Government of Uganda
Ministry of Water and Environment

DISTRICT IMPLEMENTATION MANUAL

REVISED

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List of Reference documents – also available in soft copy and on the MWE website www.mwe.go.ug

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1	Statistical Abstract, 2012,Uganda Bureau of Statistics
2	Table of Sub-County populations

Chapter two - Legal and Policy Framework

No	Title, Year, Author
1	National Development Plan
2	National Water Policy, 1999, Government of Uganda
3	Environmental Health Policy, 2005, Environmental Health Division, Government of Uganda
4	UWASNET Members Directory 2012, Uganda Water and Sanitation NGO Network (UWASNET)

No	Title, Year, Author
1	District Water and Sanitation Annual Workplan and Budget Format, 2007, MWE/DWD (in Microsoft Excel)
2	District Water and Sanitation Annual Workplan and Budget Instruction , 2007, MWE/ DWD (in Microsoft Excel)
3	Water and Sanitation Sector Performance Report, 2010, Ministry of Water and Environment
4	Water and Sanitation Sector Performance Report, 2011, Ministry of Water and Environment
5	District Water and Sanitation Conditional Grant Additional Reporting Requirements, 2007, MWE/DWD (in Microsoft Excel)
6	Guidelines for updating the Water and Sanitation Data Base
7	Simplified Guide to Local Government Development Planning, Budgeting, Monitoring and Reporting Cycle, UWASNET 2012.

Chapter five – Community Mobilisation, Sanitation, Cross-cutting issues and O&M

No	Title, Year, Author
1	Steps in Implementation of Water and Sanitation Software Activities
2	Hygiene and Sanitation Steps

Chapter six – Water and Sanitation Technology

No	Title, Year, Author
1	Springs Construction Manual for Technicians and Engineers, Water Aid Uganda/MWE/DWD, 2007
2	Shallow wells Technology Manual, MWE/DWD, 2007
3	Piloting domestic roof water harvesting in Bukanga and Isingiro counties of Mbarara district and Sheema south in Bushenyi district, Uganda Rainwater Harvesting Association, 2006.
4	Investigating Options for Self-help Water supply – From Field Research to Pilot in Uganda, WSP, 2006.
5	Guidelines for up scaling DRWH in Uganda, 2012
6	Water Supply Design Manual (draft 2012)
7	Technical Guide to development of WfP facilities, DWD, 2012 (draft)
8	Proposed guideline for implementing Rainwater Harvesting activities in Uganda (Sept 2012)
9	Revised ToR for Management of ATC
10	Summary of activities undertaken by ATC in 2011/2012
11	Steps in Implementation of Water and Sanitation Software Activities
12	Hygiene and Sanitation Steps
13	Improved Sanitation and Hygiene financing Strategy
14	A handbook on Safe Water Chain
15	Aborloo and Fossa Alterna a joint publication by IRC, SNV, and Netwas
16	Water and Sanitation for disabled people and other vulnerable groups (Hazel Jones and Bob Reed)
17	National Sanitation Guidelines (MOH)
18	School Sanitation Technology options

Chapter Seven

No	Title, Year, Author
1	Sample Terms of Reference for Construction Works
2	The Local Governments (Public Procurement and disposal of public assets) Regulations 2006
3	The Public Procurement and disposal of public assets guidelines, 2003
4	The Public Procurement and disposal of public assets – charts and forms

Chapter Eight – Contract Management

No	Title, Year, Author
1	Contract Management Plan Template, 2007, MWE/DWD
2	"Supervisors Manual for Drilling and Test Pumping(MWE/DWD, 2007, MWE/DWD.

3	The Operations Manual for Water and Sanitation Development Facilities (WSDFs) 2009
4	The Local Governments (Financial and Accounting) Regulations 2007

Chapter Nine - Environment

No	Title, Year, Author
1	Environmental Monitoring Template for Water and Sanitation, 2007, DWD
2	EGGSSA Chapter 10, 2003, USAID. Environmental Guidelines for Small-Scale Activities in Africa

Chapter Ten –Integrated Water Resources Management

No	Title, Year, Author
1	DWRM Guidelines for Catchment Based WR Planning - Working Draft v7, July 2012
2	Operational Manual for Catchment-based Water Resources Management, July 2012
3	Framework and Guidelines for Water Source protection, Draft 2, 5 Volumes, June 2012
4	Water Quality Standards and Guidelines, 2007, MWE
5	Water Safety Plans - Template for rural water supply, example from India
6	Draft National Strategy Framework for adaptation to climate change from water resources perspective (MWE, 2008)

Abbreviations and Acronyms

AHA Asset Holding Authority
ATC Appropriate Technology Centre
BFP Budget Framework Paper
CAO Chief Administrative Officer
CBMS Community Based Maintenance System
CBOs Community Based Organisations
CD Compact Discs
CDA Community Development Assistant
CFO Chief Finance Officer
C**MP** Contract Management Plan
DDCBS District Directorate of Community Based Services
DDHI District Directorate of Health Services
DDMC District Disaster Management Committee
D**DP** District Development Plan
DDPR Department of Disaster Preparedness and Refugees
DE District Engineer
DHI District Health Inspector
DRA Demand Response Approach

DLG	District Local Government
DRWH	Domestic Roof Water Harvesting
DTH	Down The Hole
DTPC	District Technical Planning Committee
DWD	Directorate of Water Development
DWO	District Water Office/District Water Officer
DWRM	Directorate of Water Resources Management
DWSCC	District Water and Sanitation Coordination Committee
DWSCG	District Water and Sanitation Conditional Grant
EHD	Environmental Health Division
FDS	Fiscal Decentralisation Strategy
FY	Financial Year
GFS	Gravity Flow Scheme
GI	Galvanised Iron
GOU	Government of Uganda
GPS	Global Positioning System
HPM	Hand Pumps Mechanics
IDMS	Inter-District Meetings
IDP	Internally Displaced Person
IWRM	Integrated Water Resources Management
JSR	Joint Sector Review
LGBFP	Local Government Budget Framework Paper
LGDP	Local Government Development Programme
LGs	Local Governments
M&E	Monitoring and Evaluation
MAAIF	Ministry of Agriculture, Animals, Industry and Fisheries
MDGs	Millennium Development Goals
MGLSD	Ministry of Gender, Labour and Social Development
MIS	Management Information Systems
MOES	Ministry of Education and Sports
MoFPED	Ministry of Finance, Planning and Economic Development
MoH	Ministry of Health
MoOLG	Ministry of Local Government
MoOU	Memoranda of Understanding
MTBF	Mid-Term Budget Framework
MWE	Ministry of Water and Environment
NEMA	National Environmental Management Authority
NDP	National Development Plan
NGOs	Non Governmental Organisations
NWSC	National Water Sewerage Corporation

Foreword

This District Implementation Manual (DIM) provides a comprehensive overview of the workings of the sector for stakeholders operating at various Local Government (LG) levels. The manual sets out the sector policy and institutional environment, stakeholder roles and responsibilities and outlines the procedures to be followed. The manual provides technical knowledge and information concerning the implementation of the water and sanitation activities in the sector.

The manual is intended as a reference document for practicing water and sanitation professionals as well as to provide orientation to new players in the sector. The emphasis of the document is on rural water supply and sanitation service delivery through District local Governments.

The manual contains sector specific annexes to support the main document. These are available as soft copies on the MWE website (www.mwe.go.ug). The contents of the main document and annexes will be revised and improved regularly in order to adjust to new developments thus keeping it relevant at all times.

