

MANAGEMENT AND REGULATION FOR SUSTAINABLE WATER SUPPLY SCHEMES IN RURAL COMMUNITIES

Diana Nkongo

June 2009

WaterAid Tanzania

PO Box 33759, Dar es Salaam
Tel: 022 270 1609
Fax: 022 277 5306
wateraidtz@wateraid.org

Abstract

This study examined a range of different management options by comparing the underlying factors of management that were possible determinants of scheme sustainability. The study looks at what has happened to 30 rural water supply schemes in 10 districts. Purposive criteria rather than random choice were used for site selection based on the type of management option and technology in use.

The study was largely qualitative using semi structured meetings, focus group discussions (FGDs) and observation. At each study site, a maximum of 4 FGDs were carried out; two FGDs with water users (1male and 1female), 1 FGD with management committee and the last one with the village government. The content of discussion was structured in two parts; 1st part is on community perception with regards to sustainability of their water scheme and 2nd part on degree to which roles of people using and managing the scheme were separated. The analysis of findings was done using SPSS and Excel softwares.

In general, study found that long term sustainability of rural water supplies schemes is still a big challenge and 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, the existing regulatory framework and lack of awareness on Separation of Roles within members of community.

The study also observed that registration of COWSOs is important but not necessarily way toward scheme sustainability. This has to go in line with awareness on roles and responsibilities of different groups within a community.

Finally, the study identified a range of regulatory issues that have to be included when designing any regulatory framework. That include; MoU with district (with some sort of follow up), external audit report, external assessment of performance, contract, internal audit report, minutes of meetings, report to general assembly, setting & reviewing price and Users vote out provider or manager of the AHA.

Author's Acknowledgements

I am extremely grateful for the hospitality, support and information offered by the participants in this study. I would also like to thank Rehema Tukai, Dominick de Waal and Ben Taylor of WaterAid Tanzania for their advice, guidance and support throughout the study.

© WaterAid Tanzania 2009.

Table of Contents

1. Introduction and Background	1
2. Methodological approach.....	3
2.1 Introduction.....	3
2.2 Scoring	4
2.3 Coding the Results	4
2.4 Interpreting the results.....	4
2.5 Data Processing.....	4
2.5.1 Sustainability Snap Shot:.....	4
2.5.2 Separation of Roles	5
3. Case studies	8
3.1 Shinyanga Case.....	8
3.1.1 Background Data	8
3.1.2 Site selection	9
3.1.3 Sustainability	9
3.1.4 Separation of Roles	10
3.1.5 Key findings and conclusions	11
3.2 Morogoro, Iringa and Ruvuma Case.....	11
3.2.1 Background Data	11
3.2.2 Site selection	12
3.2.3 Sustainability	12
3.2.4 Separation of Roles	13
3.2.5 Key findings and conclusions	14
3.3 Mpwapwa Case	14
3.3.1 Background Data	14
3.3.2 Site selection	15
3.3.3 Sustainability	15
3.3.4 Separation of Roles	15
3.3.5 Key findings and conclusions	16
3.4 Rufiji Case	16
3.4.1 Background Data	16
3.4.2 Site selection	17
3.4.3 Sustainability	17
3.4.4 Separation of Roles	18
3.4.5 Key findings and conclusions	18
3.5 Dodoma Rural Case	18
3.5.1 Background Data	18
3.5.2 Site selection	19
3.5.3 Sustainability	19
3.5.4 Separation of Roles	19
3.5.5 Key findings and conclusions	20
4. Overall Analysis and Research Findings.....	21
4.1 Sustainability.....	21
4.2 Separation of Roles.....	22
5. CONCLUSION.....	25
References.....	26
Appendix I – Study Check List	27
Appendix II – AHA-Provider Relationships in Shinyanga	30

List of Tables, Boxes and Figures

Table 1: Sample coding.....	4
Table 2: Percentage of Rural households in Shinyanga using different sources of drinking water.....	8
Table 3: Summary of study sites in Shinyanga.....	9
Table 4: Summary of the study sites in Morogoro, Iringa and Ruvuma	12
Table 5: Amount of money in reserve.....	13
Table 6: Summary of the study sites in Mpwapwa.....	15
Table 7: Summary of the study sites in Rufiji.....	17
Table 8: Summary of the study sites in Dodoma Rural.....	19
Table 9: Perception on knowledge and participation by focus groups.....	24
Box 1: Study hypotheses	2
Box 2: Example of Financial calculation; Zanzui WUG	9
Box 3: Example of Financial calculation; Rudewa Gongoni/Kingiti WSC	13
Figure 1: COWSOs Perceptions on Sustainability.....	22
Figure 2: Separation of roles between Purchaser and Provider.....	23
Figure 3: Separation of roles between AHA and Provider	24

List of Acronyms

AHA	Asset Holding Association
COWSO	Community Owned Water Supply Organisation
DWE	District Water Engineer
DWP	Distribution Water Point
FGD	Focus Group Discussion
GoT	Government of Tanzania
HH	Household
Max	Maximum
MoU	Memorandum of Understanding
O&M	Operation and Maintenance
PEMS	Pump and Engine Maintenance Scheme
SoR	Separation of Roles
SPSS	Statistical Package for Social Scientists
SSS	Sustainability Snap Shot
SWOT	Strength Weakness Opportunity Threat
VEO	Village Executive Officer
VG	Village Government
VWC	Village Water Committee or Water Committee
WHO	World Health Organization
WSC	Water Supply Company
WUA	Water User Association
WUG	Water User Group

1. Introduction and Background

Over a long period of time i.e. in late 1960s and 1970s the government assumed responsibility for the financing and implementing both construction and operation & maintenance of the water schemes. People were being supplied with free water as a basic social good [5].

In 1971, following the party declaration that all rural people should have easy access to safe water before 1991-this policy- together with other rural development policies based on Arusha Declaration of 1967- attracted support from numerous donors. Since 1971 donors have been involved in the financing and implementation of the rural water supplies. Donors' built and then transferred infrastructures to the regional water engineers who had no budget to operate and maintain those schemes, as the results most of the schemes collapsed [4].

During the 1980s community participation was brought by most of donors and user fees for operation and maintenance was reintroduced. These measures- all together- were meant to 'fix' sustainability. But did these measures fix sustainability? Each donor developed their own version of community participation and scheme management. For example, the Dutch through a consulting company DHV Company financed the construction of hand-pumped wells in Shinyanga region and rehabilitation of both gravity and piped schemes in Morogoro region and introduced community management solutions for small schemes referred to as 'Water Users Groups' and for big schemes referred to as 'Water Supply Companies'. Denmark through DANIDA who covered Iringa, Mbeya and Ruvuma regions, financed the rehabilitation of gravity schemes and introduced the 'Water Users Association' model of management. Other donors like FINIDA in Lindi & Mtwara, SIDA in Mwanza, Mara & Kagera, NORAD in Kigoma & Rukwa and WATERAID in Dodoma worked mainly with village water committees.

In 1991 the government launched the 1st National Water Policy. The policy focused on participation and cost sharing in the construction, operation and management of community based domestic water supply systems. At the operational level, the policy recommended the establishment of village water committees and water funds [3]. In late 90s it was noted that the recommended management practice i.e. village water committees was not the best practice since many of the schemes had problems and some collapsed completely. It was also realized that a group scheme management should only be allowed to collect funds if they are a legally registered organizations or after obtaining a special permit from the District Commissioner [5].

In an attempt to resolve this muddle, Ministry of Water and Livestock Development took some initiatives and came up with six management options, mainly based on the theory and not practices-and has never been evaluated- also the transition to those options is still very slow. A ministry report shows that there are 5000 Village Water Committees and 1000 other autonomous water users' entities.

This study on 'Regulation and Sustainability' – 20 years on – looks at what has happened to 30 rural water supply schemes: which parts of the models that was introduced works? What are the successes and failures? What are the management problems and challenges and how are these problems rooted in the existing institutional framework? Also it goes further on assessing (i) if communities are generally adequately informed of the technical, legal and financial processes to be able to effectively manage their schemes? And (ii) if the regulatory process in practice is similar to the theoretical one?

The study was the first of its kind. It moved away from conventional assessments where project impacts are evaluated mainly in terms of mechanical measures of inputs and outputs. Instead, it involved different social groups, and measured impact using largely qualitative methods supported by some quantitative coding of responses.

The study was a two-way learning exercise in which both communities and study teams developed a better understanding of the local and national issues relating to the management of community owned water supply organisations. It raised issues regarding actual problems and provides with opportunities for learning and exchange of ideas on how better can projects be managed.

While the study examined a range of different management options, the aim was not to compare and contrast these options. This is because each and every village has in effect adapted – for better or worse - the original or idealised model that was set up resulting in a blurred spectrum of management practice with little relation to the original models.

The study instead compared the underlying factors of management that were possible determinants of scheme sustainability.

Box 1: Study hypotheses

1. Separation of roles/power is necessary for Sustainability.
Question: To what extent does separation of roles determines Sustainability?
2. Greater participation and better regulation are the key factors for Sustainability.
Question: To what extent do participation and regulation determines Sustainability?

2. Methodological approach

2.1 Introduction

The research covers total of 30 sites in 10 districts. Purposive criteria rather than random choice were used for site selection based on the type of management option and technology in use. Sample sizes varied significantly. For example, for the Rufiji case, six villages were selected all from one district (Rufiji District). For the Shinyanga case, the six schemes selected were from four different districts.

The research was largely qualitative using semi structured meetings, focus group discussions (FGDs) and observation. At each research site, a maximum of 4 FGDs were carried out; two FGDs with water users (1 male and 1 female), 1 FGD with management committee and the last one with the village government. Discussions involved a total of 113 focus groups; 30 groups of women, 29 groups of men, 28 groups of management committees and 27 groups of village governments.

Due to unavoidable circumstances we failed to conduct discussions with 6 groups due to different reasons. For example a male group of Mshikamano WUG in Meatu district was not interested with any water related discussion because of the unfulfilled long term promise they have been given all along on the provision of safe and clean water. What impact could this have for the future generations?

