes of sampling it was assumed that all old schemes had experienced breakdown. 'New' and 'old' categories were differentiated by the age at which it would be expected that a technology type would begin to experience failure. Functioning and non-functioning old schemes were selected to examine the management of breakdowns. It was suspected that villages hosting functioning old schemes may display a coping mechanism ensuring the ongoing performance of their water supply. New schemes were included in the sampling to validate the assumption that new schemes have not experienced breakdown and also to examine differences in implementation strategy over time. Of the villages that had experienced breakdown, the only consistent difference between those that had recovered and those that hadn't was access to savings at the time of breakdown. This invited a closer examination of village-level financial management.

Figure 3.1 – The functionality of waterpoints against installation year



Revenue collection

Revenue collection was weak in the majority of villages visited. The prevailing management type in Dodoma and Singida is the Village Water Committee (VWC), an arm of the village government. The committee is comprised of a number of individuals from the village who have collective responsibility for the operation and maintenance of the water scheme, as well as revenue collection. VWCs have encountered many problems: money from water revenue is often diverted by the village government for alternative uses, and incentives for good performance are absent. In an attempt to move away from management by VWCs, the National Water Policy (2002) offers six alternative management options that can be registered with the Ministry of Water, making them autonomous legal entities and distancing the management of the scheme, including the revenue collection, from the village government. Despite this move, the VWC still appears to be the default management option.

One practice that seemed to improve revenue collection in Dodoma was payment per bucket, as opposed to ad hoc, annual or monthly contributions. This is due to the fact that the payment method is inescapable, simple and transparent. In villages where cash availability was intermittent, users could pay in grain, which the village government then sold to convert into cash for the village fund. The success of this payment method may be facilitated by there being limited alternative water sources in Dodoma where the ground water is deep. In Singida, payment per bucket could serve to deter people from using the improved supply and drive them to use potentially contaminated water from hand-dug wells.

The introduction of a private operator (PO) also served to dramatically improve revenue collection. A PO is an individual from the village who is made responsible for the management and (sometimes) maintenance of the water scheme by the village government. POs have emerged in Dodoma in the absence of external facilitation, a mark of the frustration village members have with the poor service levels achieved under VWCs. District authorities have learnt from these cases, and in some areas are actively encouraging the participation of the PO, facilitating their selection and assisting with contractual arrangements.

The introduction of the PO system goes some way to distancing the village government from revenue collection and the water fund as money no longer passes through their hands. Cash is deposited directly into the bank account on a monthly basis by the PO. Withdrawals from the water fund require the signature from the District Water Engineer as an additional safeguard against inappropriate expenditure of water revenue. However, even the PO is not immune from interference from village government, as observed in one village in which the government subverted the operation of the PO in order to regain access to the water revenue. Registration of the management entity with the relevant Ministry is an essential step towards financial sustainability by securing its autonomy.

In contrast to the VWC, the PO has the incentive to effectively collect revenue as he is entitled to either a percentage of his collection or the remains after a flat rate has been deposited into the village water fund. He gains from providing a good service to the users, and his success also ensures the health of the village water fund, evidenced in Dodoma by record savings.

The involvement of the PO also serves to separate roles that are antagonistic – eliminating potential conflicts of interest. The service provider, regulator, user and asset holder have importantly different interests with respect to a water supply. Where these roles are each performed by different members of the village, stakeholders, in their respective capacity, can pursue the interests of their position free of internal conflict, thereby better fulfilling the requirements of that role.

Regulation

Good revenue collection does not necessarily mean good value for money for the consumer and asset holder. While POs are often associated with unprecedented savings in the village water fund, there is also evidence to suggest that the POs are making extremely large profits. In one village visited, the monthly contribution to the village water fund was approximately 2% of the PO's total monthly revenue generated in the dry season. One feature that is common to almost all village water schemes is a lack of regulation which creates an opening for POs to extract large sums of money from even very poor communities.

Regulation is, in the main, not taking place, either by external agents, village government or the consumers themselves. Despite being paying customers, the villagers very rarely show any display of voluntary regulation to hold the management of their schemes to account. The primary concern of the villagers interviewed was whether or not water flowed; if the village system yielded water then users were satisfied, and seemingly disinterested in the matters of water management.

Monitoring the PO is hindered by the lack of meters on the majority of schemes. Without them, it is not possible to objectively verify the volume of water sold, and therefore the expected revenue generated. Without this insight, it is difficult for the regulator to set a contract that balances the incentives of the PO and the interests of the asset holders and consumers. POs need to make sufficient profit to justify the time and costs involved, asset holders need to ensure that sufficient revenues are put aside for

maintenance and eventual replacement, and consumers would like to keep the cost of water as low as possible.

Pricing

Pricing can perform multiple functions in a village water supply. Tiered pricing can assist in the achievement of equity by helping to ensure no one is denied access to the service on financial grounds. It can serve to control demand in the case of a village served by multiple water points from different sources of varying quality. And, most importantly for this study, it is the basis upon which cost recovery is achieved.

The long term cost of a water scheme is an immutable feature of the technology. Full cost recovery, in the absence of any financial assistance, can only be achieved with cost-reflective tariffs. At present, the price of water is determined without reference to cost estimates. It should be based on the cost of operations and maintenance, rehabilitation and eventual replacement of the scheme

This is a complicated business, as industrial specifications for the expected life span of extraction systems are generalised; the durability of a borehole depends on the properties of the aquifer and fluctuations in the price of fuel cannot be reliably predicted. In the absence of access to formal financial institutions, savings accrue no interest and theft or accidental damage to a scheme can leave it crippled. Furthermore, usage is difficult to predict, and the introduction of payment may discourage use of the improved system and encourage people to revert to use of alternative, traditional sources. Usage is likely to fluctuate with the seasons due to the changing availability of surface and shallow water.