Special thanks and acknowledgements go to the staff of the Rural Water Supply Department (RWSD) of the Ministry of Water & Environment (MWE), the Steering Committee for the DIM Review and Updating exercise chaired by the MWE/RWSD and comprised of Uganda Water and Sanitation NGO Network (UWASNET), Catholic Relief Services (CRS), Water Aid Uganda, Plan Uganda, the District Water Officers (DWOs) represented by DWOs of Jinja and Masaka districts, the Technical Support Units (TSUs) represented by TSU5, the Consultants Socio Economic Data Centre (SEDC) and WE Consult who carried out the review and updating of the DIM, and IRC International Water and Sanitation Centre's Sustainable Services at Scale Project (IRC/Triple-S) in Uganda that provided the Secretariat for the DIM Review Steering Committee and finances for the entire review and updating exercise and processes.

I sincerely hope that this manual will continue to be a very useful guide for district local governments

Prof. Ephraim Kamuntu
Minister,
Ministry of Water and Environment

Chapter One: Introduction

1. Introduction

In April 2012, the Ministry of Water and Environment (MWE), withsupport from the Sustainable Services at Scale (Triple-S) Project of IRC International Water and Sanitation Centre (IRC/Triple-S) embarked on the Review and Update of the District Implementation Manual (DIM) for Water and Sanitation sector. The review and update process was premised on the need to have a more relevant DIM that took into consideration changes in the water and sanitation sub-sector, changes in national policy and in planning frameworks since the production of the first version of the DIM in 2007.

The MWE also recognised the need to address the challenges in implementation, standardization, harmonization and coordination of rural water and sanitation service delivery which the 2007 DIM was meant to do, but had not adequately done. A study conducted in March 2011 by IRC/Triple-S in Lira and Kabarole districts, further provided evidence that the 2007 DIM had not addressed the challenges of ineffective coordination and harmonization of actors' roles at the district level and the inadequate enforcement of policies and guidelines

The first version of the DIM was formulated in 2007 underthe initiative of the Directorate of Water Development (DWD) of the Ministry of Water and Environment (MWE), with support from the sector Development Partners. The DIM was intended to guide sector stakeholders by bringing together all sector institutional policies, rules, and guidelines into one document for ease of reference. Since 2007, a number of changes have taken place in the sector as well as in the national policy and planning frameworks. The water and sanitation sector also still faces challenges in implementation, standardization, harmonization and coordination of rural water and sanitation service delivery (Triple-S, March 2011).

This revised DIM (2013) focuses mainly on rural water supply and sanitation (RWSS) service delivery through District Local Governments (DLGs). It is planned that this manual will continue to be improved and updated from time to time to keep it relevant to the changing sector policies and guidelines as well as contexts and circumstances.

1.1 Purpose of the Manual

The purpose of this manual is to support and guide sector stakeholders in the implementation of water, sanitation and hygiene (WASH) activities in order to enhance coordinated and harmonised action. It provides guidelines for implementers at district level, including DLGs and civil society organizations (CSOs). The manualsets out the policy and institutional environment as well as sector stakeholders' roles in line with the Sectorwide Approach to Planning (SWAp) and the sector approaches for harmonized strategies.

The revised DIM does not provide new rules and guidelines for the sector, but draws from and summarizes existing laws, policies and guidelines so as to bring them into a one-stop reference document for practicing water and sanitation professionals and for the orientation of new players in the sector. It is expected that by utilising this manual, effective coordination and harmonization of actors' roles at the district and Sub-County level as well as adherence to policies and guidelines will be enhanced.

1.2 Intended Users of the Manual

The manual is intended for use by district and Sub-County level implementers of water and sanitation services. These primarily include district water and sanitation staff as well as those from relevant or collaborating sectors such as health, education and community development. Other primary users include the Sub-County health and community development extension staff as well as Non-governmental Organisations (NGOs), Community Based Organisations (CBOs), and Faith-Based Organisations (FBOs)] involved in planning and implementing WASH services. Other primary users include Technical Support Units (TSUs) staff whose mandate is to support and work closely with district implementers. The TSUs will further disseminate and monitor the utilisation of the manual by district actors and implementers. The target users or audience of the manual have been elaborated in the dissemination strategy.

1.3 How to use this Manual

This manual can be used in the following ways:

- As a guide for training and building capacity of district and Sub-County level WASH implementers
- As a reference source for WASH implementers
- As a reference point and enforcement tool for supervisory teams

1.4 Operational Meaning of Key Terms in this Manual

Conditional Grants: This is money provided by the central government to local governments to fund decentralized services.

Emergency: A condition (or result) of disaster in which the safety of persons and property is placed at extreme peril (OPM, 2011). Emergency situations pose specific challenges to the delivery of WASH services which differ considerably from those in stable settings because they necessitate a response of an emergency nature. 'Emergency Response (ER)' means activities undertaken to address the immediate and short-term effects of a catastrophe or disaster. Response includes immediate actions to save lives, protect property, and meet basic human needs. Under ER, application of the guidelines contained in this DIM can be relaxed. See Box 1 to understand an emergency situation.

Table 1.1: Attributes of an emergency situation

• The future is often uncertain – it is not known how long a situation will continue or what the scale will be;
• In many cases, there may be security fears as a result of conflict or persecution;
• Those affected by an emergency are often forced to move from their homes and lose their property and livelihoods;
• Population densities are often very high in displaced settlements resulting in high demand for services and high potential for disease transmission;
• The affected population commonly comprises of large numbers of women and children; and
• Morbidity and mortality rates are often higher than those in stable situations.

Hardware Activities: Refers to the tangible or physical and technologically oriented aspects such as construction of water sources and sanitation facilities.

Participatory Planning: This is a planning process where all stakeholders, beneficiaries, technical staff and donors come together to carry out analysis of the existing situation, determine the desired future, decide on appropriate action and implementation strategies, discuss and agree on roles and responsibilities and agree on appropriate time schedules and milestones.

Population:Refers to the population of Uganda; rural and urban, which is estimated at 34 million people in 2012, of which about 85% live in rural areas. This figure was calculated using population and population growth rate data from the 2002 population census. Each year, the Uganda Bureau of Statistics (UBOS) issues a Statistical Abstract containing population data, growth rates and proportion of the population for each district.

Population data is essential to enable districts and central government to estimate the levels of and changes to access to improved water supplies and sanitation. For effective planning and allocation of water and sanitation facilities, each district should have information on Sub-County populations. It is important for district Local Governments to update the population values annually using the following formula for future population projections:

$$P_n = P_i e^{rn}$$

Where: Pn = Projected future population after n years
Pi = Initial population in the "base' year
r = Estimated annual population growth (%)
n = number of years
e=exponential function (2.718281828)

Rural Water Sub-sector: In the Water and Sanitation sector, the rural water sub-sector,which is the focus of this manual,covers two categories of areas:

- Rural Growth Centres (RGCs) - defined as areas with a population between 500 and 5000
- Rural areas - settlements where the population is less than 500.

Operation and Maintenance: Operation refers to the day-to-day running and handling of a water or sanitation facility for optimum use. Good operation contributes to a reduction in facility breakdown incidents. Maintenance refers to the activities required to sustain a facility in proper working condition.

Software Activities: This is an umbrella term that refers to the intangible aspects of WASH service provision, including awareness creation, community sensitisation, community mobilisation and post-construction follow-up. These activities are undertaken to change behaviour and attitudes towards hygiene and sanitation and to ensure community management of WASH facilities.

1.5 Structure of the Manual and How to use it

This revised DIM comprises of two volumes: the main document and the annexes. Both volumes are available in print and electronic format (i.e. on CD and on the MWE website). In the electronic format, the main document has links to the Annexes for easy reference. The documents can be accessed using Windows Explorer or by double-clicking the links. Only soft copies of documents produced by the MWE are available on the CD. Legal documents and those produced by other institutions are not included. The main document includes an index (at the back) to ease cross-referencing.