The content of FGDs was structured in two parts; 1st part is on community perception with regards to sustainability of their water scheme and 2nd part on degree to which roles of people using and managing the scheme were separated. The indices derived from these discussions were then coded and used to test the two hypotheses presented in Box 1.

Information was collected based on the following:

- Community perception with regards to sustainability (*Sustainability Snap Shot*)
 - **Finance:** if the community has enough funds to carry out repairs and/or rebuild
 - **Technical skills:** if the community has easy and long term access to the skills to carry out repairs
 - **Equipment and Spare parts:** If the community has access to the necessary equipments and spare parts for their project

- Degree to which roles of people using and managing the scheme were separated (*Separation of Roles*)
 - **Purchaser – provider:** Measures community ability and willingness to pay for the water service
 - **Asset Holding Authority (AHA) and Provider:** Assessing contracting procedures, if they exist and how they work
 - **Regulation & Participation:** If community is being involved and if there is a clear evidence of working regulatory mechanism. This sub section was assessed based on 16 issues thought to be importance when implementing the regulatory system (See Appendix I).

The idea of including 'Separation of roles' in this study came after Participatory Video documentation of 'The Mpwapwa video'. From the video, many of the issues raised were in one way or another linked to roles and responsibilities of different groups within a community and their participation in regulating their water schemes. In the video, we noted water service to be more reliable and sustainable where there is a private provider, and at the same time community concern noted to be involved and more free to ask in case they have any doubt or not satisfied compared to where the provider is a village water committee who is not bound by any contract or bond. It is from this angle where the thought of assessing how the roles and responsibilities were separated among different groups within a community first started. Therefore, four groups were identified namely; Purchaser, Provider, Regulator and AHA. Also, assessment on how they relate to each other was analyzed.

2.2 Scoring

During this exercise, each group was asked to give a brief historical background of their project. After the history the research team asked questions about the three phrases in each category starting with the Sustainability Snapshot followed by the Separation of Roles. For every answer given, either being 1,2 or 3 being 'No', 'Yes' or 'Not known' detailed explanation was given and it was documented as well. Finally, the way forward on how the situation can be improved was discussed. The scoring was structured in such a way that 1 is the worst scenario and 3 is a desired situation (See Appendix I).

2.3 Coding the Results

At the end of the process the Sustainability Snapshot and the Separation of Roles looked like in table 1 below. This is an example from one discussion group. Details on the sub categories and questions asked can be found in appendix I.

Table 1: Sample coding

A. Sustainability Snapshot (SSS)		B. Separation of Roles (SoR)	
Technology	Borehole	Management Model	Private operator
Finance	2	Purchaser- Provider	3
Technical skills	1	AHA- Provider	2
Spare and equipment	1	Regulation and Participation	1

2.4 Interpreting the results

With the results on table 1 above one can easily conclude that lack of technical skills and availability of Spare parts & equipments are the issues which need serious measures, also regulation and participation needs to be improved.

2.5 Data Processing

Data were processed using SPSS and Excel computer programmes. Some times by transferring SPSS files to Excel where possible or by working with the two programmes separately. This was to be done that way due to the nature and data collection method used which had many variables and relied more on qualitative information.

Some calculations were made to come up with summarised quantitative data for a COWSO from FGDs conducted (*maximum of four FGDs per COWSO*). Formulae for the computations are as shown below:

2.5.1 Sustainability Snap Shot:

$$1. \text{ [COWSO Score]}_{\text{Finance /Technical skills /spare parts}} = \frac{[(\text{Sum of FG scores}) / (\text{Sum of maximum possible scores})] \times [\text{Maximum possible score}]$$

Note:

- FG score not equal to Zero are the one to be considered in this calculation. In this data set ZERO means missing data.
- 3 is the Maximum possible score for each variable, 9 overall

Example:

COWSO/Focus Group	Focus Group score		
	Finance	Technical skills	Spare parts
Idoselo WUG:			
Women	2	0	2
Men	2	2	2
Management committee	2	2	1
Tanangozi WUA:			
Women	0	3	1
Men	0	3	1
Management committee	3	3	1
Village Government	3	3	1

COWSO Score:

(Idoselo WUG) _{Finance} = $[6/9] \times 3 = 2$
(Idoselo WUG) _{Technical skills} = $[4/6] \times 3 = 2$
(Idoselo WUG) _{Spare parts} = $[5/9] \times 3 = 1.67$

(Tanangozi WUA) _{Finance} = $[6/6] \times 3 = 3$
(Tanangozi WUA) _{Technical skills} = $[12/12] \times 3 = 3$
(Tanangozi WUA) _{Spare parts} = $[4/12] \times 3 = 1$

2. Sustainability Snap Shot (SSS)_{Cowso} :

$$= [(Cowso \ score)_{Finance} + (Cowso \ score)_{Technical \ skills} + (Cowso \ score)_{Spare \ parts}] / 9$$

Example:

$$(SSS)_{Idoselo \ WUG} = (2+2+1.67)/9 = 0.63$$

$$(SSS)_{Tanangozi \ WUA} = (3+3+1)/9 = 0.78$$

The calculated (SSS)_{Cowso} data were then used to analyze COWSOs perceptions on sustainability. But, first they were categorized as follows:

- If (SSS)_{Cowso} is between 0.99-1.66 that falls into **category 1** meaning 'Finance/Technical skills/Spare parts not available for maintenance when needed'
- if (SSS)_{Cowso} is between 1.67-2.33 that falls into **category 2** meaning 'Finance/Technical skills/Spare parts available for minor maintenance'
- if (SSS)_{Cowso} is between 2.34-3 that falls into **category 3** meaning 'Finance/Technical skills/Spare parts available and sufficient for big maintenance'.

2.5.2 Separation of Roles

3. [Purchaser-Provider]_{Cowso score} : The score on this was based on research team reflection after the focus groups discussions of every COWSO as follows:

1. people don't pay for water service
2. people some times pay for water service
3. People always pay for water service at a point of collection or every month (excluding most vulnerable people).

4. [AHA-Provider]_{COWSO score} : Scoring was based on research team reflection after the focus groups discussions of every COWSO as follows:

1. there is no contract - meaning there is 'no separation of role'
2. either contract or bond exist - meaning there is 'weak separation of role'
3. Both contract and bond exist - meaning there is 'strong separation of role'.

5. [Regulation and Participation]_{COWSO score}: The Cowso score on regulation and participation was based on the averages of focus groups scores. The scores were -1, 0 or 1. The averages were based on 0 and 1 but not -1. See example below:

Example:

Regulatory mechanisms	Ismani WUA				COWSO score
	Focus Group score				
	W	M	MC	VG	
MoU	-1	1	1	0	$(1+1+0) / 3 = 0.66$
External auditing	-1	1	1	-1	$1+1 / 2 = 1$
Internal audit reports	0	0	1	0	$0+0+1+0/4 = 0.25$
Minutes of meeting	1	1	1	1	$(1+1+1+1) / 4 = 1$

6. [External Regulation]_{Focus group score}
 = If [Max (MoU, registration, external auditing report, external assessment of performance, league table of schemes) > 0, 1, 0]

Example: Luguru WUG

Focus group	MoU	Registration	External auditing report	external assessment of performance	league table of schemes	External Regulation
Women	-1	0	-1	-1	0	0
Men	0	0	0	1	0	1
Management committee	1	0	0	1	0	1
Village government	1	-1	0	0	-1	1

7. [Entity Regulation]_{Focus group score}
 = If [Max (contract, constitution, internal auditing report, minutes of meeting, report to general assembly, public posting of income and expenditure) > 0,1,0]

Example: Luguru WUG

Focus group	Contract	Constitution	Internal auditing report	Minutes of meeting	Report to general assembly	Public posting of income and expenditure	Entity Regulation
Women	1	0	-1	0	0	0	1
Men	0	0	0	0	0	0	0
Management committee	1	0	0	0	0	0	1
Village government	0	0	0	0	0	0	0

8. [User Regulation]_{Focus group score}
 = If [Max (Vulnerable people served, approving income and expenditure, Setting and Reviewing price, vote out AHA or provider) > 0, 1, 0]

Example: Luguru WUG

Focus group	Vulnerable people served	Approving income and expenditure	Setting and Reviewing price	Vote out AHA or provider	User Regulation
Women	1	0	0	0	1
Men	1	0	0	0	1
Management committee	1	0	1	0	1
Village government	0

Note: . means a missing data

9. [External Regulation]_{scheme score}
 = average of [External Regulation]_{Focus groups scores}
 = average of [External regulation scores for Women, Men, Management committee and village government focus groups]
 (See example below)

10. [Entity Regulation]_{scheme score}
 = average of [Entity Regulation]_{Focus groups scores}
 = average of [Entity regulation scores for Women, Men, Management committee and village government focus groups]
 (See example below)

11. [User Regulation]_{scheme score}
 = average of [User Regulation]_{Focus groups scores}
 = average of [User regulation scores for Women, Men, Management committee and village government focus groups]
 (See example below)

Example: Luguru WUG

	Focus group score				Scheme Score
	Women	Men	Management committee	Village government	
External Regulation	0	1	1	1	= (0+1+1+1)/4 = 0.75
Entity Regulation	1	0	1	0	= (1+0+1+0)/4 = 0.5
User Regulation	1	1	1	0	= (1+1+1+0)/4 = 0.75

12. [Overall Regulation]_{scheme score}
 = ([External Regulation]_{scheme score} + Entity Regulation]_{scheme score} + [User Regulation]_{scheme score})/3

3. Case studies

3.1 Shinyanga Case

3.1.1 Background Data

Shinyanga Region is situated in the northern part of Tanzania between 2° and 5° southern latitude and 31° and 35° eastern longitude; covering 50,781 Sq. Km. The area has semi-arid land with tropical climate and average annual rainfall of between 600mm and 900 mm. The wet season is usually from November to beginning of May.