Full cost recovery aims to generate the equivalent of the total cost of the original installation, including surveying, drilling, transport and the technology, as well as funds for operation and maintenance. It is necessary to strive towards full cost recovery in light of the policy context in which water schemes are being installed. The latest Tanzanian National Water Policy stipulates that communities themselves must achieve full cost recovery, and only have one chance of financial support from government. It follows then that either communities meet this challenge, or donors must be prepared to fill the deficit, which would not be consistent with sustainability.

The cost of the scheme varies with the technology. Table 3.1 outlines the maintenance costs for the Nira and Afridev handpumps to give an illustration.

Full cost recovery for some schemes may well be realistic under certain conditions:

- the user group is large
- ability and willingness to pay is high
- the technology affordable
- good financial management

Table 3.1 – Estimated maintenance costs per year for the Nira and Afridev handpumps.

	Nira	*Afridev*
Maintenance: First Year	Sh 12,000	Sh 15,500
Maintenance: Second Year	Sh 20,000	Sh 35,800
Maintenance: Third Year	Sh 25,000	Sh 50,000
Maintenance: Forth Year	Sh 29,000	Sh 76,000
Maintenance: Fifth Year	Sh 45,000	Sh 100,000
Maintenance: Sixth Year	Sh 45,000	Sh 100,000
Maintenance: Seventh Year	Sh 45,000	Sh 100,000
Maintenance: Eighth Year	Sh 45,000	Sh 100,000
Maintenance: Ninth Year	Sh 45,000	Sh 100,000
Maintenance: Tenth Year	Sh 45,000	Sh 100,000

Total	*Sh356,000*	*Sh777,300*
Cost of purchasing, transport and installation of cylinder, pump head, rising main and concrete seal	Sh1,800,000	Sh1,800,000
Total 10 yearly costs	*Sh2,156,000*	*Sh2,577,300*
Cost of new HP installation (pump, surveying and drilling 50m borehole)	Sh11,685,000	Sh11,850,000
Total costs over 30 years	*Sh16,353,000*	*Sh17,781,900*

Source: Activity Report for Pump Attendant Training, WaterAid, and personal correspondence

The Tanzanian National Water Policy gives a target of 250 people per source which equates to approximately 50 households. Table 3.2 shows that for Nira and Afridev handpumps, the monthly contribution required to cover the cost of maintenance over 10 years and then a replacement of the cylinder, rising main and pump head is approximately Sh400. At present, monthly contributions are usually Sh200.

Full cost recovery would involve an increase in the contribution to approximately Sh1000 per month. While considerably more than that which is currently being paid, this equates to approximately Sh30/day, which is just over the normal price for a bucket of water. And that would be for a household that is likely to use approximately 5 or 6 buckets per day. Therefore, with the same amount of usage, this would equate to approximately Sh5/bucket, which is highly achievable.

Table 3.2 – Monthly contribution per household to cover different costs

No of Households	25	*50*	100	150	200
Cost of maintenance over 10 years					
Nira	Sh718	Sh359	Sh180	Sh120	Sh90
Afridev	Sh859	Sh430	Sh214	Sh143	Sh107
Cost of new handpump installation and maintenance over 30 years					
Nira	Sh1817	Sh908	Sh454	Sh303	Sh227
Afridev	Sh1976	Sh987	Sh494	Sh329	Sh247

However, there will be remote, small, impoverished villages where the groundwater is deep and full cost recovery impossible. The appropriateness of installing an improved water supply in such circumstances should be questioned. Alternative approaches such as those enshrined in the concept of self supply should be considered, where incremental improvements are made in line with the communities' desires and capabilities.

One reason why cost recovery is not achieved is because the responsibility for setting the price of water is given to the villagers, in keeping with the prevailing ideology of participation and bottom-up decision-making. This issue demonstrates the clash of bottom-up demand responsiveness with top-down instruction, in this instance the former is less pragmatic with respect to long-term financial sustainability of improved schemes than the latter.

Participation is now the orthodoxy in mainstream development practice, and while important in some circumstances, it also has its limits. Without possession of relevant information and skills, the decisions made by villages are likely just to reflect the opinions of the facilitator. If so, to call this 'choice' is misleading. It does not capture the role of the implementing agency in the decision, and therefore can absolve the agency of responsibility for its consequences.

Either implementing agencies accept their role in the decision-making process, and strive to deliver objective and independent advice through their facilitation, and provide on-going support after completion of the project. Or they must allow communities to find their own way through a process of

experimentation and trial and error, which would require considerable time and a rethink of what is acceptable when it comes to the quality of a rural water supply.

3.4 Conclusions

Sustainability in the areas studied is being undermined by ***poor financial management***. Addressing this challenge will require action by implementing agencies (including local government), donors and national government alike.

Revenue collection was weak in the majority of villages and was improved by the introduction of a ***private operator***. Flat-rate contributions and a punitive bond are highlighted as important elements of the private operator's contract.

There is currently an absence of ***monitoring and regulation*** at the village level, a role that could usefully be performed by District Water and Sanitation Teams (DWSTs).

Ownership and participation have a valuable role to play in achieving sustainability, but can create their own challenges. In particular, how realistic is participatory decision making where community members have very little understanding of the various technological and management options and their implications?