The main revised DIM document is structured as shown in Table 1.2

Table 1.2: Structure of the Manual

Chapter	Description of the Chapter
Chapter 1: Introduction	Background, purpose and objectives, target audiences, key definitions, and an overview of the legal, policy and institutional framework.
Chapter 2: Legal, Policy and Institutional Framework.	The legal, policy and institutional framework of the Ugandan Water and Sanitation sector as well as definition of the sub-sectors, the roles and responsibilities of different stakeholders explained and a summary of coordination mechanisms.
Chapter 3:Sector Strategies and Plans	Summary of all key water and sanitation sector strategies as of June 2012 that have been adopted by the WASH sector.
Chapter 4: District Planning, M&E and Reporting.	Planning, M&E, and reporting procedures and guidance on the required formats.
Chapter 5: Community Mobilisation and Sensitization	An overview of community mobilisation, and other software activities associated with provision of water and sanitation services
Chapter 6: Water Supply and Sanitation Technologies	A description of the water supply and sanitation technologies that are commonly provided through DLGs.
Chapter 7: Procurement.	An overview of the procurement process, with particular emphasis on the pre-qualification methods at DLG level
Chapter 8: Contract Management	Contract management procedures for the construction and supervision of springs, deep borehole drilling and piped water supplies, and financial management procedures.
Chapter 9:Environment.	An overview of environmental issues in the water and sanitation sector, including water quality.
Chapter 10: Water Resources Management (WRM)	An introduction to WRM

Chapter Two:
Legal, Policy and Institutional Framework

2. Introduction

The implementation of WASH activities in Uganda is governed by national laws, policies and planning documents. It is important for all actors to play their roles within the parameters set by the existing laws, policies and institutional arrangements. Accordingly, the rest of this manual can best be understood, interpreted and utilised within the context of the existing legal, policy and institutional terrain. This chapter summarises the key legal, policy and institutional frameworks that are relevant for the sector.

2.1 Legal Framework

The legal framework outlines the rights and responsibilities of different stakeholders as well as the basis for water resources management and regulation. The key legal frameworks and regulations that guide the management of the sector are:

2.1.1 The Constitution of the Republic of Uganda (1995)

The Constitution of the Republic of Uganda (1995) lays down the national objectives, the overall principles of state policy, and provides the framework for key policies relevant to WASH such as the decentralisation policy. The Constitution provides for every citizen's right to clean and safe water, as well as a right to a clean and healthy environment. It also provides for affirmative action in favour of groups marginalized on the basis of gender, age and disability. District implementers of WASH are therefore expected to respect these provisions as stipulated in the Constitution.

2.1.2 The Water Act, Cap 152

The Water Act provides for; the use, protection and management of water resources and supply; the constitution of water and sewerage authorities; and facilitation of the devolution of water supply and sewerage undertakings.

2.1.3 The Local Governments Act (1997)

The Local Governments Act defines roles for different levels of government in provision and management of water and sanitation related activities. The Act specifies functions and services for central government, district councils, urban councils and those to be devolved by the district council to lower local government councils. The provision of water and maintenance of facilities is a role of District Local Councils in liaison with the lead ministry and the relevant line ministries.

2.1.4 The National Environment Act

The National Environment Act (1998) builds on the National Environment Policy. The Act provides roles and mandates for the management of the environment and natural resources. As a lead agency in the water sector, the MWE/Directorate of Water Resources Management (DWRM) has a shared responsibility with the National Environmental Management Authority (NEMA) for:

water quality standards; standards for discharge of effluent into water; limits on the uses of lakes and rivers; management of riverbanks and lake shores; restriction on the use of wetlands; and management of wetlands.

2.1.5 The Public Health Act (2000)

The Public Health Act (2000), Cap 281 aims to consolidate the law regarding the preservation of public health. It sets out the framework for regulation of the pollution of the environment to detrimental limits which can be risky to the health of the population of Uganda. The Public Health Act is particularly relevant to the implementation of hygiene and sanitation activities, and particularly the enforcement of standards.

2.1.6 The Land Act

The Land Act (1998)draws from the Constitution of the Republic of Uganda (1995) and vests all land in the citizens of Uganda to be owned in accordance with customary, freehold, mailo and leasehold tenure systems. This implies that both Government and private owners of land can set up facilities on the land which they occupy and own. Land tenure issues are critical to the development of water infrastructure. Any location of a water supply project must respect the proprietary rights of the land-owner or occupier, as protected by law.

2.1.7 The Public Finance and Accountability Act

The Public Finance and Accountability Act (2003) provides for the development of an economic and fiscal policy framework for Uganda; to regulate the financial and management of the government; to prescribe the responsibility of persons entrusted with financial management in the government; to provide for the audit of government state enterprises and other authorities of the state; and to provide for other connected matters. In line with this Act, implementers of WASH are required to follow sound financial management and accountability procedures.

2.1.8 Public Procurement and Disposal of Public Assets Act and Regulations (2003)

The Public Procurement and Disposal of Public Assets Act (2003) provides for the legal basis for procurement and disposal of public assets in Uganda. This Act also led to the establishment of the Public Procurement and Disposal of Public Assets (PPDA) Authority. The Act defines the procuring and disposing entities, which comprise of: an accounting officer, contracts committees, a procurement and disposal unit, a user department and an evaluation committee (the functions of these entities are outlined in section 2.4.2 of this manual). Procedures for resolving disagreements between the different entities are set out in the Act, whichalso sets out the framework in which the Public Procurement and Disposal of Public Assets (PPDPA) Authority operates.

2.1.9 The Local Governments Public Procurement and Disposal of Public Assets Regulations (2006)

The Local Governments Public Procurement and Disposal of Public Assets Regulations (2006), sets the rules and procedures to be followed by DLGs procurement and contract management. This includes details on procurement methods, operations of the contracts committee and contract management procedures. See more details on issues of procurement in Chapter 7.

2.2 Sector Policy and Planning Framework

The sector policies provide the principles of action to be followed in the implementation of WASH activities, as well as the rules of practice. The key policies and planning frameworks include the following:

2.2.1 The National Development Plan 2010/11-2014/15

The National Development Plan (NDP) 2010/11-2014/15 is the overarching planning framework that guides all planning activities in the country. The NDP outlines the poverty alleviation objectives for the water and sanitationsector for the period 2009-2014, together with the strategies and interventions to realise them. The objectives address the key elements of:

- Increasing access to safe water supply in rural areas.
- Increasing access to improved sanitation.
- Improve efficiency and effectiveness in water and sanitation service delivery.

2.2.2 The National Water Policy

The National Water Policy (1999) aims at promoting an integrated approach to manage the water resources in ways that are sustainable and most beneficial to the people of Uganda. The approach is based on the continuing recognition of the social value of water, while at the same time giving much more attention to its economic value. The policy has two broad aspects, namely, Water Resources Management and Water Development and Use.

In respect to Water Resources, the Water Policy sets the guiding principles, strategies (enabling environment, institutional development, planning and prioritization, data collection and dissemination), management functions and structure, roles of the private sector and NGOs, as well as data and information.

2.2.3 The National Health Policy (1999)

The National Health Policy (1999)addresses the main contributors to the burden of disease which include malaria, HIV/AIDS, TB and WASH related diseases such as diarrhoea. The Government places greater emphasis on rural areas where the population has low access to safe water and low sanitation coverage. This is to be achieved through the promotion of personal, household, institutional, and community sanitation and hygiene.

2.2.4 The Environmental Health Policy (2005)

The Environmental Health Policy (2005) establishes the environmental health priorities of the Government of Uganda and provides a framework for the development of services and programmes at national and local government levels. The goal of the Policy to attain a clean and healthy living environment for all citizens in both rural and urban areas. The policy also puts forward a number of guiding principles. Some of the key principles include:

i. Prevention of environmental degradation.
ii. Every Ugandan's right to a clean and healthy environment.
iii. Inter-sectoral collaboration.
iv. The principle of 'some for all' rather than 'all for some'.
v. Gender responsiveness.

2.2.5 The National Gender Policy (1999)

The National Gender Policy (1999) enshrines the affirmative action by GOU in support of gender equity in the national socio-economic activities and encourages women to play a major role in decision-making. With respect to water, the policy recognises women and children as the key stakeholders in water provision and use.