Main economic occupations include; subsistence farming, livestock-keeping and informal sector. Main crops in the region include Cotton, tobacco, paddy, Maize, beans, cassava and sweet potatoes. The majority of the people in the study area fall under low-income group of people who earn their income from small scale farming of Cotton, Tobacco, Paddy, Maize, Beans, Cassava and Sweet potatoes only few depends on livestock-keeping, selling of food stuffs and other domestic stuffs in small shops.

Natural sources where water is readily available throughout the year are scarce. Rivers do not have surface discharges during most of the dry season, lakes and springs are almost non-existent. As per 2002 census data, majority of the rural households rely on unprotected sources and less than 10% of households rely on piped sources except for Maswa and Shinyanga Urban which have coverage of between 10% and 20% which again is still very low (see table 2).

Quality of water differs from place to place. Physical property of surface water such as colour and turbidity are bad. However these factors are not relevant to the health of people/customer. Some bacteriological and organic pollution is likely and serious in a large number of unlined shallow wells and hand dug water holes in riverbeds. Toxic elements are absent in the groundwater, but high fluoride and salt contents are the main hazards of the groundwater in the east of Maswa and Kishapu where the fluoride contents is above the allowable i.e. 5-10ppm, whereas elsewhere in the Region it is below 5ppm. In the areas mentioned above the groundwater at shallow depth is locally salty and the conductivity of the deep groundwater generally suggests salts contents exceeding the W.H.O limit of 1500ppm. For deep groundwater, exploitation is recommended by means of boreholes with depths of 10m or more. In general depth may vary from 20-100m. Shallow ground water can be exploited by means of shallow wells with depths 4m to 10-15m. River wells drawing water from sandy riverbeds with depth up to 2-2.5m [10].

Table 2: Percentage of Rural households in Shinyanga using different sources of drinking water

Administrative area	Population	% coverage			
		Piped	Protected	Unprotected	Other
Bariadi	572,929	6.9	43.5	49.5	0.0
Maswa	279,466	12.7	19.0	68.3	0.0
Shinyanga Rural	275,357	0.6	26.0	69.1	4.3
Kahama	528,840	3.0	29.6	67.3	0.1
Bukombe	355,706	8.2	19.1	72.5	0.1
Meatu	241,389	5.4	30.6	63.8	0.2
Shinyanga Urban	60,755	19.3	41.3	36.9	2.5
Kishapu	226,136	3.2	6.4	90.3	0.1
Shinyanga Region	2,540,578	6.0	27.6	65.7	0.6

Source: 2002 Census

3.1.2 Site selection

Shinyanga was selected as one of the case study area based on the management option i.e. 'Water Users groups'. This model of management was brought by the Dutch- who funded- the construction of 714 hand-pumped wells through their DHV Company from 1993 till 2001. Their plan of operation placed among other things, greater emphasis on the establishment of an adequate management system for O&M of the installed water and sanitation facilities. Based on the experience and given the realities of rural life where people's social cohesion and identity are usually determined by their proximity, a cluster of between 25 and 50 families who have lived within the same village for a long period of time was seen as an appropriate option to form a more responsible local organization to own and manage the improved water point sources. The approximation of full coverage in a village in Shinyanga is one water point for 25 to 50 families (about 200 to 250 people) [9].

Table 3: Summary of study sites in Shinyanga

Entity Name	Idoselo	Ngundangali	Mwandoya-Igobe	Mshikamano	Zanzui	Luguru
Management practice	WUG	WUG	WUG	WUG	WUG	WUG
Type of Source	Shallow well	Shallow well	Borehole	Shallow well	Borehole	Borehole
Technology	Hand Pump	Hand Pump	Pump and Engine	Hand Pump	Submersible pump	Submersible pump
Functioning?	Yes	Yes	Yes	Yes	Yes	No
Other water sources available	None	Traditional wells	None	Seasonal river	None	Stream

3.1.3 Sustainability

Financial - All water schemes visited had some funds for operation, but not for big maintenance or replacement. For piped schemes situation revealed was worse, even though it is believed they have high daily turnover compared to other schemes. Take an example of financial calculation of Zanzui (see box 2). Calculations shows that the annual turnover minus salaries is 4,272,000/= : scheme had no major maintenance for the past four years and since year 2000 community started paying for the water service, this implies that at least they should have a total profit of around 17milions, instead they only have 300,000/= as their bank balance. Where is the rest of money going?

Box 2: Example of Financial calculation; Zanzui WUG

Zanzui village has piped scheme with a submersible pump. The scheme is estimated to be serving around 270 Households, payment structure is on unit basis where by a 20 litre bucket is being sold for Tshs 20/=. Zanzui community started to pay for the water service from year 2000. Daily expenditure is estimated to be around 4000/= (this covers diesel and allowance for a person in charge). Monthly expenditure includes Tshs 10,000/= which is being given to a watchman. According to them they have bank balance of Tshs 300,000/=. The profit for the four years starting 2000 is calculated as follows:

Estimated no. of buckets required for a HH of 5 based on the Singida impact study: 3 buckets per HH per day

$$\{[(\text{No. of HH} \times \text{No. of buckets per HH} \times \text{price per bucket}) - \text{Daily expenditure}] \times \text{No of days in a month}\} - \text{Salary for a watchman} \times 12 \text{ months}$$

$$\{[(270 \times 3 \times 20) - 4000] \times 30 \text{ days}\} - 10,000 = 4,272,000 \text{/= annual profit}$$

$$4,272,000 \text{/= annual profit} \times 4 \text{ year} = 17,088,000 \text{/= Estimated profit for four years}$$

Technical skills – With regard to technical skills, at least every scheme was found to have some technical personnel. However the technical staff available found to differ on their level of capacity and knowledge from one another. Among six projects only Mwandoya-Igobe piped scheme and Zanzui piped scheme were found to have well qualified and experienced technical staff who were government employees working as technicians under the water department before they were made redundant after decentralization process.

Equipment and Spares parts - Small and inexpensive equipments like spanners are available at village level but expensive spare parts and equipments are not found. Although even the availability of those small equipments has to be questioned-since it is not at the project level. These equipments are with few individuals who own them privately and to our understanding every pump/engine has to come up with its own tool box. Other spares are bought outside the village - at district or regional headquarters. It is difficulty to conclude where exactly one can get spares, this depend much on the economic activities at a certain locality. E.g. it is easy for projects within Bariadi district to get some of the spares like bushes, oil filters and valves at the district head quarter than the project located at Shinyanga rural district.

All the groups interviewed complained about the availability of spare parts. This was seen as one of the main obstacles to sustainability of their water projects. Suggestions were given on how the existing situation could be improved; (i) selling point for spare parts to be introduced at a very possible and nearest point to most of the villages at a certain locality and (ii) local entrepreneur should be encouraged to sell some of the important spare parts like oil filter, valves etc.

3.1.4 Separation of Roles

Results show 'Separation of Roles' to be very weak. Out of the three components of sustainability, relation between 'Purchaser-Provider' appears to be very strong in 4 schemes out of 6 schemes. Ngundangali and Mshikamano both being hand pump schemes have weak relation between Purchaser and Provider. Reason may be because Ngundangali offer free water services and still under the village water committee management while for Mshikamano there is a mix feeling between community members; there is a group which pays for every unit of water they receive from the tap while another group is allowed to fetch first six buckets free of charge daily because they are registered members of the user groups.

'AHA-Provider' and 'Regulation and Participation' situation reveled was worst. Common findings and issues found were:

- i. Communication gap between the management committees and other groups. Inconsistency on groups' response of the same entity can be taken as an example (see appendix II),
- ii. Lack/poor contracts and bonds between AHA and Providers: Mwandoya-Igobe had bond with treasurer. The treasure has been bonded by a rich man within the community who will be responsible in case he disappears with group's water fund. For contract; Only Luguru and Idoselo had contracts. Idoselo had a written management contract with management committee while Luguru had a written service contract with the service provider (private operator). The Luguru contract was of poor standard which resulted to the failure for the private operator to provide service as it was agreed. Contract says "...Tshs 1000/= per month will be charged for private connection and Tshs 500/= per month at public water points. Tshs 10/= per bucket will be charged for those who would not afford to pay in monthly basis..." How feasible is this in relation to sustainability of the service, especially for the piped scheme with a submersible pump like the one in Luguru?
- iii. Insufficient regulation and participation by both parties involved. E.g. voluntary regulators (communities) are not clear of what power they have over their projects and how to go about it. However, there were some few individuals with clear understanding on their roles but they do lack support from other community members. "A young guy called Gembe Mome in Zanzui village wanted to know income and expenditure of their group. But due to village government's

bureaucracy and lack of support from other group members he failed. Community saw him as a lunatic” FGD- Women, Zanzui WUG, Bariadi District in Shinyanga.

3.1.5 Key findings and conclusions

Despite the policy of ‘community participation’, still communities are not participating fully especially in resolving and regulating their water related problems/issues, this give chance for the management committees to misuse the water funds. Also due to difficulties /unavailability of spare parts, lack of management skills and unwillingness to pay for the service - sustainability will still be a problem. However in groups like Idoselo and Mshikamano; they have managed to come up with ‘revolving funds’ also known as ‘Ifogongo’ as another way of raising their water funds while Zanzui WUG had come up with ‘Welding business’ as extra income generating activity. The Ifogongo seem to work out very well and motivate others to join for the Idoselo WUG, while for the Mshikamano WUG it’s only the management committee which is benefiting from the Ifogongo.

In general, user groups have seen to be more appropriate for small groups of people managing hand pumps and not for the piped schemes especially those with more than one distribution point like Mwandoya-Igobe. Registration of water users groups is at district level which is quite good, however registration procedures are unclear: user groups have no constitutions and their registration is based on ‘Memorandum of Understanding’ which is not a legal document.

3.2 Morogoro, Iringa and Ruvuma Case

This case study covers three districts from three different regions: Kilosa district in Morogoro, Iringa rural district in Iringa and Namtumbo district in Ruvuma. Two schemes were assessed in each of the three districts.