Sustainability must not be forgotten. The drive behind attempts to meet the Millennium Development Goals (MDGs) is drawing attention towards increased coverage to meet targets which potentially and harmfully distracts from the need for long-term maintenance of water schemes: maintenance of both the soft- and the hard-ware, which is so critical for ongoing service provision.

3.5 Recommendations

1. Information should be gathered that will enable the price of water to be determined in order to achieve full cost recovery in a range of contexts and with different technologies. If full cost recovery is not realistic, this has implications for the suitability of the National Water Policy and for current investment plans.

2. Efforts should be made to introduce effective financial regulation of village water schemes. Managers and service providers must be made accountable to the community. Both the stimulation of voluntary regulation and external regulation should be explored. This could represent an important future role for DWSTs.

3. Increasing the number of private operators is likely to have a positive impact on the size of village water funds, and is therefore recommended. However, regulation of the private operators must be introduced to avoid excessive profits and weak contractual arrangements.

4. The feasibility of installing meters should be investigated, to improve monitoring of revenue generation and contractual adherence and determination of suitable flat-rate payments by the Private Operator.

5. Community members should have the opportunity to visit other schemes so that they can share problem solving strategies

6. District water department staff should also undertake exchange visits so that there is greater information sharing at the district level regarding issues such as the contract

4. Private Operators as a Possible Solution to Sustainability? Quick Fixes and Slow Transitions – Sam Moon

4.1 Introduction and Research Questions

This study looks at the role of the private sector in developing and sustaining rural water schemes in Tanzania. Specifically it contrasts the performance of privately operated schemes with other forms of management and identifies barriers and flaws in implementing a private management system on a larger scale. Key issues that have emerged and will be discussed are the contract between operator and village, the availability of on-going support and maintenance, village size and engine type, and finally financial issues, particularly adherence to cost-recovery.

The primary goals of this report are to produce valuable analysis directly from the recently available Waterpoint Mapping (WPM) data as well as investigate questions that emerge from this analysis. To achieve this second goal a follow-up survey was designed based upon the findings from the WPM data. The scope and time frame of the field work has meant that a purposive survey framework was chosen in which villages were chosen primarily to investigate specific findings from the data.

The study focussed on the following research questions:

1. Is there a correlation between private management schemes and improved functionality rate at the total population level or at regional and district levels?
2. What are private management schemes doing that other schemes are not – are there fundamental hardware or service differences?
3. Can a pattern of causation between better service and the private sector be established and if so what are the implications?

4.2 Analysis of Waterpoint Mapping Data

At the time of this study, Waterpoint Mapping (WPM) surveys had recorded a total of 6,812 different DPs across the study area. Of these, the vast majority (86%) are managed by Village Water Committees (VWCs). No other single management type represents more than 3% of the total. Prior to 2002, national policy stipulated that each village must have a VWC so other management types are generally new actors taking some, or all, of the role of the VWC. The alternative management types are usually highly localised and linked to specific projects or districts. This analysis is designed to profile the alternatives, assess how they are performing and how they developed with a focus on private operators.

Figure 4.1 – Comparing functionality by management system

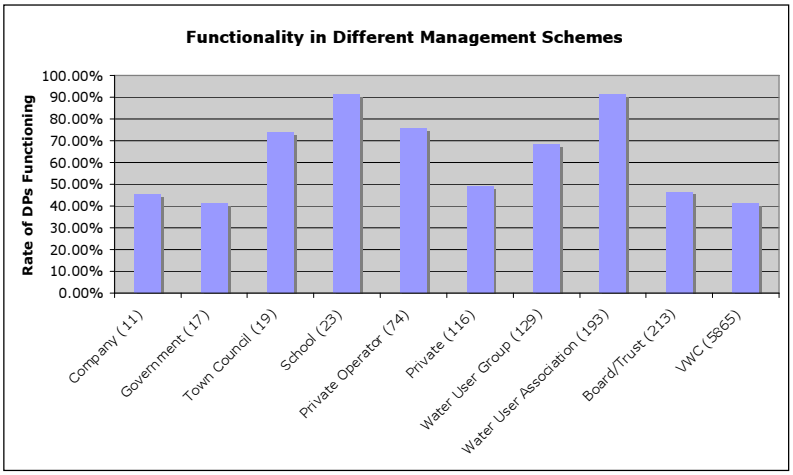
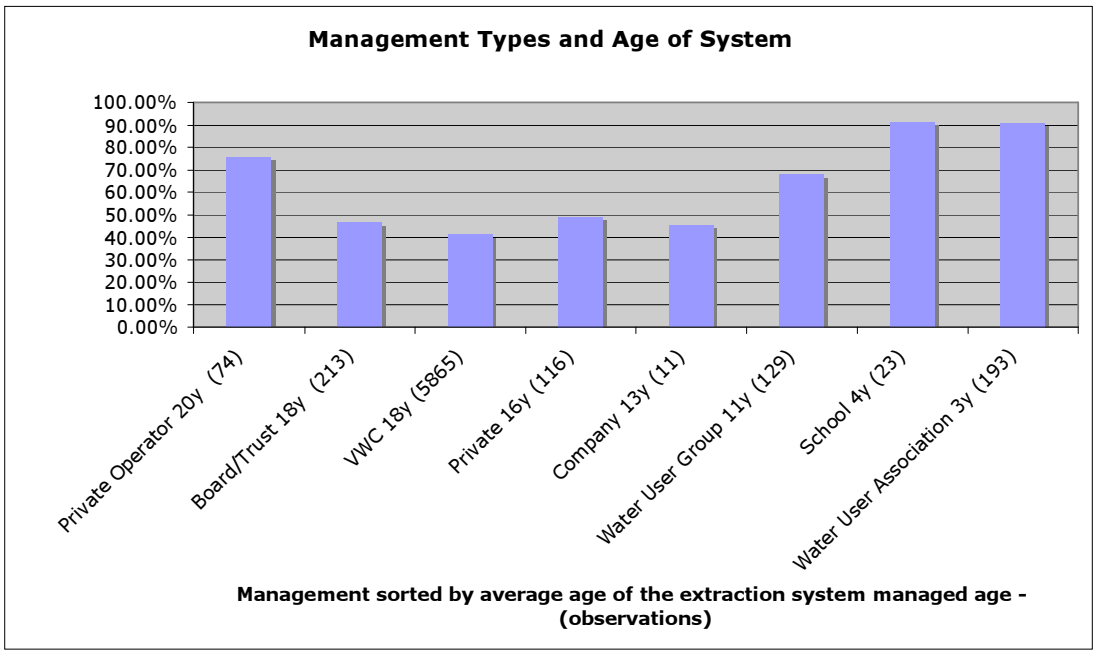