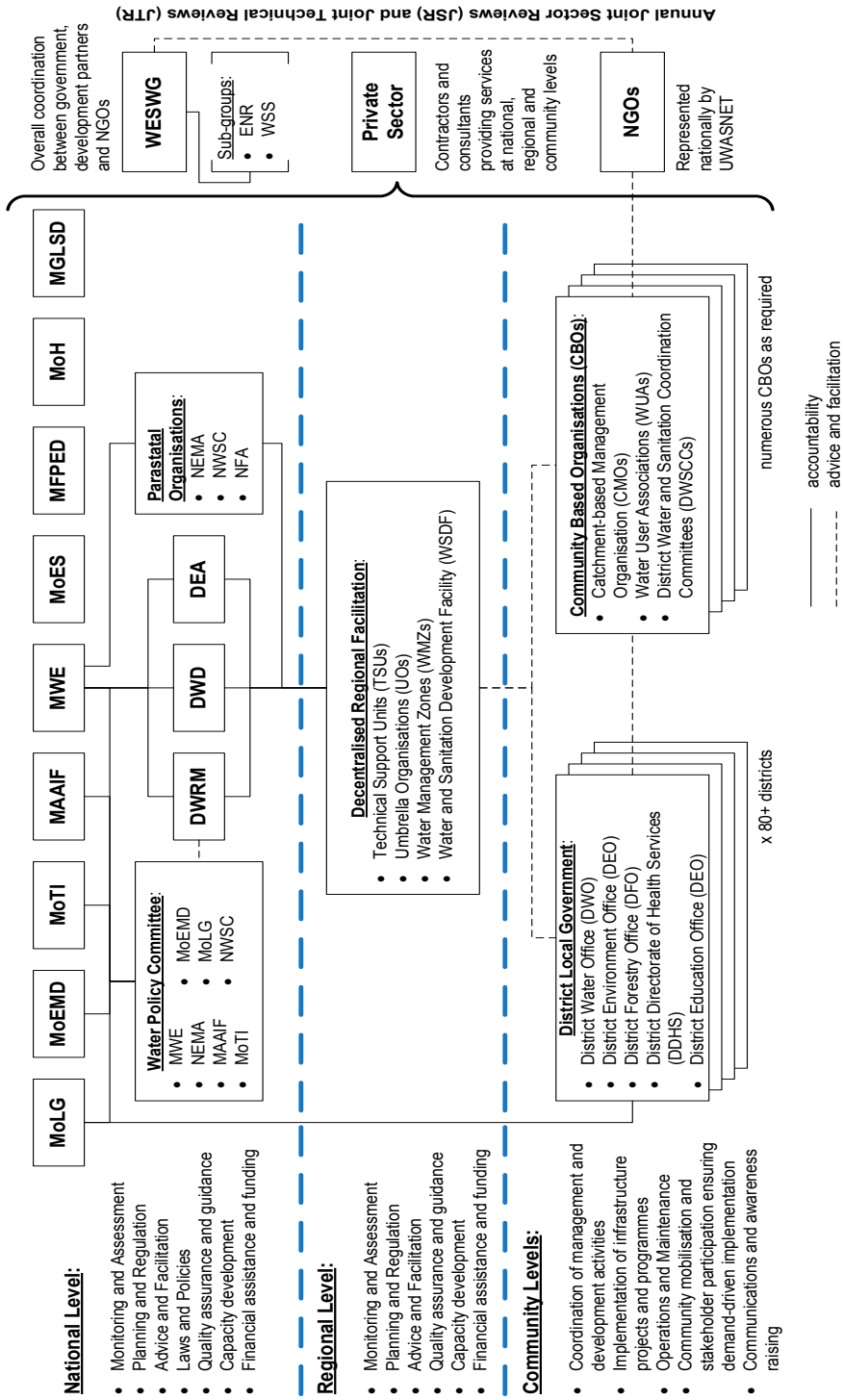
2.3 Institutional Framework

2.3.1 Institutional Roles and Responsibilities

The Water and Environment sector consists of two sub-sectors, namely; Water and Sanitation (WS) and Environment and Natural Resources (ENR). The WS sub-sector comprises of; Water Resources Management, RWSS, Urban Water Supply and Sanitation (UWSS), and Water for Production (WfP). The ENR sub-sector comprises Environmental Management (EM); Management of Forests and Trees (MFT); Management of Wetlands and Aquatic Resources (MWAR); and Climate, Weather and Climate Change (CWCC).

The Water and Sanitation Sector Working Group (WSSWG) was merged with the Environment and Natural Resources Working Group (ENRWG) to form the Water and Environment Sector Working Group (WESWG). The WESWG provides policy and technical guidance for the sector. It comprises of representatives from all key sector institutions (Government, Development Partners and NGOs). See Figure 2.1 for institutional framework for the water and environment sector

Figure 2. 1: Water and Environment Sector Institutional Framework



The institutional framework for WASH comprises of several actors located at the national, "regional", district and community level.

For effective implementation, all actors have to play their respective roles and be co-ordinated as elaborated here below:

2.3.2 National level

The MWE plans and coordinates all the sector activities and has the overall mission 'to promote and ensure the rational and sustainable utilisation,development and effective management of water and environment resources for socio-economic developmentof the country'. MWE has the overall responsibility for setting national policies and standards, managing and regulating water resources and determining priorities for water development and management. It also monitors and evaluates sector development programmes to keep track of their performance, efficiency and effectiveness in service delivery.

The mandate of the MWE regarding sanitation and hygiene activities is stipulated in the Memorandum of Understanding (MoU) that was signed by the Ministry of Health (MoH), Ministry of Education and Sports (MES), and MWE. The role of MWE is limited to development of public sanitary facilities and promotion of good practices of hygiene and sanitation in small towns and RGCs. With respect to WfP, MWE is the lead agency for water for production and development off-farm, while the responsibility for water use and management for agricultural development on-farmis vested with the Ministry of Agriculture, Animal Industry and Fisheries (MAAIF).

The Ministry of Water and Environment has three directorates including:

i. **The Directorate of Water Development (DWD),** which provides overall technical oversight for the planning, implementation and supervision of the delivery of urban and rural water and sanitation services across the country, including water for production. DWD regulates the provision of water supply and sanitation. It also provides capacity development and other support services to Local Governments, Private Operators and other service providers. DWD comprises of three Departments; Rural Water Supply and Sanitation; Urban Water Supply and Sanitation and Water for Production. The Regulation Unit of MWE regulates urban water supply services

ii. **The Directorate of Water Resources Management (DWRM)** is responsible for developing and maintaining national water laws, policies and regulations; managing, monitoring and regulation of water resources through issuing water use, abstraction and waste water discharge permits; Integrated Water Resources Management (IWRM) activities; coordinating Uganda's participation in joint management of trans-boundary water resources and peaceful cooperation with Nile Basin riparian countries. The directorate comprises three departments, namely; the Department of Water Resources Monitoring and Assessments, Department of Water Resources Regulation and Department of Water Quality Management.

iii. **The Directorate of Environmental Affairs (DEA**) does the regulation, coordination, inspection, supervision and monitoring of the environment and natural resources as well as the restoration of degraded ecosystems and mitigating and adapting to climate change. DEA is comprised of four Departments of Environmental Support Services (DESS), Forestry Sector Support Department (FSSD), Wetlands Management (WMD) and the Department of Meteorology (DOM).

iv. **The National Environment Management Authority (NEMA)** is responsible for the regulatory functions and activities for compliance and enforcement of the existing legal and institutional frameworks on environmental management in Uganda. NEMA's mandate

covers both green and brown issues of environmental management. It oversees the implementation of all environment conservation programmes and activities of the relevant agencies both at the national and local Government level.

v. **The National Forestry Authority (NFA):** NFA is responsible for sustainable management of Central Forest Reserves (CFRs), supply of seed and seedlings, and provision of technical support to stakeholders in the forestry sub-sector on contract.

vi. **The Water Policy Committee (WPC)**provides an avenue for promoting IWRM at national level and guiding the strategic management and development of water resources of the country. The WPC also coordinates the preparation of national water quality standards, mediates and undertakes conflict resolution between national authorities on water resources matters.

vii. **The Policy Committee on the Environment** consists of ten ministers responsible for natural resources and is responsible for harmonising the sectoral roles and responsibilities over the range of environmental issues across its jurisdiction. The committee plays a critical role in integrating environmental considerations into the policies, plans and programmes of the respective sectors and sub-sectors.It also provides policy guidance and oversight to NEMA.