3.2.1 Background Data

Kilosa district is situated in the Northern part of the Morogoro Region between 36 and 38 east of Greenwich and between 6 and 8 south of the equator. The district composed of alluvial flood plains of the Mkata and Wami Rivers. In the south-eastern part consists of the flood plain of Ruvu and Mgeta Rivers. The area belongs to the tropical rain climate zone which is the main characteristics of the region with rainfall variation from 1200mm in the highlands plateaus to 600mm in lowlands periods. Main economic occupations in the district include; small scale farming (Paddy, Maize, Cotton and beans), livestock-keeping and informal sector [2 & 13].

Iringa Rural and Namtumbo district are found in Iringa and Ruvuma region respectively. These regions- both situated in the southern highlands in Tanzania. The altitude of the regions ranges from about 500 meters to more than 2,500 meters above sea level. The various altitudes and types of soil influence the type of vegetation and rain pattern significantly. The main economic activities are subsistence agriculture and to a lesser extent commercial agriculture. The main crops cultivated are maize and tobacco [11].

Kilosa district is fairly well endowed with surface water resources. A large number of rivers and streams are perennial and dependable water sources throughout the year. Groundwater resources, which are easily exploited because of the high ground water table, are found in a number of areas, i.e. alluvial river valley and some areas with swamp deposit. Quality of water in Kilosa appears to be generally fairly good as far as physical and chemical aspects are concerned. Toxic substances are absent. The parameters like fluoride & nitrates appeared to be in a low or acceptable concentration [2].

Like for Kilosa District, Iringa and Ruvuma also do not have water problems. These areas are covered by surface water-permanent rivers and streams with absence of toxic substances like fluoride.

3.2.2 Site selection

Selection of the sites was mainly based on the type of management practice. In Iringa and Ruvuma 'Water Users Association' were assessed while in Kilosa study assessed 'water supply companies'. For the Water supply companies; the selection went further by selecting those within a true rural community i.e. those situated at a very natural locality where the company income/revenue is only being generated from its domestic users unlike Ikela Water Supply Company which gets more than 60% of its revenue from the Kilombero Sugar Company.

Same trend, as it was for Shinyanga, donors imposed models of management. This time the Dutch - through their DHV Company established the Water supplies companies in Morogoro and Denmark- through DANIDA came up with 'Water Users Associations' in Iringa and Ruvuma.

In 1995, Dutch spearheaded the establishment of autonomous rural water companies of which 21 out of 22 were then registered as private companies limited by guarantee. As that was on an experimental footing, the program decided in January 1999 to concentrate its support and carry out SWOT analysis to only seven WSCs. As the main conclusion of the SWOT studies carried out was that sustainability is at risk for most companies in the Morogoro region [8].

DANIDA, in 1996 signed an agreement with GoT for Phase IV of the Water project with the main focus on strengthening the management of water user for O&M of the water supplies schemes. And as part of the process water entities were encouraged to take up responsibilities for their schemes and obtain legal registration. Danish assisted 12 schemes to formulate their constitutions and by-laws and become legally registered Water Users Associations [11].

Table 4: Summary of the study sites in Morogoro, Iringa and Ruvuma

Entity Name	Kimamba	Rudewa Gongoni/Kingiti	Ismani	Tanangozi	Njaramatata	Libango
Management practice	Water Supply Co.	Water Supply Co.	WUA	WUA	WUA	WUA
Location	Morogoro (Kilosa district)		Iringa (Iringa rural district)		Ruvuma (Namtumbo district)	
Type of Source	Borehole	Borehole	Gravity scheme	Gravity scheme	Gravity scheme & Shallow wells	Gravity scheme
Technology	Submersible pump	Submersible pump	Gravity	Gravity	Gravity & Hand Pumps	Gravity
Functioning?	Yes	Yes	Yes	Yes	Yes	Yes
Other water sources available		big stream	None	big stream	None	None

3.2.3 Sustainability

Financial - Among the six schemes none had enough funds to sustain their water projects, despite of providing services for many years. Piped schemes both managed by water supply companies have bad performance, main reason being the existing tariff structure-monthly flat rate of between 100/= Tshs and 1500/=Tshs. This is very little to cover for day to day O & M.

Table 5: Amount of money in reserve

Entity	Population served	Bank balance (Amount served in Tshs)
Libangu WUA	8577 (According to 1999)	6000.00
Kimamba Water supply Co.	More than 10,000	27,569.75
Rudewa Gongoni/Kingiti Water supply Co.	5000	70,094.00
Njalamatata WUA	23,000	500,000.00
Ismani WUA	63,000 (22 villages)	3,000,000.00
Tanangozi WUA	11 villages	2,500,000.00

Communities in Kilosa were unsatisfied with the service provided by their respective water supply companies. Community supplied by the Kimamba Water Supply Co. complained on the company failure to pay for electricity bill of around 1,200,000/= Tshs. For Rudewa Gongoni/Kingiti Water Supply Co, community rose concern on the failure of the company to replace a non-functional motor with a new one which costs 1,380,000/= Tshs and made them suffer by not having service for more than three months. On the other hand the Companies board of directors, accused communities for their poor cooperation, and more specifically for their low willingness to pay for the service.

Box 3: Example of Financial calculation; Rudewa Gongoni/Kingiti WSC

Rudewa Gongoni/Kingiti Company is managing a piped scheme which uses electricity. The scheme is estimated to be serving around 326 man powers at public kiosk and 126 private connections. Payment structure is based on monthly flat rate of 300/= Tshs at public kiosk per man power and 1,500/= Tshs for private connections. Monthly expenditure on power supply is around 70,000/= and the cost of buying a new motor is 1,380,000/= Tshs.

$$\begin{aligned} \text{Est. annual revenues collection} &= [(300/= \times 326) \times 12] + [(1,500/= \times 126) \times 12] \\ &= 1,173,600/+ + 2,268,000/= \\ &= 3,441,600/= \end{aligned}$$

$$\begin{aligned} \text{Estimated annual profit} &= 3,441,600/= - (70,000/= \times 12) = 2,601,600/= \\ \text{Cost for a brand new motor} &= 1,380,000/= \end{aligned}$$

From the calculation above one would think that this company had a wealth fund, but in reality it has almost nothing (only Tshs 70,000/= in their bank account). Same applies to Libango WUA which has Tshs 6000/= as their savings while their monthly income is estimated to be 800,000/=. Where is the rest of money going?

Technical skills - In all of the study sites assessed in this case, level of technical skill observed to be available were only for very minor maintenance like replacement of the broken pipe/plumbing.

Equipment and spare parts - Spare parts and its availability is a problem, especially for old schemes like Ismani which was built with asbestos pipes; the association has annual collection of around 10Mil Tshs, but most of it ends up doing repair. All of the sites visited observed to be assisted by DWE's office in this scenario.

3.2.4 Separation of Roles

The assessment shows strong 'Purchaser-Provider' relation in Kimamba and Gongoni/Kingiti both under water supply companies and fairly strong in Ismani and Njalamatata. For 'AHA-Provider' and 'Regulation and Participation' the relation was weak;

- i. All WUAs and Water Supply Companies interviewed none had a written contract between AHA and Provider, and for the case of provider's bond to AHA only Libango had - for the manager and treasurer who are both employees of the association

- ii. Village governments have been left aside, and for the water supply companies the situation is worst: the companies' management committees do not want to be questioned by either AHA or DWE
- iii. Few communities like Kimamba and Njalamatata had recognized their position as AHAs and react over their management committees. *'Kimamba community took its own measure of pushing forward its problems up to the district level after bureaucracy of the ward Baraza on dealing with their problems'*

3.2.5 Key findings and conclusions

WUAs and Water Supply Companies interviewed all have legal status and are not being interfered by village governments. The management committees take this as an opportunity to underrate the power of village governments and AHAs. This is a challenge for sustainability of community water schemes. The entire problem has been caused by unclear understanding on roles and responsibilities.

"Internal auditing is taking place in Ismani and Tanangozi WUAs. In Ismani, it's the association financial committee responsible for auditing while for Tanangozi, it's the manager together with the management committee. In both cases the treasurer is the one being audited. Where is the role of the internal regulator (Village Government)?"

Lack of appropriate monitoring system and inadequate/insufficient regulatory mechanisms both internal and external resulted to most of the management committees to misuse their positions. Take example of Tanangozi WUA where membership is restricted; among a village of 2000 people only 60 are members of the association. One can only become a member if the association committee thinks you are not chaotic or well informed.

"... I wanted to become an association member, but they refused my application. It is common, if they think you are capable and you will always want to know what is going on..." (E. Kalomo, Water User, Tanangozi Water User association, Iringa)

Unlike Shinyanga, the idea of having a selling point at either village or ward level was not seen as a cost effective alternative for easier availability of spare part. This is obvious according to the nature of most of the schemes interviewed i.e. gravity schemes which have infrequency break down.

Complexity of organization structures which are of three levels: (i) DWP/User group level (group of users around one DWP), (ii) middle level (association of users in a sub-village, village or users area) and (iii) Top level (association of users in several DWPs, villages or user areas) contribute to communication gap between the association or company level management committees and water users. These committees usually meet with middle level user representatives who normally do not give feed back to their people at lower levels.

3.3 Mpwapwa Case

3.3.1 Background Data

Mpwapwa district is one of the five districts in Dodoma region, covering 7.479sq. kms. The district lies in the semi-arid zone (characteristic of Dodoma region). Major economic activities are agriculture, livestock keeping and business enterprises both at large and small-scale. Main crops grown are maize, millet, and sorghum and groundnuts (as cash crop) all this is been determined by the best season.

Availability of natural water sources is a problem; rivers are seasonal and dry up in the dry season. Ground water is the main source of water.

3.3.2 Site selection

Mpwapwa was chosen as one of the case study area on the fact that it was where the thought of conducting the ‘Regulation and Sustainability study’ came up after the Participatory video documentation where many managerial and sustainability issues were raised. For the purpose of this study only six villages were picked up. The selection was based on whether the village was among the ten villages in the video documentation and furthers more on the type of management practice and technology in use.