Figure 4.1 displays management type listed in order of number of observations. The VWC category has the lowest functionality rate (42%) apart from Government (41%), though several other management types have similar functionality levels. This begs the question: does management type make a difference to sustainability?

Figure 4.2 illustrates the relationship between the average age of systems in a given management type and functionality. Except for 'Private operator', the data shows again that there is a correlation between age and functionality. Management types with younger average ages – i.e. School and WUA managed WPs – have a notably higher functionality rate as would be expected for systems less than 5 years old. Management types with older average ages perform less well, with the single exception of schemes with private operators. In this case, the average age of schemes is 20 years, and yet functionality rates are high – over 75%.

Figure 4.2 – Functionality by management type and age



This evidence suggests that private operators are doing something different. One possibility is that private agents could have picked off the best and most profitable schemes. More specifically, it is unlikely that a private agent would continue to operate a non-functioning scheme for an extended period. This effect may explain part of the anomaly, but the fact remains that, on average, private operators manage the oldest schemes. This finding is important as it suggests that there is profitability in ageing schemes despite the fact that maintenance is expected to be significantly higher. The data is unable to illustrate exactly how these schemes are made profitable and the follow-up survey addresses two issues: are private operators bringing in expertise? Or alternatively are they simply generating more money to afford parts and servicing?

What are Private Operators Doing Differently? Autonomy and Management

By classing the different management types into different levels of autonomy the data is able to show how more autonomous schemes are providing a higher rate of functional DPs. Autonomy is introduced as an indicator to group management types by the freedom with which the scheme is able to operate. The indicator is defined in three categories:

Non-autonomous	Government, VWC, and town council run schemes
Autonomous	WUAs including the Singida WATSAN Project, WUGs, Board/Trust and school run schemes
Private/Autonomous	Schemes run privately by either a private operator, a company or by a private group

Figure 4.3 – Functionality by operator autonomy

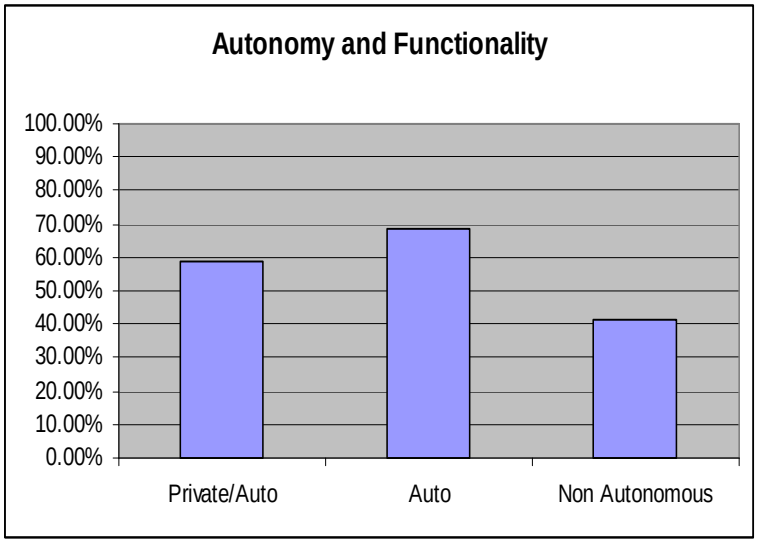


Figure 4.3 presents this functionality rates by level of operator autonomy. While more autonomous management schemes as a whole do have a higher proportion of functional DPs, private management does not appear to have such a large effect. However, the difference between the Autonomous and Private/Autonomous categories can be explained by the Singida WATSAN project, which has installed 142 brand new pumps that have seen very few failures. Removing these observations from the chart results in the two categories both having a functionality rate of 60%.

4.3 Follow-Up Field Study

The structure of the follow-up survey attempts to encompass multiple qualitative variables to draw a clearer picture of the dynamics of service improvement under private management if indeed there is improvement.

Methodology

Given the scope and timeframe of this project, purposive surveys were taken in villages selected based upon analysis of the Geodata survey and information derived from interviews. Informal interviews with WAMMA members, guided interviews with District Water Engineers (DWEs) and structured interviews based upon questionnaires at the village level.

The villages chosen are mostly ones in which a private operator manages the system, while other villages were chosen to explore how WUAs function and also whether there are any measures being taken to ensure that the new systems will remain sustainable. Dabalo was chosen because the surrounding villages all have successful private operators, yet in this village there was a violent response when one was introduced. Mazae Nje recently had a large gravity scheme installed and yet the management remained a VWC. Finally, Chungu is in the process of gathering investment for a new scheme and intends to use a private operator once the system is installed.