A number of **other line ministries** have important roles in the sector as shown in Table 2.1.

Table 2. 1: Key Line Ministries and Responsibilities

Line Ministry	Responsibility
Ministry of Health	Responsible for hygiene and sanitation promotion for households through the Environmental Health Division (EHD).
Ministry of Education and Sports	Responsible for hygiene education and provision of sanitation facilities in primary schools. It also promotes hand washing after latrine use in the schools.
Ministry of Agriculture Animal Indistry and Fisheries	Responsible for spearheading agricultural development, including the on-farm use and management of water for production (irrigation, animal production and aquaculture).
Ministry of Gender, Labour and Social Development	Responsible for gender responsive policy and programme development as well as community development/mobilisation.
Ministry of Lands, Housing and Urban Development (MLHUD)	Responsible for the management of land affairs including physical planning, surveys and mapping, valuation, land registration.
Ministry of Tourism, Wildlife and Antiquities	Through Uganda Wildlife Authority, the Ministry of Tourism, Wildlife and Antiquitiesmanages the forests in National Parks and Wildlife Reserves, especially under the Uganda Wildlife Act, 1996 (CAP 200).
Ministry of Finance, Planning and Economic Development (MoFPED)	Mobilises funds, allocates them to different sectors and coordinates development partner inputs.

2.3.3 Capacity Building and Support Institutions

i. **TSUs:** The mandate of TSUs is to support the capacity building of district-based structures. This involves training, technical advice, support supervision of Districts to enable them effectively implement for their roles in the rural sub-sector. The mandate of TSUs also covers water for production.

ii. **Umbrella Organizations (UOs)** are regional organisations constituted as associations of the local Water Supply and Sanitation Boards(WSSBs) with the principal objective of providing operation and maintenance (O&M)back-up support. The organisations provide the following services to their member boards:

- Training
- Technical support
- Legal support
- Organizational support
- Support supervision of rehabilitation and extension works
- Water quality monitoring

The UOs also support and supervise monitoring and reporting procedures, hence providing services to administrative bodies e.g. MWE /DWD and donors. The concept has been successful in the Southwest part of the country, where functionality of water systems is above 90%. Two additional UOs have been set up to support the Eastern Region (Mbale) and the Mid-Western region (Kyenjojo).

iii. Water Management Zones (WMZs): Four WMZs were established in 2006 as part of the Water Resources Management Sub-Sector Reform. The WMZs provide the decentralised MWE presence in implementation of catchment-based management. The WMZs enable integration and synergy of existing functions of TSUs and UOs, conduct monitoring and regional assessment and general planning and coordination of catchment-based WRM activities.

iv. The Water and Sanitation Development Facility is a funding mechanism for investments at community level through a demand responsive approach. One of the key objectives of the WSDF is to improve the socio-economic situation and the opportunities for people living in rural Growth Centers (RGC) targeted by the project through provision of safe, adequate, reliable and accessible water supply and promotion of sanitation facilities. Emphais is placed on gender issues to ensure that women are empowered and involved in decision making. The WSDF overs the following areas: South western (WSDF – South West based in Mbarara), Northern region (WSDF North based in Lira), Eastern (WSDF-Eastern based in Mbale) and Central (WSDF Central based in Wakiso

2.3.3.1 Civil Society Organizations

CSOs contribute to the water and sanitaion sub-sector by iproviding services, mobilising communities, testing new technologies and contributing to national policy debates. CSOs in the sector operate under the coordination of the Uganda Water and Sanitation NGO Network (UWASNET). UWASNET has an active membership of over 170 NGOs and CBOs.

CBOs are also active in service delivery and advocacy for sustainable forest sector development.

They work especially at the grassroots levels, mobilising and sensitising local people, supporting active local participation in managing forests and trees, providing forestry advisory services, and advocating for the concerns of the underprivileged in national development processes. Local NGOs and CBOs working in the forestry sub-sector operate under an umbrella organisation, the Uganda Forestry Working Group (UFWG), whose secretariat is housed by Environmental Alert. An estimated 200 CSOs are involved in environment and natural resources. The following frameworks provide guidance on the relationship between CSOs and districts in WASH implementation:

- The strategic framework for cooperation between local governments and NGOs for water and sanitation provides guidance to LGs and NGOs on how to jointly plan and implement community mobilization/software activities with respect to WASH. It also provides guidance to districts on how to procure NGOs to undertake software activities. This means that districts with gaps in capacity and staffing can out-source software works to NGOs without any legal restriction or hurdles.

- The Local Governments Act (1997) requires NGOs to undertake joint planning with districts and to implement plans that are integrated in the District Three Year Development Plans. CSOs should, therefore, use all available avenues to participate in district planning and budgeting.

2.3.4 District Level (Local Governments)

Local Governments(LGs), which include Districts, Town Councils, and Sub-Counties, have the mandate and responsibility for planning and implementing water and sanitation sector activities for their communities. LGs are empowered by the Local Governments Act (1997) to provide water services and manage the Environment and Natural Resource base. LGs, in consultation with MWE, appoint and manage private operators for all piped water schemes that are outside the jurisdiction of National Water and Sewerage Corporation (NWSC).

2.3.4.1 District Roles and Responsibilities

Different district departments have various but complimentary roles to play in planning and implementing water and sanitation activities as elaborated below. However, the implementation of sector activities requires full participation and cooperation between all major stakeholders including NGOs:

i. The District Water Office (DWO):- The DWOtakes the lead in the implementation of all the water and sanitation activities at district level. The main roles performed include:

- Planning
- Initiation and supervision of crosscutting and sustainability issues
- Initiation and follow up of procurements
- Drafting of contracts
- Supervision of contractors and consultants
- Contract management
- Initiation and following up of capacity building
- Ensuring operation and maintenance (O&M) of water and sanitation facilities by WUGs
- Initiate and carry out monitoring, together with other stakeholders
- Ensure that reports are submitted to the appropriate authorities in time
- In case of disasters and emergency situations, actively participate in disaster management in collaboration with other relevant departments.

ii. **The District Directorate of Health Services (DDHS):-** The DDHS is responsible for coordination with the DWO in implementation of sanitation activities and hygiene education promotion. The Health Assistants who are stationed at Sub-County level have responsibilities that include water and sanitation related activities, hygiene education and promotion of behaviour change. In some instances, staff from the District Health Inspectorate can be seconded to manage sanitation activities in the DWO (e.g. Assistant District Water Officer –Sanitation). Joint planning and implementation of activities between the DWO and DHI should assist in effective utilisation of resources in the sector.

iii. **The District Directorate of Community-Based Services (DDCBS):-** DDCBS must work jointly with the DWO in matters related to community sensitisation and mobilisation before,during and after construction (i.e. pre and post-construction). These activities are intended to ensure sustainability of water and sanitation facilities.