In Mpwapwa, ‘Village water committee’ is a common management practice. This model of management was the product of the 1st National Water Policy of 1991. Many donors e.g. WaterAid-who funded-the construction and rehabilitation of water schemes continued using this model.

Table 6: Summary of the study sites in Mpwapwa

Village Name	Berege	Lukole	Igoji I	Iwondo	Chipogoro	Uiyenzele
Management practice	Private Provider	Village water committee	Private Provider	Village water committee	Village water committee	Village water committee
Type of Source	Borehole	Gravity scheme	Borehole	Borehole	Borehole	Borehole
Technology	Pump & Engine	Gravity	Pump & Engine	Pump & Engine	Pump & Engine	Pump & Engine
Functioning?	Yes	Yes	Yes	Yes	Yes	No
Other water sources available	None	None	None	None	Seasonal river during dry season	Seasonal river

3.3.3 Sustainability

Financial - financial sustainability still a challenge. In this case every scheme assessed had little saving. Schemes like Berege, Iwondo and Igoji I noted to have good collection efficient-but not enough to cover for big maintenance and some of minor maintenance. How comes the scheme can have good collection efficient and yet had no money? This may be possible, and for this case the main reason is very high O & M costs for Berege due to the age of the scheme while for Igoji I and Iwondo its due to lack of local technical expertises.

Technical skills- Lack of local qualified technical personnel is quite common for most of the schemes. This makes continuing dependency to District Water Technicians who have been accused as main contributors of the poor and mis-use of the water funds.

Equipment and spare parts- Unavailability of equipment like Shelex at a very low possible level contributes on more spending just for bringing the equipment from the district headquarters. As the results of having more unnecessary costs of which are avoidable by having on site kind of shelex and more money being saved instead. Spare parts, especially for many of the old schemes in Mpwapwa are difficulty to get. Mostly, they are available through grey market or unused machines. This is a challenge for many of the communities with schemes having old technology.

“...we normally spend more (120,000/=Tshs) for transporting Shelex from the district headquarters just to replace rods of Tshs 15,000/=...” (Kennedy Masinga, Private Provider, Berege Village).

3.3.4 Separation of Roles

There is a strong ‘Purchaser-Provider’ relation nearly in all of the schemes except for the Lukole (a village with gravity scheme)-this is possible due to the geographical allocation of the study site where

there is limited sources of water available most being borehole with pump and engine technology where payment is per bucket.

'AHA- Provider' the relation is very weak especially for piped schemes managed by Village water committees, and for the 'Regulation and Participation' it is worse. The research team observed this to be caused by the existing 'institutional set up' where Village water committees are not independent and lacks mandate.

3.3.5 Key findings and conclusions

- Inadequate management and administration skills especially for the Village water committees (VWC) and Village governments (VG) to supervise private providers (PP). *'E.g. Berege and Igoji 1 has similar % distribution i.e. Water Committee (39%), Private Provider (41%) and O & M (20%). The Berege water scheme is too old that means the O & M percentage was supposed to be more than the other two unlike Igoji 1 where the pump is quiet new'*
- Lack of workable regulatory procedure e.g. in Uiyenzele village, people responsible with the water account were the former and the present Village Chairperson, also the bank card was not with them, it was with a former VEO who has been transferred to another village
- Lack of both external and internal auditing, 'It is normal for a VWC to have cash in hand for a long time instead of banking
- Lack of committed fundis, *'...local artisan can be given money to go and buy spare parts, he/she may come with false receipts...'* (Lucy Lukuna, Water user, Chipogoro village)
- Involvement of private providers have resulted to sustainable services and less interference by the village governments
- Communication gap between management committees and water users. This is because of the existing organizational structure, which do not allow direct communication between these two groups
- Lack of unclear terms on what community is supposed to pay/compensate District Water Technicians for their services affects the use of water funds. *"...we normally pay them as well as providing them with food and drinks, although we are not sure of how much are they supposed to be paid..."*.
- Lack of other means of raising a village water fund other than Revenues collected
- Uncommitted and unaccountable Leaders
- Lack of an independent water committees
- Having spare parts shop at the district headquarters or Pump and Engine Maintenance Scheme (PEMS) to be revamped, is one of the recommended long term solution to spare parts availability.

3.4 Rufiji Case

3.4.1 Background Data

Rufiji district is within the Coastal region which is in the eastern Tanzania on the Indian Ocean coast, with average annual rainfall of between 800mm and 1200mm. Water for drinking is from both; Surface

and under ground. Although it's only in some few places i.e. areas along the river, where one can easily get soft water (saline free water) from the ground.

The district is inhabited by Wandengereko and Wakichi as the main tribe. The major economic activities are agriculture (Cashew nut, millet and cotton), fishing and timber mainly at small-scale.

The district is endowed by the perennial river Rufiji, which is the largest river in Tanzania. In the Coast/Dar Es Salaam regions water Mater Plan; it was found that ground water yields were either of insufficient quantity or inadequate quality for long-term use for village water supplies. Only one zone comprising of river deposits, where seen to have good potential for ground water development and the most appropriate method is by constructing shallow large-diameter wells in recent alluvial deposits. Boreholes are generally not recommended except for sites associated with raised coral reefs along the coast or where sand zones are encountered in the recent alluvial deposits. Most of alluvial deposit in this area contains silts and clays which makes screening and adequate development difficulty [12].

3.4.2 Site selection

Like Mpwapwa, the common management practice is the Village Water Committees. Only different is the common type of technology used i.e. hand pump. Selection of Rufiji as one of the case study area was based on the management option, type of technology and its geographical location (area around the coast).

Table 7: Summary of the study sites in Rufiji

Village Name	Nyanjati	Mahege	Kibiti	Ikwiriri North	Chumbi A	Ngorongo
Management practice	Village water committee					
Type of Source	Shallow well					
Technology	Hand Pump					
Functioning?	Yes	No	Yes	Yes	Yes	Yes
Other water sources available	None	Traditional sources	Private wells	Traditional-Ring well	Rufiji river	Stream

3.4.3 Sustainability

Financial – It was observed that financial sustainability to be a problem like in other case studies. This was, for example in Mahege village, the water supply scheme was not operating, community failed to replace a broken hand pump due to lack of fund and in Ikwiriri North village-community still gets free water service. However, other villages have managed to sustain their water projects in a short term bases, like Kibiti who managed to by 2 cylinders for Tshs 300,000/= each. Quality of water also contributes on getting less revenue; where water from the protected sources has saline taste, that water is used for none drinking/cooking activities and mostly during dry season for communities living far from the river or big streams.

Technical skills – Level of knowledge is very minimal. It has been acquired during project implementation where by each village was told to select two individuals to work with a contractor for a reason of acquiring some knowledge. In few cases, trained people have moved elsewhere due to various reasons like getting married, migration to the urban centres etc. Normally the selection of the two individuals is on ad hoc basis, no enough time is given to the committees to come up with good and potential people. Management committees thought it is because of poor involvement of communities from planning to implementation stage.

Equipment and spare parts – Availability of spare parts is very challenging. Within a district, they are not accessible; they have to travel to Dar Es Salaam. It is also inconvenience going to district headquarters

rather than going to Dar Es Salaam due to transport problem. Suggestion given to tackle this problem is having a spare parts shop some where accessible within a district e.g. Kibiti.

3.4.4 Separation of Roles

Findings show strong 'Purchaser- Provider' relation except for Ikwiriri village where water is at no cost, and weak relation for 'AHA-Provider' and 'Regulation & Participation' to all of the sites. Reason for weak 'AHA-Provider' and 'Regulation & Participation' relations observed to be lack of service contracts and bonds with providers-this is due to the existing institutional structure where village government who is supposed to be regulating internal is the oversea and final decision maker. Other reason being traditional beliefs among different groups within a community.

3.4.5 Key findings and conclusions

- Problem of water quality 'Salinity' affects water revenue. Many communities continuing using traditional/unprotected sources and for those communities living close to Rufiji river like Chumbi A village continuing fetching water from the river for most of their domestic use e.g. water for drinking and cooking regardless of the history behind where many people died by being attacked by crocodiles in the River
- Overlapping of power and conflict of interest (Politics) affects performance. In Nyanjati village, some community members suggested water tariff to be reviewed from Tshs 5/= to 10/= per 20 litre bucket. The idea was disagreed by the village Government. In Kwiriri, a politician bearing a full cost of the project (drilling and installation of hand pump) on behalf of the community resulted to dependency and killed the sense of ownership therefore unwillingness to pay for the water service
- Lack of proper follow up, mismanagement of water funds and unregulated water project. In Kibiti, a person in charge for day to day revenue collection is the one who keeps money for a whole month before handing over to the village government. In Chumbi A, payment receipt is being issued after every 6 buckets, whether all six buckets are for six different people the 6th person will be given a receipt. In Mahege, a member of the village government was the treasurer of the water committee
- Competition between the private owned schemes and the community scheme results to less revenue to the latter. In Kibiti, other do not fetch water from the public sources, instead they go to private providers due to long queue at the community scheme
- 'Ownership' has been mis-understood by communities. It is interpreted as ownership of actual asset and not just operation and maintenance of the facilities. This made Chumbi A village not to bother how they will raise the 5% contribution from their pockets in order to get a water project, instead they uprooted the existing distribution networks-sold the pipes and got money to pay for the 5%.

3.5 Dodoma Rural Case

3.5.1 Background Data

Dodoma rural district is the biggest districts in Dodoma region, covering 14,004sq. Kms. The district lies in the semi-arid zone (characteristic of Dodoma region). Major economic activities are agriculture, livestock keeping and business enterprises both at large and small-scale. Main crops grown are maize, millet, and sorghum and groundnuts (as cash crop).

Like neighbouring Mpwapwa, availability of natural water sources is a problem. Ground water is the main source of water.

3.5.2 Site selection

Selection of Dodoma rural district as one of the study sites was based on the management option i.e. 'Agent' commonly known as 'Wakala' in Swahili. This model of management is still very new in the district and for now there about 20 village water schemes already using this model. The model was adapted from Mpwapwa but with some modification. Six schemes were assessed; 5 managed by Local agencies and 1 by Village water committee.