Analysis

Sustainability of water sources is closely related with access to parts and ability to pay for them. The village water fund is the best indicator available to assess whether or not a village can afford spares or not. This survey did find any evidence at the village level that finding parts was a major problem; the bottleneck is finding the funds to pay for them.

The results from the survey show a wide variety in the size of the village water funds but clear linkages to other variables. The size of the fund is not particularly dependent on village size but the district, the

distance from a main road, the type of pump, the contract, and the length of time of regular payment for water all seem to have an impact.

It has been argued that villages with systems requiring diesel are more likely to accept a private operator. There are several stated reasons for this: diesel and regular maintenance as obvious costs contributing to willingness to pay; the critical mass of population required for a pump and engine installation is sufficient to generate profitability; and also some perceived prestige from using a pump and engine. Villages with diesel engines will, in practice, have been paying for diesel since the installation of the scheme so the attitude towards paying for water will have been built, in some cases for several decades.

Financial Management of Private Operators

The quantitative section of this survey attempted to estimate the cost of water per litre of diesel. Unfortunately, no rule emerged with the cost dependant on the type and health of the engine as well as the depth and circumference of the borehole. It is also difficult to assess the costs of operation and maintenance, as it is generally only known to the private operator.

The revenues, at least in Dodoma Rural, are slightly more transparent. The contract is awarded to the bidder who can offer the highest monthly contribution to the village water fund. Failure to meet this monthly sum results in termination of contract and loss of the bond (set at two months' contributions). Any excess revenues become profit for the private operator and are not documented. It has been argued that water meters and a ratio system for dividing revenues would improve transparency and stabilize profits. Singida Town Council has had water meters in place for several years and the accounting data for the entire system is readily available and up to date. It is unclear how well meters will work in villages; the accounting and regulating capacity may be insufficient.

Private operators have, in some villages, requested meters to help regulate their employees. What it will do for incentives is less clear. Berege has installed meters and uses a ratio system for village water fund contributions. It remains to be seen whether this system generates larger contributions but in Berege it is already clear, within a few months, that the private operator is utilizing the 20% of revenue earmarked for maintenance as profit on top of the 39% awarded by the contract.

Cost Recovery

Evidence across the survey showed that private operators are much more likely to provide greater efficiency in fund collection. The study of villages using in Singida peri-urban confirmed that WUAs, despite their fairly autonomous status do not generate funds with anything near the efficiency of private operators.

Cost-recovery for pump and engines is complex to calculate and highly subjective. Maintenance and operational costs are high, but the rapid growth of village water funds under private operators is a clear indicator that ongoing costs are being met. Some funds are growing at a rate of several million shillings annually after accounting for costs incurred. It is unclear whether this rate of growth is enough to be completely self-sufficient (i.e. enough to cover a complete reinstallation of the system after the expected lifespan), but it is certainly enough for some villages to start looking to invest the money in technical equipment and savings funds.

Cost-recovery for hand-pumps is clearer. The cost of a full installation of a new hand-pump is approximately TSH 1.8 million, which then has an expected life span of approximately 7 years. To be self-sustaining the village should aim to generate this kind of amount every seven years. Assuming ten hand-pumps in a village and replacement after 7 years, this means that contributions to the water fund will have to average around TSH 3million per year before costs. This kind of figure is likely to be beyond the means of smaller villages. Cost-recovery levels with no replacement are much more manageable.

The village of Dabalo in Dodoma Rural has only hand-pumps as an improved water source. The WAMMA teams and local government attempted to introduce a private operator to manage the scheme. After three days a small number of villagers reacted violently to the scheme and it was ended. Nevertheless,

the private operator deposited TSH 30,000 in contributions to the water fund in those three days from twelve working pumps. This shows that for the majority of the population there is no lack of willingness to pay per bucket, even for hand-pumps. If this figure is representative of the money that could be generated from hand-pumps managed by a private operator then it is on par with the estimated annual cost of a seven-year replacement plan.

Appropriate management systems

Manguanjuki and Mtipaa in Singida peri-urban share a pump and engine system and were advised to use a WUA structure and through the creation of WUAs and WUGs have been deliberately been protected from the influence of the district water officials. The result is that the two villages are generating almost no revenue from the system and have isolated themselves from the DWE and urban water authority. With the pump being brand new, the effects are not being felt yet: the cost of diesel is being covered but no savings are being created to finance any future maintenance.

The management system was designed by the implementers of the project (WaterAid) and simply used as a template for all villages in the project area. All other villages use hand-pumps so WUAs may be more appropriate, for these two villages it is not. Significant reform will have to be made to the management schemes in these villages or they will remain dependent on donor support.

The research revealed the existence of a minority of predatory private operators forcing the price of water very high and operating with large profit margins. There were also reports that certain villagers were given preferential treatment in access to water, while some were actually denied access. Standardized contracts and local government supported regulation have minimized this kind of effect in Dodoma Rural where, despite the position often being highly lucrative, private operators are very replaceable and the large bond, as much as TSH 1million, returnable on the satisfactory completion of the contract, is a sufficient deterrent.

4.4 Conclusions

The success of cost-recovery policies and private operation is highly circumstantial. The WAMMA team and the DWE in Dodoma Rural are systematically instituting private operators and a standard contract in all villages. They have generally met with moderate success. The transition is helped by the fact that most villages have a pump and engine system making a standard contract appropriate and that the villages are relatively densely populated but these are not necessarily conditions of success.