The DDCBS should:
Second staff to work in the DWO (as Assistant District Water Officer – Mobilisation)
At Sub-County level, work with Sub-County Community Development Officers (CDO) and Community Development Assistants (CDA) to carry out mobilisation for water and sanitation activities. There is need for considerable coordination to maximise the efforts in carrying out the tasks.

iv. **The District Education Office (DEO):-** The DEO liaises with the DWO and DDHS in planning and implementation of sanitation and hygiene education in schools and institutions.

v. **The District Environment Office** is responsible for the environment and natural resources.

vi. **District Forest Services of local Governments (LGs/DFS)** manage Local Forest Reserves (LFRs); carry out support and quality control of forest extension for private and community forests; develop and enforce bye-laws; strengthen forestry in production and environment committees and district development plans; as well as land administration, surveying, and approval of Community forests.

vii. **The Chief Administrative Officer (CAO):** The CAOis responsible for the overall management and approval of the district water and sanitation programme. The CAO is the accounting officer for all district funds.

viii. **The District Planne**r coordinates the planning of water and sanitation activities in the Local Governments.

ix. **The District Finance Officer(DFO):-**The DFOis involved in approval and processing of payments for the water and sanitation activities.

x. **The District Engineer** is the head of the Engineering Department(Directorate of Works and Technical Services) in the district. She/He is involved in the implementation of the district water and sanitation programme and is the immediate supervisor of the DWO.

xi. **District Water and Sanitation Coordination Committees (DWSCCs):** These comprise of administrative and political leaders, technocrats and NGO/CBO representatives at district level. The role of the DWSCC is to oversee the implementation of WSS programmes, strengthen collaboration and coordination with other sectors (health, education, social development and agriculture) and other players (private sector, NGO and CBOs and civil society). The DWSCCs meet on a quarterly basis.

xii. **District Hand-pump Mechanics Associations (DHPMA):** The MWE, and its development partners have promoted the setting up of district HPMAs in all districts in Uganda.

The associations undertake hand-pump repairs in all Sub-Counties of respective districts. The HPMAs are trained (as shown in Picture 2.1 i.e., mechanics undergoing training) and equipped with tools and materials to facilitate hand-pump repairs in their areas of operation; they are required to enter into performance contracts with clearly defined targets within Sub-Counties and districts. The Functionality Thematic Working Group, which was set up by the MWE, recommends that HPMAs first register as CBOs as required by the Ministry and be allowed to undertake commercial activities to ensure their sustainability.

Picture 2. 1: Members of the Lira DHPMA undergo refresher training, January 2012. Photo: IRC/Triple-S

xiii. **The District Environment Committee** coordinates the activities of the district councils relating to the management of the environment and natural resources.

xiv. **The District Contracts Committee (DCC)** is established by the Chief Administrative Officer (CAO). The contracts committee is responsible for adjudication of recommendations from the Procurement and Disposal Unit and award of contracts; approving the Evaluation Committee; approving bidding and contract documents; and approving procurement and disposal procedures. The DCC is comprised of five members who are nominated by the Chief Administrative Officer (or Town Clerk, in the case of municipalities), and approved by the Secretary to the Treasury before formal appointment. The DCC includes a chairperson, secretary and maximum of three other members. A person shall be a member of the contracts committee in his or her individual capacity as distinct from his/her position or designation. More details regarding the Contracts Committee are set out in the PPDPA Act (2003) and Local Government PPDPA Regulations (2006).

xv. **The District Procurement and Disposal Unit** is responsible for the management of all procurement and disposal activities except adjudication and the award of contracts. Functions include: supporting the contracts committee; planning procurement activities; recommending procurement procedures activities; preparing and issuing bid documents; advertising bid opportunities; and issuing approved contract documents.

xvi. **The District Evaluation Committee** undertakes evaluations and reports to the District Procurement and Disposal Unit. It comprises a minimum of three members. The members are required to sign a code of ethics, provided under the Public Procurement and Disposal of Pubic Assets Act (2003), declaring that they do not have any conflict of interest in the procurement requirement.

xvii.

2.3.5 Community Roles and Responsibilities

A **Water and Sanitation Committee** (WSC)/**Water User Committee** (WUC) is the executive organ of a water user group and shouldbe established at each improved water point. Water User Communities organise themselves by forming WUCs to oversee the O&M of the water facilities. The roles of WUC in a functional CBMS are shown in Box 2.2 below

Box 2. 2 Roles of the Water User Committees

- Appoint water source caretakers (WSCs) to manage the day today O&M of water facilities; including cleaning the surroundings, carrying out preventive maintenance and minor repairs of the water facilities.
- Ensure proper use and maintenance of their water facilities.
- Collect cash or contributions in-kind from water users for the purpose of maintaining the water facilities.
- Open a bank account and ensure safe custody of money collected
- Select technicians; 1- 2 HPMs, plumbers and gravity flow scheme attendants (GFSAs) for training by the district/centre (MWE)/Project
- Pay for the services of the technicians.
- Report repair requirements beyond the financial capacity of the water user communities and technical capacity of the technicians (e.g. replacing pipes and de-silting) to the Sub-County
- Pay for the cost of the spare-parts for repairing their water facilities

The functionality of the WUC ensures sustainable operation and maintenance (O&M) including cleanliness of the source. Picture 2 shows some members of a WUC with a well maintained source in the background.

With respect to the environment and natural resources, over the years, community members have been encouraged to form user groups at local level, e.g., Beach Management Units (BMUs), Forestry Resource User Group, Land Committees and Environment Committees. These structures are intended to enable oversight of the environment and natural resources at the lowest level.

Picture 2. 2: Members of WUC, Okello Amuku shallow well, Akolodong village

2.3.6 Private Sector

The private sector is responsible for direct implementation of water and sanitation sector activities through contracts from the local governments or through provision of services paid for by either the users or the local governments. Their roles include construction of water sources and borehole drilling as well as the provision of consultancy services. Private firms undertake design and construction in water supply and sanitation under contract to local and central government. The engagement of the private sector using contracts is undertaken through a competitive manner and is based on the procurement guidelines. Supervision of the private sector is undertaken by DWO and/or appointed consultants. Private hand-pump mechanics and scheme attendants provide maintenance services to water users in rural and peri-urban areas. Private operators manage piped water services in small towns and rural growth centres. On the other hand, private forest owners (PFOs) including local communities with registered forests are legal forest management authorities.

2.3.7 Key Co-ordination Activities

i. The Annual Joint Government of Uganda - Donor Water and Environment Sector Review: Commonly referred to as the Joint Sector Review (JSR). This is a forum for performance assessment, budget and policy guidance attended by representatives from local Governments, development partners, NGOs, government Ministries and other stakeholders. The JSR allows a broad spectrum of stakeholders to get insight into, discuss and influence sector developments. It draws conclusions and makes recommendations on the overall developments in the sector. The Water and Sanitation Sector Working Group (WSSWG) makes binding decisions during the JSR, such as endorsing formal undertakings.

ii. **TheAnnual Joint Technical Review (JTR):** The JTR is a forum for a mid-term technical assessment and follow-up on the implementation of the agreed undertakings of the previous JSR. The JTR is held about six months after the JSR, and is normally attended by government institutions, agencies, selected local governments, Development Partners, civil society organizations in the sector, and stakeholders from the private sector.

iii. **Inter-District Meeting (IDMs):** The IDMs bring together political and technical heads of the Local Government, Private Sector, and NGOs to share implementation experiences and mechanisms of cooperation, usually at regional/multi-district level. They enable MWE to explain policy related issues and provide an interface between DWD and the Local Government where views that affect implementation are explained and shared. They are held bi-annually and facilitated by the MWE personnel.

Chapter Three: Sector Strategies and Plans

3. Introduction

The implementation of WASH activities in Uganda is guided by a number of sector strategies regarding the following: O&M, gender equity and equality, HIV/AIDS, pro-poor strategies, water quality, rainwater harvesting, RGCs and WASH during emergencies. This Chapter therefore summarises all key water and sanitation sector strategies as of June 2012. Annex 3 provides soft copies of all readily available strategy documents.