Table 8: Summary of the study sites in Dodoma Rural

Village Name	Chenene	Kisima cha Ndege	Chibelela	Chifukulo	Mlowa Barabarani	Mvumi Mission
Management practice	Agent	Agent	Agent	Agent	Village water committee	Agent
Type of Source	Borehole	Borehole	Borehole	Borehole	Borehole	Borehole
Technology	Pump & Engine	Pump & Engine	Pump & Engine	Pump & Engine	Pump & Engine	Pump & Engine
Functioning?	Yes	Yes	Yes	Yes	Yes	Yes
Other water sources available	None	Traditional wells	Seasonal river	None	Traditional wells	Traditional wells

3.5.3 Sustainability

Financial – There is more hope on finance component in this case study compared to other cases which have been documented in this research report. Where there is an agency managing water scheme, a good flow of money is going to the water fund account although it does not reflect the actual income and expenditure. However in Mvumi Mission village, most of the times the agency deposit less the amount agreed in the contract due to indirect expenditure by the village government on the revenue collected e.g. payment of electricity bill for the village government office and allowances for village government. We can argue on sustainability by saying; short and medium term sustainability is possible but long term sustainability is still questionable.

Technical skills – Some of the communities like Chenene and Chifukulo have people with knowledge but the district do not allow them to repair their machines even for very minor maintenance. Instead they have been encouraged to use PEMs, this makes continuing dependency and having unnecessary costs which may be avoided.

Equipment and spare parts – This is one of a critical problem every where-spare parts not available at a very low possible level. In Dodoma Rural district spares can be obtained at district level compared to many of the districts covered by this study. Furthermore, district has identified specific suppliers were community have to go and buy spare parts in case need arises as a way of regulating quality of spare parts used – to some extent this have simplified their lives.

3.5.4 Separation of Roles

There is strong 'AHA-Provider' relation: 5 out of 6 communities had both contract and bond with their providers and high percentage of AHAs are well informed of a bidding process for the best provider to be elected. Also, relation between 'Regulation & Participation' seems to be strong except for Kisima cha Ndege village where AHAs are not confident enough to react over their underperforming provider who is among rich people in a village.

3.5.5 Key findings and conclusions

- Monthly deposit to water fund accounts depends on what the highest bidder have committed and not on the actual O & M costs
- Most of the agents take over management of water schemes during dry season when water selling is more gainful, and hand them over to village water committees during rain season. As the results most revenue collected during rain season disappears unknowingly, hence loss of revenue
- Where there is agency managing water project, water committee is unclear of its role, most of them have become dormant, instead of doing day to day follow up as a way of regulating
- Even though there is weak follow up mechanisms by village water committees, but at least there is good flow of money to their water funds accounts compared to other water projects managed by village water committees
- Community dependency and unnecessary costs will never end, if the district will stick to its rules of not letting retired technicians (fundis) use their knowledge even for minor maintenance
- Communities seems to be willing to cover training costs for selected members to be trained on how to repair machines as a long term solution and a way of reducing some of unnecessary costs
- No close follow up to the contract between AHA and Provider
- Appropriate tariff structure should be developed based on the type water source and technology in use.

4. Overall Analysis and Research Findings

This section gives the overall analysis and research findings regarding 30 COWSOs covered in case studies in the section above based on the selected parameters as outlined in the methodological section of this report.

4.1 Sustainability

Sustainability of rural water supply schemes was analyzed based on financial, technical skills and equipments & spare parts. On finance-the study tried to find out if COWSOs have enough funds to carry out repairs and/or rebuild, on technical-if they have easy and long term access to the skills to carry out repairs and on equipment and spare parts-if they have easy access to the necessary equipments and spare parts for their water projects. Overall results shows sustainability of rural water supply schemes to be on short term bases.

From figure 1 below, 8 COWSOs perceived to have no funds available for maintenance, 20 COWSOs perceived funds to be available for minor maintenance while just 2 COWSOs were of the opinion that funds are available for big maintenance. On technical skills, 6 COWSOs perceived to have no local people with technical expertise to carry out maintenance, 21 COWSOs perceived technical skills to be available for minor maintenance and only 3 COWSOs had feeling that technical skills are available for big maintenance. And on the availability of equipment and spare parts, 19 COWSOs had a feeling that spare parts and some of expensive equipments are inaccessible, 11 COWSOs felt spare parts being available for minor maintenance while none of the COWSOs were of the opinion that spare parts are available for big maintenance. The above finding gives an impression on how large is the problem regarding to availability of finance, technical skills and spare parts for big maintenance nearly for all COWSOs and in particular the availability of spare parts.

Further analysis was then carried out to find out reasons why some of the COWSOs are better-off compared to others. The 2 COWSOs which gave the opinion of having enough finance available for big maintenance were Tanangozi and Chenene which are gravity and pump & engine scheme respectively. Chenene being a pump and engine scheme under the agent mode of management was seen to have good performance with Tshs 8,372,602/= in their water fund account. Willingness to pay among community members-due to lack of alternative sources of water nearby thought to be a reason for the good performance for Chenene. Also the fact that Chenene scheme apart from serving community members it is also serving a nearby government institution (military)-this though to have helped to raise their water funds account. It was also observed that Tanangozi-a gravity scheme under WUA have good performance with Tshs 2,500,000/= in their water fund account, although the above amount was seen to be very minimal compared to the age of the scheme, coverage area (11 villages) and technology of the project which is less expensive to manage. Tanangozi scheme is also serving a government institution (Tosamaganga Secondary School), which uses big portion of water- this helped on raising their water funds account.

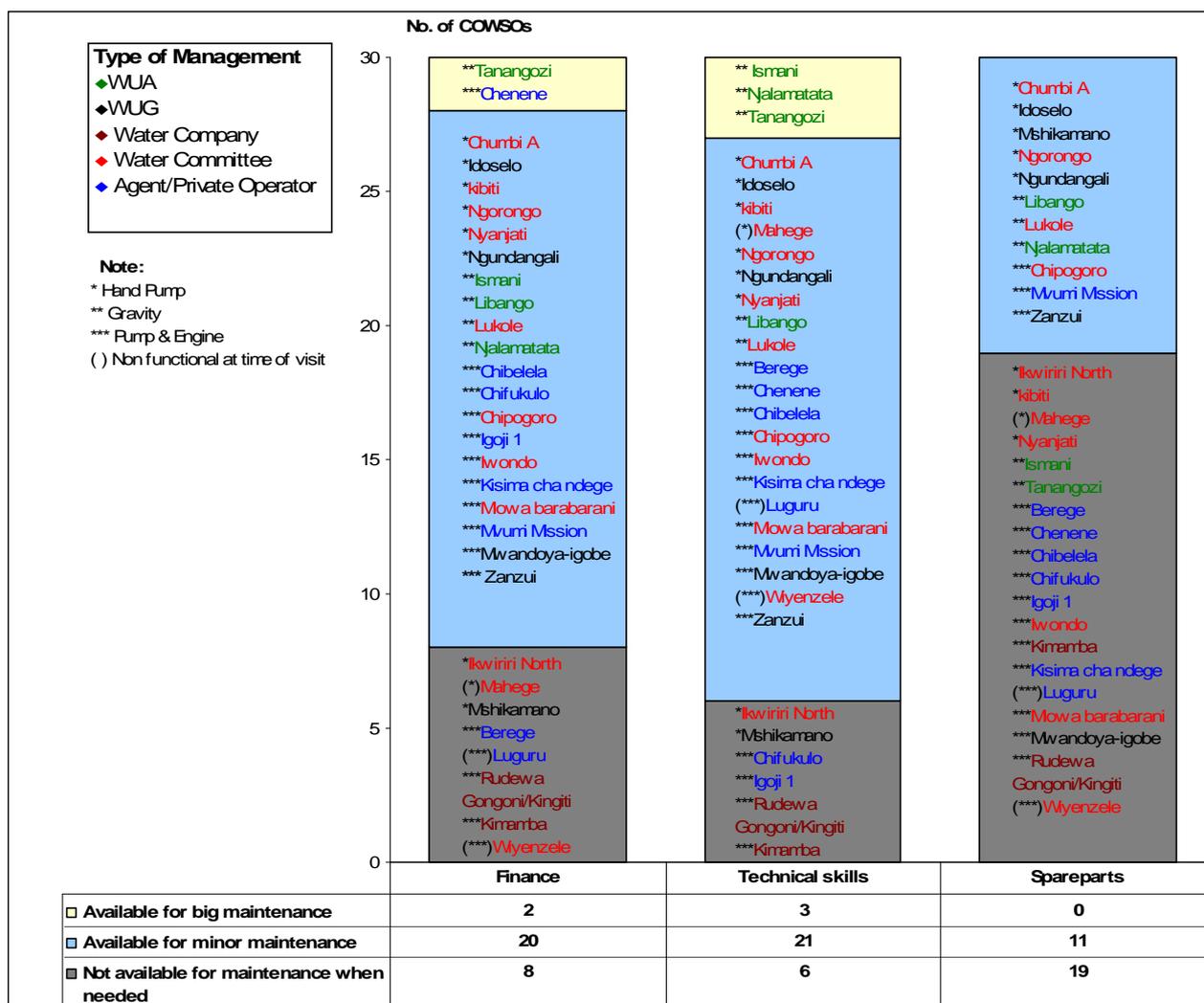
On the other hand, the 8 COWSOs which perceived to have no fund for maintenance were due to the following reasons: (i) mis-management of funds for Rudewa Gongoni/Kingiti, Kimamba, Mahege, Mshikamano and Wiyenzele, (ii) poor contract for a private operator for Luguru, (iii) provision of free water service for Ikwiriri North and (iv) age of the scheme plus old technology for Berege which resulted to most of the share of the village water committee i.e. 39% distribution to be used to pay back additional amount paid by the private operator for maintenance. (For more detail on this refer to the previous section).