The response in villages has universally been that private operators have improved the service with the exception of Dabalo. The reasons cited were primarily that the DPs were kept running for more of the year with maintenance being dealt with more efficiently.

Pump and engine schemes will almost always be able to generate a profit and given the increased efficiency in O&M there is good reason to encourage more villages to adopt private operators.

The survey of hand-pump costs shows that villages using them will probably remain dependent on support from donors or government in the event of a replacement being necessary. However, given that hand-pumps have a significantly shorter life span that pump and engine schemes it is extremely misguided to assume that the cost-recovery level is so much less. The attitude tends to be that negligible profitability means hand-pumps can never be managed by private operators. Evidence from Dabalo shows that this may not be the case, but the creation of a private operator will need to be handled with extreme care.

Participation and ownership are challenging concepts. Knowledge gaps, where community members have little understanding of the technological and management options, or of the available funding, make genuine participatory decision making almost impossible. This raises the question of whether it is appropriate to try and bridge such a vast (and costly) knowledge gap for the sake of ownership.

5. Regulation and Sustainability of Rural Water Supply Projects: What can we do better? – Diana Nkongo

5.1 Introduction

This study was undertaken to examine the effects of a range of different water supply management options on regulation and sustainability in rural Tanzania. To explore the issues surrounding regulation and management at the community level, qualitative data was collected from 30 purposively selected Community Owned Water Supply Organisations (COWSOs) managing rural water supply schemes in 10 districts.

This report will explore the roles that Regulation and Separation of Roles play in sustainable service delivery and how they are currently managed and implemented. It will challenge the current model of community capacity building and highlight the need for implementing agencies to include communities themselves, not just the managing committees. The role that the private sector can play in this process will also be explored. The community members should be a key player in the regulation process but before this can happen they must have the capacity to do so and be made aware of their role in holding the management to account.

5.2 Methodology

The purpose of this research was to assess the effects of various management systems on the sustainability of 30 rural water supply projects. The aim was not to compare and contrast these options as each village has adapted an idealised model resulting in a spectrum of management practices with little relation to the originals. Instead the study compares the underlying factors of Regulation and Separation of Roles and their affect on sustainability. This gave rise to the hypotheses:

1. *Separation of roles/power is necessary for sustainability*
2. *Community participation and better regulation are key factors for sustainability*

Fieldwork was undertaken to find out if the hypotheses are correct and to learn any lessons which could improve the sustainability of future projects.

The study looks at 30 Community Owned Water Supply Organisations (COWSOs) managing rural water supply schemes in 10 districts. Purposive, rather than random, selection was used to select the study sites based on the management system and technologies in use. Within each study site, 4 focus group discussions were carried out: two with water users (1 male and 1 female), one with the management committee and one with the village government. The discussions were structured in two parts: community perceptions of the sustainability of their water scheme and the degree to which the roles of people using and managing the scheme were separated and defined.

There were two stages to the analysis of this study. First, the 30 schemes were grouped by management system, technology type and location to produce 6 case studies. This was then followed by a broader, overall analysis combining the conclusions from the case studies. This summary paper focuses mainly on the second broader analysis.

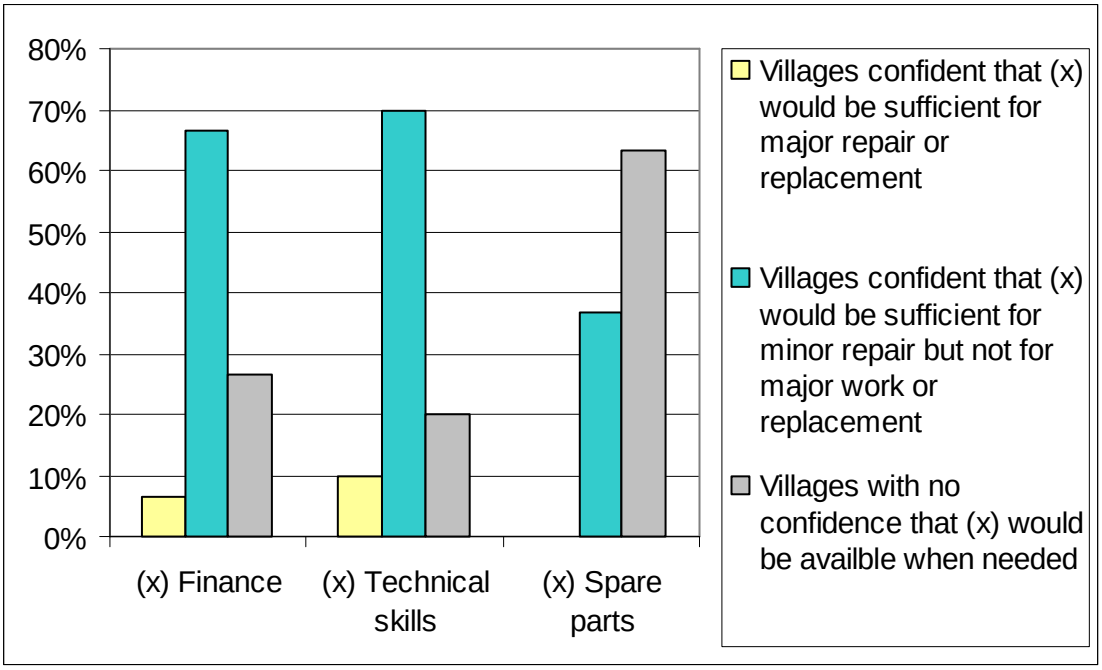
5.3 Sustainability

The study observed that the community's confidence in long term sustainability is very weak. There was no correlation between the management system being employed and the confidence of the community, having a legally registered COWSO is not sufficient to provide confidence in the sustainability of the project. It was also observed that the size of the water fund was not in itself a guarantee of sustainability if it was not appropriately weighted to take into account the age and technology in place.