Sector Strategies

3.1 The Water and Sanitation Sub-sector Gender Strategy

The MWE/DWD developed a Gender Mainstreaming Strategy (2003-2008) for the WSS, which was revised and culminated into the Water and Sanitation Sub-sector Gender Strategy (2010-15). This strategy provides stakeholders with operational guidelines on how gender principles and concerns will be mainstreamed within the water sector. It is intended to form an integral part of sector activities and, therefore, its objectives and activitieshave to be simultaneously outlined within departmental work plans of operation. The Strategy also sets gender targets for the sector and outlines key strategies for achieving these targets.

The overall objective of the strategy is 'to empower women, men and vulnerable groups through ensuring equity in access and control of resources in the water and sanitation sector, leading to poverty reduction.' This is envisaged to be realized by addressing the following specific objectives:

i. Integrating a gender perspective in the water and sanitation sector policies and developing guidelines to operationalise gender in programme planning, implementation, M&E.
ii. Enhancing capacity of the water and sanitation sector stakeholders for gender mainstreaming.
iii. Improving opportunities for men, women and other disadvantaged groups to access water and sanitation facilities and to participate in their management.
iv. Strengthening the collection, analysis, documentation and dissemination of gender related information for enhancing the visibility of gender issues and achievements in the sector.
v. Promoting and building partnerships and networks with other institutions for effective implementation of the strategy.

3.1.1 The HIV/AIDS Mainstreaming Strategy

The MWE/DWD developed an HIV/AIDS Strategy to ensure mainstreaming of HIV/AIDS in WASH services (MWE/DWD, 2004).

The Strategy provides districts and Sub-Counties with guidelines on how to mainstream HIV/AIDS in the Sector. By mainstreaming HIV/AIDS, MWE/DWD aims at retaining the capacity and productivity of staff by reducing HIV/AIDS infection, encouraging safe sex practices and providing counselling and support to those living with HIV/AIDS. The Strategy, which aims at building awareness among MWE staff, targets peer leaders in each department, and women leaders who are required to influence the behaviour of their peers.

3.1.2 The National Framework for Operation and Maintenance of Rural Water Supplies

The 'National Framework for Operation and Maintenance of Rural Water Supplies' was first formulated in March 2004, and revised in 2011. It sets guidelines for all sector players in the use and maintenance of water facilities to rural communities. The updated O&M Framework aligns sub-sector plans to the objectives, strategies and interventions as set out in the NDP (2010/11-2014/15), which spells out GOU commitment to increase access to safe water supply in rural areas from 63% to 77% by 2015 as well as improving functionality of water supply systems.

The key goals of the O&M Framework are:

- To provide guidance and policy direction for streamlining O&M in daily operations at all levels within the sub-sector, to ensure long term sustainability of facilities and enjoyment of intended benefits.
- To form the basis for planning, implementation and monitoring of O&M to be used by all actors including government and development partners involved in implementation and support of rural water and sanitation sub-sector.
- To raise awareness on the need to plan and balance O&M issues with investments in new facilities.
- To streamline and strengthen O&M aspects in the planning and implementation of water and sanitation activities by key sector players.

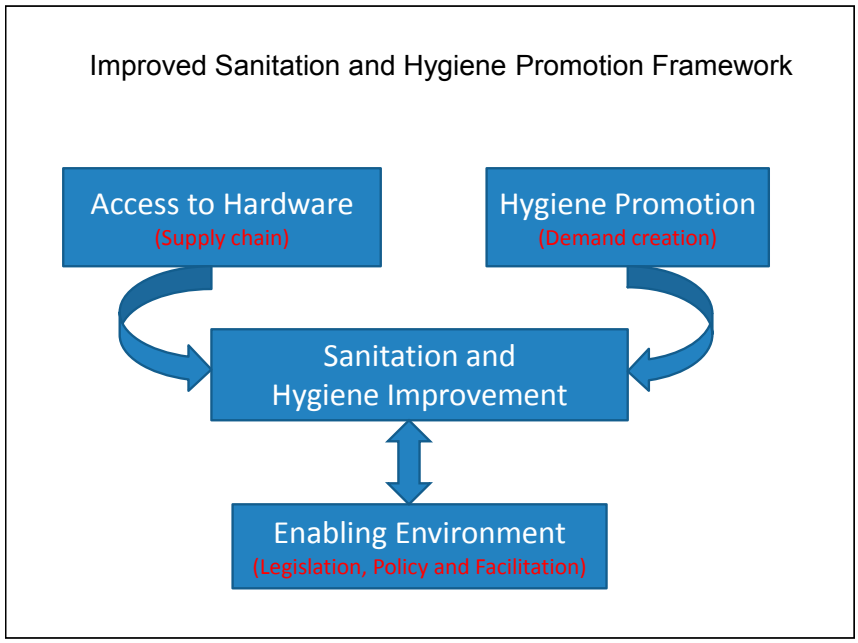
The O&M framework is in line with the CBMS. Under CBMS, community members are responsible for the operation and maintenance of their water supplies, while Sub-Counties and districts are responsible for offering them back up support. Communities are expected to formulate an O&M plan to guide their activities. It should be noted, that the Government is now encouraging a 3year rather than an 8year O&M Plan because it is more realistic.

3.1.3 The Improved Sanitation and Hygiene Framework and Strategy

The MoH spearheaded the development of the 10-year Improved Sanitation and Hygiene (ISH) financing strategy that identified three pillars for successful sanitation programming. The three sanitation pillars are:

- demand creation,
- supply chain improvement
- providing an enabling environment.

The ISH strategic framework may be summarized as shown in Figure 3. 1:



3.1.4 The Pro-Poor Strategy for the Water and Sanitation Sector 2006

The Government of Uganda formulated the Pro-poor Strategy for the Water and Sanitation Sector (2006) with the aim of improving the effectiveness of the WASH sector in providing services to the poor. The Strategy presents general actions as well as those for the four sub-sectors (rural water supply and sanitation; water for production; small and large towns water supply and sanitation and water resources management). Table 3.1 provides a summary of the action points as contained in the pro-poor strategy.

Table 3. 1: Pro-poor General and rural water action points

	General Strategies
A	Allocate sub-sector budget equitably
B	Improve overall sector performance
C	Lower costs of service delivery
D	Improve sanitation and hygiene practice
E	Monitoring the impact of W&S services on the poor
F	Gender, people with disabilities and HIV/AIDS mainstreaming
G	Implement Integrated Water Resource Management (IWRM)
	Rural Strategies
A	Empower communities through participation to ensure cross-subsidy
B	Target W&S services towards the poor and unserved
C	Increase density of water points / networks and thus reduce distance to water source
D	Encourage self supply based on markets solutions
E	Promoting Rain Water Harvesting (RWH)
F	Water Quality Protection and monitoring
G	Prioritize interventions in poorest geographical areas
H	Phase out use of grants for operation and maintenance
I	Involve women in planning and management
J	Subsidise bulk rural supplies in highly disadvantaged areas

3.1.5 National Water Quality Management Strategy

The National Water Quality Management Strategy (2006)aims at ensuring that water quality is recognised as a cross-cutting issue, and mainstreamed in all water, sanitation and environmental management activities. Specifically, the Strategy aims at:

- Promoting awareness and education on water quality management for all stakeholders;
- Promoting integrated water resources management;
- Ensuring that the quality of Uganda's water resources is protected, maintained and improved;
- Promoting effective coordination and sustainability for water quality management; and
- Ensuring generation of accurate and reliable water quality information for decision-making and support.

In view of the above, 10 strategic targets and associated actions are set as priority issues requiring urgent attention. A summary of Water Quality Guidelines and Standards as well as key issues to be considered by District Local Governments are set out in Chapter Nine.