Regarding to technical skills availability, 3 COWSOs namely; Ismani, Njalamatata and Tanangozi all being gravity schemes indicated to have enough technical personnel to cover for even big maintenance. This is possibly due to the fact that gravity schemes do not need high level of technical expertise to keep them running. 6 COWSOs which claimed not to have the technical expertise to even fix simple problems, four of them (Chifukulo, Rudewa Gongoni/Kingiti, Igoji 1 and Kimamba) were pump and

engine systems. Mshikamano had a partially trained individual who can't fix a pump while Ikwiriri North had none.

On spare parts availability, among the 11 COWSOs which claimed spare parts to be available for minor maintenance; 3 were operating gravity schemes, 5 operating hand pumps schemes and the remaining 3 COWSOs (Chipogoro, Mvumi Mission and Zanzui) were operating pump & engine schemes. The 3 pump & engine operating COWSOs claimed spare parts for minor maintenance to be available possibly due to their geographical locations and activeness of the areas. Chipogoro (active place along Dodoma-Iringa road), Mvumi Mission (active, very near to Dodoma municipality just one hour driving) and Zanzui (active, very near to Bariadi district head quarter just half an hour driving). Most other COWSOs perceived spare parts to be unavailable where those with pump and engine schemes.

Figure 1: COWSOs Perceptions on Sustainability



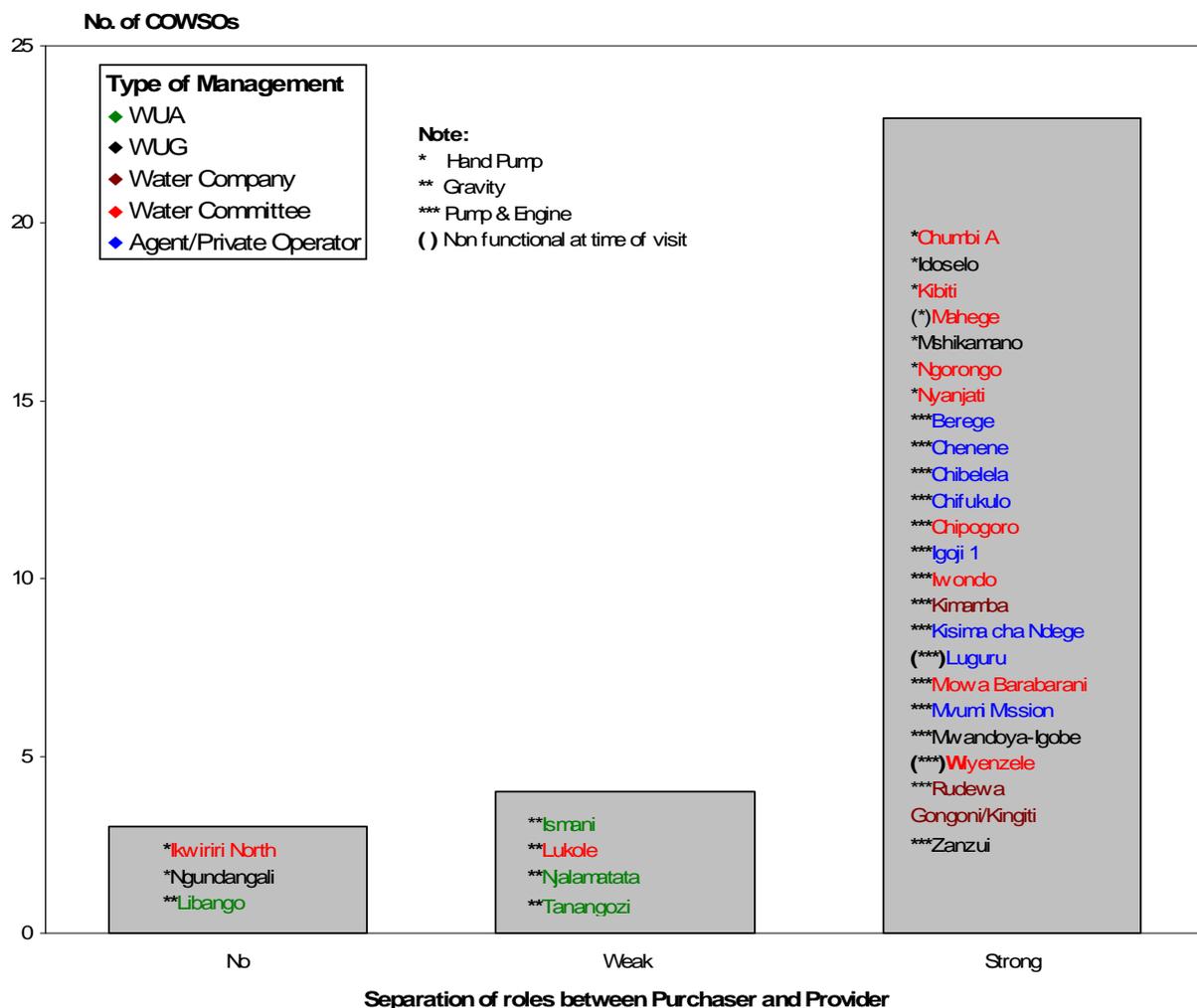
4.2 Separation of Roles

Separation of roles was analyzed based on the following; Purchaser-Provider, AHA-Provider and Regulation & Participation. Purchaser-provider; measured community ability and willingness to pay for the water service, AHA-Provider; assessed contracting procedures, their contents and existence and Regulation & Participation; assessed community participation and workability of the regulatory framework.

Figure 2 shows separation of roles between Purchaser and Provider for the 30 COWSOs covered by this study. The purchaser-provider separation of roles revealed to be strong for 23 COWSOs, weak for 4

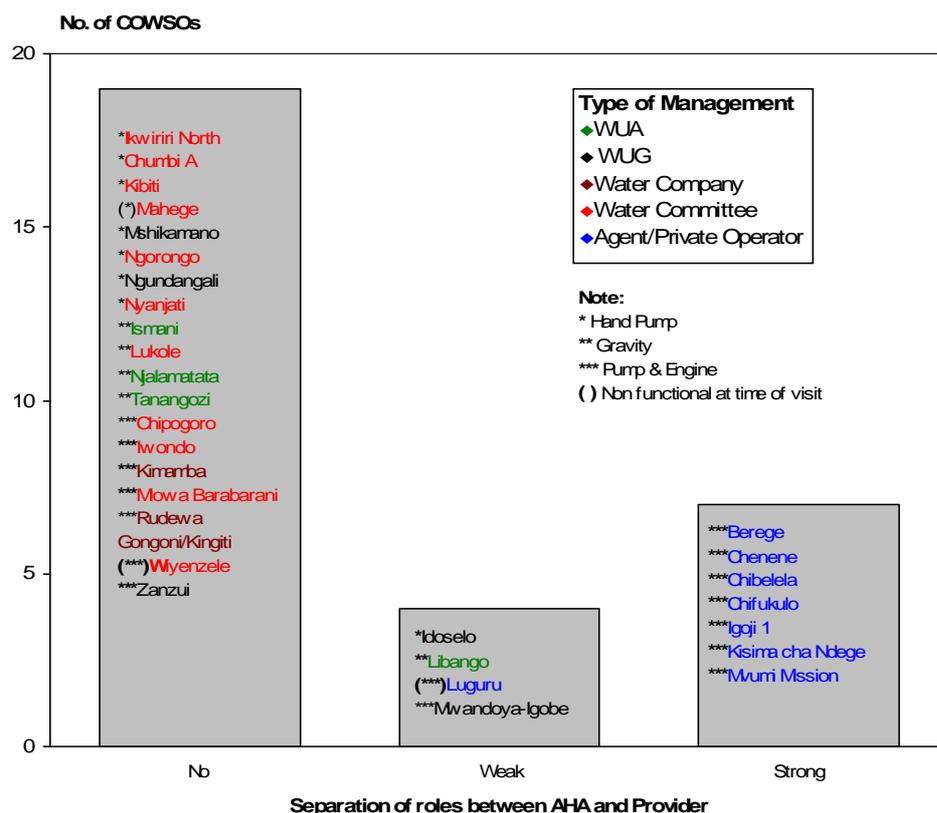
COWSOs and not to exist for 3 COWSOs. Out of 23 COWSOs which claimed to have strong separation of roles between purchaser and provider; 7 were hand pump operating COWSOs and the remaining 16 were those COWSOs operating pump & engine schemes. The 4 COWSOs which claimed to have weak purchaser-provider separation of roles-all were operating gravity schemes whereas the 3 COWSOs which claimed separation of roles not to exist; 2 were operating hand pump schemes and 1 was operating a gravity scheme. The above finding shows that COWSOs which revealed to have strong purchaser-provider separation of roles all have a unit base structure of payment except for Idoselo. Idoselo-a hand pump operating COWSO which has a similar payment structure to the 4 COWSOs operating gravity schemes i.e. monthly flat rate, has managed to have strong purchaser-provider separation of roles possibly because; (i) it has strict provider and (ii) the COWSO itself is managing small group of people which make follow up very easy unlike the 4 COWSOs which manages at least one village; Ismani (manages 22 villages), Tanangozi (manages 11 villages), Njalamatata (manages 1 villages) and Lukole (manages 1 villages).

Figure 2: Separation of roles between Purchaser and Provider



Regarding to separation of roles between AHA and Provider and as indicated on figure 3, about 19 COWSOs noted to have no separation of roles; among them 11 were managed by village water committees, 3 managed by WUAs, 2 managed by Water Companies and the remaining 3 managed by WUGs. The 4 COWSOs which observed to have weak separation of roles between AHA and Provider were; Idoselo, Libango, Luguru and Mwandoya-Igobe. Idoselo had service contract with management committee, Libango had bond with manager and treasure, Luguru had contract with service provider while Mwandoya-Igobe had bond with treasurer. Additionally, 7 COWSOs were observed to have strong separation of roles between AHA and Provider and all were COWSOs which were private managed and operating pump and engine schemes.