The confidence scores were taken as an aggregate of the scores of all 4 parties who took part in the focus group discussions: men, women, the management committee and the village government. All of the village water schemes had experienced some level of breakdown in the past. All but 3 were functioning at the time of the investigation.

From Figure 5.1 we can see that the communities' biggest concern is with the accessibility of spare parts, 63% of communities had no faith that spare parts would be available when they were needed and 0% were confident that parts would be available for a major repair or replacement. Those interviewed had more confidence in finance being available to repair breakdowns and were most confident that technical skills would be available, with 70% saying that they thought the skills were available for minor maintenance.

Figure 5.1 – Community confidence in sustainability of water supply schemes



The two communities who had confidence that their finances would cover major repair or replacement both serve institutions as well as the rural villages. These were Chenene, using a borehole, and Tanangozi, using a gravity flow scheme, serving a military base and major high school respectively. These were the only 2 schemes within the sample serving institutional as well as community needs. This would indicate that the diversification of users of a water source to commercial in institutional interests improves the perceived financial security of the project. This could be due to better financial management being in place or that communities assume that the institutions will pay for the repair of the water source if it breaks.

The three communities, Ismina, Njalamatata and Tanangozi, who were confident that they could engage in serious maintenance, all operate gravity schemes. This is possibly due to the fact that gravity schemes do not need a high level of technical expertise to keep them running. Of the 6 schemes where it was perceived that there was a lack of any expertise 4 of them (Chifukulo, Rudewa Gongoni/Kingiti, Igoji 1 and Kimamba) operate pump and engine systems, the other 2 use hand pumps. This highlights the issue of maintenance as a continuing challenge to pump and engine schemes.

Of the 30 communities interviewed, none were confident that spare parts would be available for major repair or replacement. 11 thought that spares for minor repairs would be available. Of these 3 operate gravity schemes, 3 operate pump and engine schemes and 5 operate hand pump schemes. The three pump and engine schemes where communities felt that some spares would be available were all well located along main roads and close to major towns or district headquarters. The other 13 pump and engine schemes all felt that spares would not be available for even minor repairs. This highlights another perceived problem for pump and engine schemes that even where there are the technical skills

within a community to fix a problem there is a perceived lack of access to spare parts in all but the most accessible places.

5.4 Separation of Roles

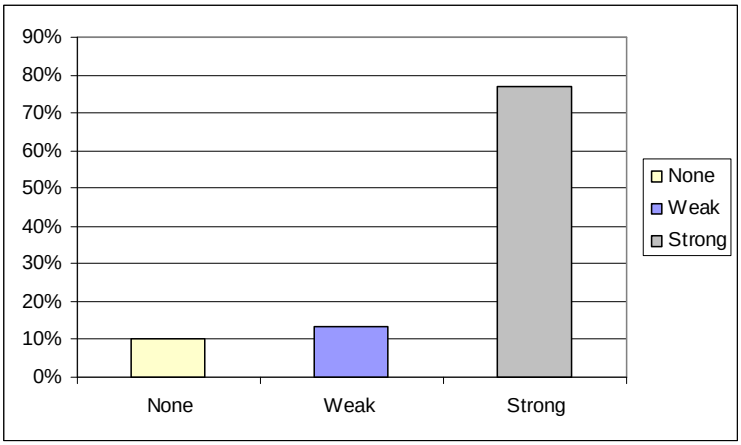
This analysis will focus on how roles and responsibilities are defined within a community. It focuses on 4 key groups and will look at the perceived roles and responsibilities of each group and relations between them:

1. Purchaser–Provider,
2. Asset Holding Authority (AHA)–Provider.

The analysis will then move to analyse the participation of each group within the regulatory processes.

Separation of roles between Purchaser and Provider

Figure 5.2 – Separation of roles between Purchaser and Provider



None: people don't pay for water service

Weak: people sometimes pay for water service

Strong: people always pay for water service (either at point of collection or monthly)

Figure 5.2 shows that for the 77% of those surveyed there was a strong separation of roles between purchaser and provider. This included 100% of those schemes using a Private Operator (PO) or Water Companies as the management system. 100% of the schemes using a pump and engine as well as 78% of the schemes using hand pumps were in this group. All but one of these schemes employ a unit based payment structure. This would suggest that the use of private operators and unit based payment helps ensures the separation of roles between purchaser and provider and that separation is mostly likely to be achieved in schemes employing a pump and engine.

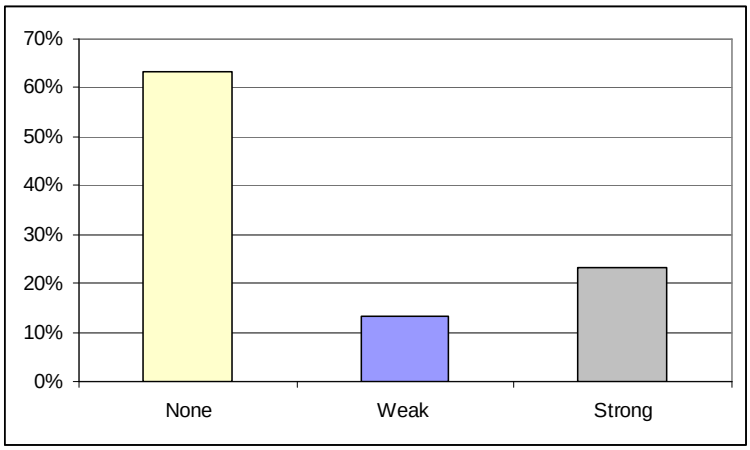
Of the communities which had a weak separation, 100% of them operate gravity schemes and 75% were managed by a Water Users Association (WUA). These schemes operate a flat rate payment structure which is paid monthly.