Figure 3: Separation of roles between AHA and Provider



The third measure of separation of roles was Regulation & Participation which was analysed based on 9 issues as outline in table 9; however data were collected based on 16 issues as showed on appendix I. Other issues were left aside because they were not adding any value to the analysis. Finding shows management committees to be more knowledgeable followed by village governments. Women and men groups (both AHAs and purchaser) observed to be less knowledgeable on regulatory issues which they are not directly involved as depicted on table 9. These finding suggest that transparency is a problem.

Table 9: Perception on knowledge and participation by focus groups

	Regulatory issues	Have knowledge and participated			
		Women	Men	Management Committee	Village Government
A	MoU with district (with some sort of follow up)	15	15	24	15
B	External audit report*	3	4	11	8
C	External assessment of performance*	9	14	15	9
D	Contract*	7	7	14	9
E	Internal audit report*	4	4	11	11
F	Minutes of meetings*	9	9	23	14
G	Report to general assembly	15	11	23	14
H	Setting and reviewing price	15	11	21	16
I	Users vote out provider or manager of the AHA	17	15	24	19
	Total number of Focus groups	30	29	28	27
	Total number of focus groups under the 12 registered COWSOs	12	11	12	10

A= MoU with district (with some sort of follow up)

B=External audit report

C=External assessment of performance

D=Contract

E=Internal audit report

* Regulatory issues of which women and men groups not directly involved.

F=Minutes of meetings

G=Report to general assembly

H= Setting and reviewing price

I= Users vote out provider or manager of the AHA

5. CONCLUSION

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.

The results also shows that COWSOs which have extended services beyond local communities have greater chance of becoming financially sustainable as the case of Tanangozi and Chenene which both have extended services to other institutions. And, the size of water fund account has observed not to be a guarantee for scheme sustainability - it has to be weighted together with scheme age and technology in place.

Further more it was found that registration of COWSOs alone can not guarantee sustainability if all groups within the community especially 'AHA' and 'Regulators' are not clear of their roles and responsibilities. Majority of groups complained that minimum level of involvement and lack of awareness on 'Separation of Roles' were the major factors that constrained their involvement. It was claimed that AHA (owners as well as voluntary regulators) were not aware with most of the issues which they are not directly involved, and where COWSOs had 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. The findings show that communities' awareness on 'Separation of Roles' and on 'Regulatory issues' is an important factor in enhancing sustainability of rural water supply schemes.

The study also identified nine regulatory issues thought to be importance when designing any regulatory framework that include; MoU with district (with some sort of follow up), external audit report, external assessment of performance, contract, internal audit report, minutes of meetings, report to general assembly, setting & reviewing price and Users vote out provider or manager of the AHA.

References

1. Ruvuma Water Master Plan summary Vol 3, URT,1982
2. Morogoro domestic Water Supply Plan, Main Report, Vol 1,URT, August 1980
3. Foreign Aid, Grassroots Participation and Poverty Alleviation in Tanzania: The Hesawa Fiasco. Paper published by REPOA in a book called Researching Poverty in Tanzania, 2005
4. National Water Sector Assessment Report by De Waal, D (2005)
5. Report on Different Legal Options on Management of Rural Water Schemes by R.O.Swai, November,1998
6. Watering White Elephants: Scandinavian Institute of African Studies,1988 by Therkildsen,O
7. Mission Report: Enhancing Sustainability of Piped Water Supply in Rural Tanzania by DHV Consults, 2000
8. Mission Report: Methodology Report on Sustainability of Water Supply Companies by DHV Consultants, 1999
9. The Shinyanga Experience: Water User Group Concept as a Sustainable Management System for hand pump wells by Tom Van Miert and Deo Binamungu, 2001
10. Shinyanga Water Master Plan, Main Report
11. Rural Water Supply Project in Iringa, Mbeya and Ruvuma Regions, Tanzania. Main Report, Vol I by URT, July 2000
12. Coast/ Dar Es Salaam Region Water Master plan, Summary Vol by URT, February 1979
13. Water and Sanitation in Tanzania: An Update based on the 2002 population and Housing Census by WaterAid, July 2005
14. Livelihoods, Vulnerability and Adaptation to Climate change in the Morogoro Region, Tanzania by Jouni Paavola (2004). Available on line at www.uea.ac.uk/env/cserge/pub/wp/edm/edm_2004_12.pdf accessed May 31, 2006

Appendix I – Study Check List

A: THE SUSTAINABILITY SNAP SHOT

STAGE ONE

The aim of stage one is to undertake a quick evaluation of communities' ability to maintain the various types of water points.

Complete this 'sustainability' grid for each type of water point with reference to the description below

Project name/Village name:				
Service Provider:				
Technology				
Financial				
Technical skills				
Spare and equipment				

Financial

Which of the following is applicable to the type of water point in question?

1. No funds available for maintenance when needed
2. Fund available but not sufficient for the most expensive maintenance process
3. Fund available and sufficient for the most expensive maintenance process.

Technical skills

Which of the following is applicable to the type of water point in question?

1. Technical skills not available for maintenance when needed
2. Some technical skills for maintenance, but not for all.
3. Technical skills for all maintenance processes available.

NB: Available in this context means available to an average community member within a reasonable time

Equipment and spare parts

Which of the following is applicable to the type of water point in question?

1. Not available when needed
2. Available but not for all repairs
3. Available for all repairs.

STAGE TWO – COMMENTS

Given your above ranking, can you give a brief explanation of the reasons why you allocated such a score?

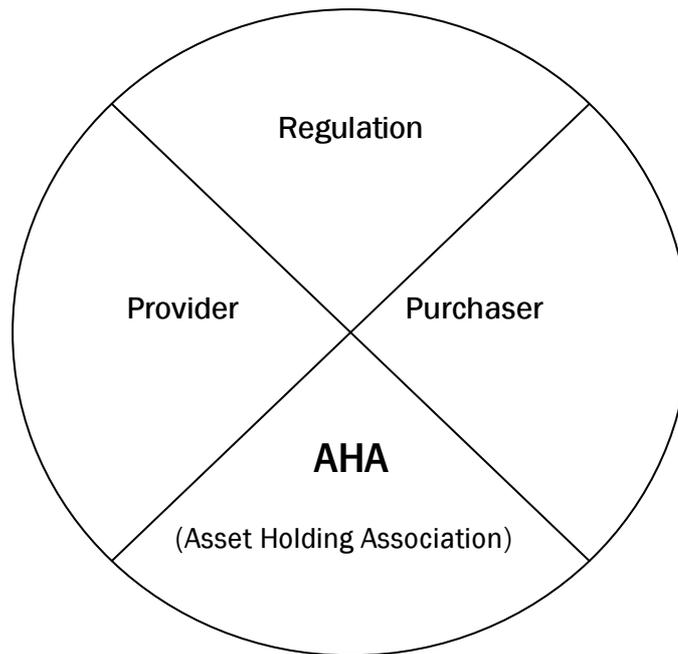
STAGE THREE - THE WAY FORWARD

Answer these questions -

- Is it reasonable to aim for 3's in all your examples above?
- What do you think you need to do differently to achieve '3's'?
- Is this possible?

If you have a series of '3s' or if you have moved recently from a 2 to a 3, have you documented this process?

B: SEPARATION OF ROLES



STAGE ONE

Purchaser- Provider

Which of the following is applicable to the type of water point in question?

1. People don't pay for water service
2. People some times pay for water service
3. People always pay for water service at a point of collection or every month (excluding most vulnerable people).

AHA- Provider

***Cross check who is the AHA by asking the following questions:

Que 1. If the scheme is sold who would receive the money?

Que 2. If the water supply system failed completely who will repair?

Which of the following is applicable to the type of water point in question? Ans YES or NO

1. Is there a written contract between AHA and provider
2. Are they different people
3. There is a bond or investment by the provider to AHA?

Scoring the answers for AHA- Provider above as follows:

1. there is no contract - meaning there is 'no separation of role'
2. either contract or bond exist - meaning there is 'weak separation of role'
3. Both contract and bond exist - meaning there is 'strong separation of role'.

STAGE TWO

Regulation and Participation

Regulatory Mechanism		Is there a clear evidence of working mechanism		
		YES	NO	NOT KNOWN
External regulatory mechanisms	MoU with district (with some sort of follow up)			
	Formally registered/Licensed organization			
	External audit reports			
	External assessment of performance			
	League table of Schemes			
Entity regulatory mechanisms	Contracts			
	Constitution			
	Internal audit reports			
	Minutes of meeting			
	Report to the general assembly			
	Public posting of income and expenditure			
Voluntary regulation /Purchaser participation	Vulnerable people served			
	Approving income and expenditure			
	Setting and Reviewing price			
	Efficiency of service (User satisfaction)			
	Is there evidence that users can vote out either the provider of the managers of the AHA?			

Note:

- External regulatory mechanisms in this context mean the **external regulation** at District level.
- Entity regulatory mechanisms in this context mean **Self regulation** at village level.
- Purchaser participation in this context means **voluntary regulation** within the locality i.e. Service consumers, water users or any one within the community apart from the service provider can be a voluntary regulator.

Appendix II – AHA-Provider Relationships in Shinyanga

COWSO name	Focus Group	Is there a written contract between AHA and provider?	Is there a cash flow?	Is there a bond or investment by the provider to AHA?
Idoselo	Women	x	x	x
	Men	x	x	x
	Management Committee	√	√	x
	Village Government	.	.	.
Ngundangali	Women	x	x	x
	Men	x	x	x
	Management Committee	x	x	x
	Village Government	.	.	.
Mwandoya	Women	x	x	√
	Men	x	x	x
	Management Committee	√	x	√
	Village Government	x	x	x
Mshikamano	Women	x	√	x
	Men	.	.	.
	Management Committee	x	√	x
	Village Government	x	x	x
Luguru	Women	√	√	??
	Men	√	√	√
	Management Committee	√	√	x
	Village Government	√	√	√
Zanzui	Women	x	x	x
	Men	x	x	x
	Management Committee	√	√	x
	Village Government	x	x	x

Key: √ Yes
 X No
 . Discussion not conducted
 ?? Not known

Note: Written contract of which the Idoselo, Mwandoya and Zanzui management committees are referring to contract period