The single community, Idoselo, which had strong separation which did not employ unit based pricing highlights other factors affecting this separation. The main factor was thought to be the size of the group to be collected from. Idoselo is a very small group making follow up easier, whereas the groups with weak separation managed between 1 and 22 villages.

Of the 3 schemes with no separation 2 were hand pumps and 1 was a gravity scheme. They employed three different management styles: Water Users Association (WUA), Water Users Group and a Water Committee. This would suggest that there are other factors affecting this issue of separation.

Separation of roles between Asset Holding Authority (AHA) and Provider

Figure 5.3 – Separation of roles between AHA and Provider



None: No contract between AHA and Provider

Weak: either contract or bond exist

Strong: both bond and contract exist

Figure 5.3 shows that the separation of roles between Asset Holding Authority (AHA) and the Provider is much less well defined than between the Purchaser and Provider. Of those surveyed 63% of projects had no contract between the AHA and the provider. This included all but one of both the hand pump schemes and the gravity schemes. None of the schemes which were being managed by water committees or water companies had a contract. In the weak section there were two pump and engine schemes, one gravity and one hand pump scheme and a variety of management types.

Of the schemes which had both a bond and a contract 100% used a pump and engine and were managed through an Agent or Private Operator. This would suggest that introduction of a small scale private sector player greatly increases the likelihood of roles being better defined and formalised.

Regulation

The study to assess the level of regulatory activities focused on three areas: External Regulation, Internal Regulation and Voluntary Regulation. The criteria in Table 5.1 below were used to assess the level of participation of the community within regulatory processes.

Table 5.1 – Criteria used to measure participation in regulatory processes

Regulatory Mechanism	*Indicators of Regulation*
External regulatory mechanisms *(External regulation at District level)*	MoU between village and district government (with some sort of follow up)
	Formally registered/Licensed organization
	External audit reports
	External assessment of performance
	League table of schemes
Entity regulatory mechanisms *(Self regulation at village level by the village government)*	Contracts
	Constitution
	Internal audit reports
	Minutes of meetings
	Report to the general assembly
	Public posting of income and expenditure
Voluntary regulation *(Participation of consumers, water users or anyone within the community apart from the service provider can be a voluntary regulator)*	Vulnerable people served
	Approving income and expenditure
	Setting and reviewing price
	Efficiency of service (User satisfaction)
	Users can vote out either the provider or the managers of the AHA?

Potential voluntary regulators were not aware of their roles and rights within and over the projects. Where water management groups had legal status, there was limited understanding of the roles of internal regulators (Village Government) and the management group. Those Village Governments who did understand their regulatory role met with resistance from the management committees.

These findings highlight the need for better understanding of the roles that each stakeholder plays in regulating the scheme. To achieve this, capacity building will be required with all stakeholders. This should include training each group in the use of relevant regulatory tools, as well as clearly defining their roles within the process.

5.5 Conclusions and Recommendations

Sustainability of Community Own Water Supply Organisations (COWSOs) in rural area is still a challenge. This problem is highly associated with lack of finance especially for big maintenance and replacement, lack of technical personnel at project level, inaccessibility of spare parts at a very low convenient places - whether due to the fact that water supply related spare parts are not fast moving things in the market or due to the outdated technologies of the old schemes of which spares are no longer in the market and also the existing regulatory framework which does not give room for smooth follow-up at all levels.

Overall, this study had observed that the problem of sustainability is much linked to governance issues. This observation conform with the two hypotheses of the study that; (i) Separation of roles/power is necessary for Sustainability and (ii) Great participation and better regulation are the key factors for Sustainability.

Further more it was found that registration of COWSOs alone can not guarantee sustainability if all groups within the community – especially Asset Holding Authorities and Regulators – are not clear of their roles and responsibilities. A lack of awareness on regulation and the separation of roles was found to be a major factors that constrained effective participation. It was found that Asset Holding Authorities (owners as well as voluntary regulators) were not aware with most of the issues which they are not directly involved. Where COWSOs had separate legal status, village governments were not sure of what they are suppose to be doing and for those few village governments which have an idea of their roles they experienced a number of resistant from management committees.

Clearly defined stakeholder roles, greater participation and proper regulation are all essential to achieving sustainability. These factors are currently being overlooked when designing water supply projects. The simple registration of a management system with the National Government or District Council does not guarantee sustainability. Community participation is vital and the major barrier to this is a lack of properly defined roles at the community level, especially for the AHA and the regulators. Service delivery programs should not only aim to facilitate the choice of management model but also to facilitate the clear definition of roles and responsibilities between the stakeholders. This would mean increasing expenditure for capacity building but would increase the likelihood of the long term sustainability of the project.

The study found that there is need for better regulatory environment for rural water supply schemes. In particular, nine possible regulatory mechanisms were identified to be considered when designing any regulatory framework:

1. Memorandum of Understanding (MoU) with district (with some sort of follow up)
2. External audits
3. External assessments of performance
4. Service contracts
5. Internal audits
6. Minuted public meetings
7. Reports to public assembly
8. Transparent setting & reviewing of tariffs
9. A mechanism for water users to vote out the provider/manager of the AHA