3.1.6 Strategy for Emergencies and Internally Displaced Peoples Camps

At the time this strategy was developed in 2004, much of Northern Uganda was engulfed in a war situation with majority of the population displaced and therefore residing in camps. The strategy was then developed to cater for such situations. To-date, the whole country is relatively peaceful, but still experiencing other natural disasters and emergencies such as landslides in Eastern Uganda. The Operational Strategy for Water and Environmental Sanitation Emergency Response in Uganda (2004), which sets out the following three key areas, still remains relevant:

- Operational framework;
- Financing mechanisms; and
- Strategy action plan.

The strategy sets out key roles and responsibilities for assessment, ratification, co-ordination, implementation, O&M and M&E as well as institutional capacity building. The Strategy places responsibility on line ministries to respond to disasters under the coordination of the Office of the Prime Minister (OPM) at national level and District Disaster Management Committee (DDMC) at district level.

The strategy outlines the key issues need to be addressed in order to develop a functional and effective institutional and operational framework: sanitation responsibility, capital costs, operation and maintenance and NWSC piped water supplies. In this regard, the strategy places the water sector implementation within the jurisdiction of DWOs in conjunction with the private sector, NGOs and CBOs, but in consultation with the DDMC.

To enable district sector departments and DWD to respond to emergency situations, each line ministry should have a Disaster Response Unit (DRU) with key trained personnel that can be deployed to emergency-affected areas. For effective implementation, the DRUs need to comprise the Unit Head, a Capacity Building Officer and four Chief Emergency Advisors. Resources and facilities should be readily available to DRU staff in case of an emergency.

3.1.7 Rural Growth Centres Strategy

The RGC is generally made up of a core trading centre and its fringes. The core normally comprises of a densely populated nuclear settlement around a commercial zone. RGCs are in transition from villages to small towns and are divided into three categories based on their population size as follows:

6.
7. 500 – 1,500;
8. 1,500 – 3,000 and
9. 3,000 – 5,000.

A given RGC may transition from one category to the next if its population increases. The projected change in population, coupled with the social infrastructures, determines the water technology choice and implementation strategy for RGCs. Inadequate water and sanitation services in RGCs constrain economic development and cause environmental and health problems.

The Long Term Strategy for Investment, Planning and O&M of Water Supplies and Sanitation in RGC, (MWE 2005), referred to as the RGC Strategy sets out the (i) service level and technical options; (ii) investment plan; (iii) implementation; and (iv) operation and maintenance. Details of these are provided under the respective chapters such as those on technology options (Chapter 6) and Sanitation and O&M (Chapter 5).

The recommended main technical option for water supply to RGCs is piped water supply. Alternative low cost options can be applied only if piped water is not viable. Guidelines for the investment plan recommend public stand posts (90%); yard taps (8%) and house connections (2%), but there are variations depending on settlement types and household income. The targeted area is the core, built up area of the RGC. Immediate surrounding villages can be supplied with piped water if financially viable. Gravity fed piped water supply is preferred whenever feasible in order to reduce both capital and running costs. It has been found that, although water demand tends to be low in the first years of operation, it increases over time.

The O&M strategy for RGCs is based on user responsibility for O&M, private sector engagement and backup support to Water and Sanitation Committees and scheme operators. The users must provide land and pay for connection to the piped water supplies. The local communities have full responsibility for scheme O&M as well as replacement costs. All customers are charged a tariff. Tariffs and collection methods will vary according to the type of scheme and running costs. More details are given in Chapter Five.

Excreta disposal options for households in RGCs are eco-san toilets, traditional simple latrines, sanitary platform latrines, ventilated improved pit latrines and water closets with septic tanks and drainage systems. The latter is only applicable where there is connection to a piped water supply. Multiple stances toilets should be constructed in public places such as markets. These require a caretaker for operation and maintenance. As people in an RGC utilise more water, it is also important to plan and construct proper drainage systems to prevent the stagnation of wastewater.

However, construction of sewer systems in RGCs is not a viable solution.
Solid waste collection at household level is not viable, but instead focus should be on awareness and sensitisation campaigns to change behaviour and encourage reuse or recycling and satisfactory disposal of remaining solid wastes. Authorities should focus on waste management in public places (e.g., refuse bunkers and trucks operated at District level). There should always be planning for solid waste landfills or gazetted dumping sites for RGCs.

Financial viability of RGCs is the main principle. Investments in the planning, design, mobilisation and construction are made by GoU and Development Partners. Implementation schedules for each District have been prepared up to 2015 and can be obtained from MWE/DWD on request. Details on the implementation components of RGCs are given in Chapter Eight, which sets out contract management procedures.

3.2 Sector Plans

3.2.1 The Rural Water and Sanitation Sector Investment Plan

The Sector Investment Plan(SIP-15) outlines the key strategies that can be used in provision and management of water and sanitation services to the rural communities and rural growth centres (RGCs). The SIP-15 details the implementation strategy of the RWS. The key concepts and underpinning approaches in SIP – 15 are:

- A demand-responsive approach
- A decentralized approach
- An overall Sector-Wide Approach to Planning (SWAp)
- Integrated approach and integrated management of water resources
- Sustainability
- Financial viability of public utilities and sound financial practices

- Co-ordination and collaboration of the major actors
- Institutional reform
- Private sector participation
- Monitoring and reporting
- Information and awareness-raising

In addition, SIP-15 provides an overview of the multitude of emerging issues in the Sector for each sub-sectoras summarised in Table 3.2.

Table 3. 2: Sub-sector strategies

WaterResources Management • Strengthening regulation; • Catchment-basedapproachestoIWRM; • Trans-boundaryWRM cooperation; • Monitoring of quantity and quality of waterresourcesdata; • Strengthening stakeholder participation and Public-PrivatePartnerships for WRM; • Adaptation to climate change	Sector Coordinationandmanagement • Sector Wide Approach to Planning (SWAP); • Strengthen WRM as the foundation for sustainable development; • Achieving synergies from local level support mechanisms; • Pro-poor strategies for theWater and Sanitation • Gender- mainstreaming gender insub-sector strategies and plans • HIV/AIDS –mainstreaming.
Rural WaterServices • A demand responsive approach; • Adecentralized approach; • Targeted Programs – especially in water stressed areas; • A "Package" approach – including all software aspects; • Attainfinancial viability; • Community based O&M; • Capacity building of LGs	Water forProduction • Poverty ReductionFocus; • Demand-Responsive Approaches; • Sustainability – useof community based systems; • Cost-efficiency; • Decentralisation and Management atthe Lowest Appropriate Level; • Privatisation and Private Sector Involvement; • Gender Responsive Approach; • Environment and Health concerns; • Integrated Approach to Planning – including software.
Sanitation • A demand creation approach; • A "Package"approach– including software; • Adoption of appropriate technologies; • Capacity building for local governments; • Enabling Environment.	

Chapter Four: District Planning, Monitoring, Evaluation and Reporting

4. Introduction

To effectively respond to existing needs, keep track of the implementation progress and make timely reports district local governments need to set up good and efficient systems for Planning, Monitoring, Evaluation and Reporting (PMER). This Chapter explains the procedures for water and sanitation sector PMER at District, Sub-County and community level.

4.1 The District Planning Cycle

4.1.1 Overview

The Government of Uganda (GOU) Financial Year (FY) runs from the 1st of July to the 30thof June. Planning in local governments starts in October/November when Ministry of Finance, Planning and Economic Development (MoFPED) issues the "Budget Call Circular" to central Government informing all line ministries,to start the budget preparation process for the subsequent year.The purpose of the circular is to:

- Communicate the proposed priorities for the subsequent financial year including indicative expenditure figures;
- Emphasize the policy and administrative guidelines for the development of the Budget for the subsequent financial year; and
- Request each line ministry to prepare Sector Budget Framework Papers (BFPs) for the subsequent financial year and submit them to MoFPED by a specified deadline.

The sector BFPs should provide detailed sector priorities and activities geared towards achieving sector objectives in line with the National Development Plan (NDP) and sector Strategic Investment Plans. In the case of the Water and Sanitation Sector, the DWSCG District allocations are set out in the BFP.

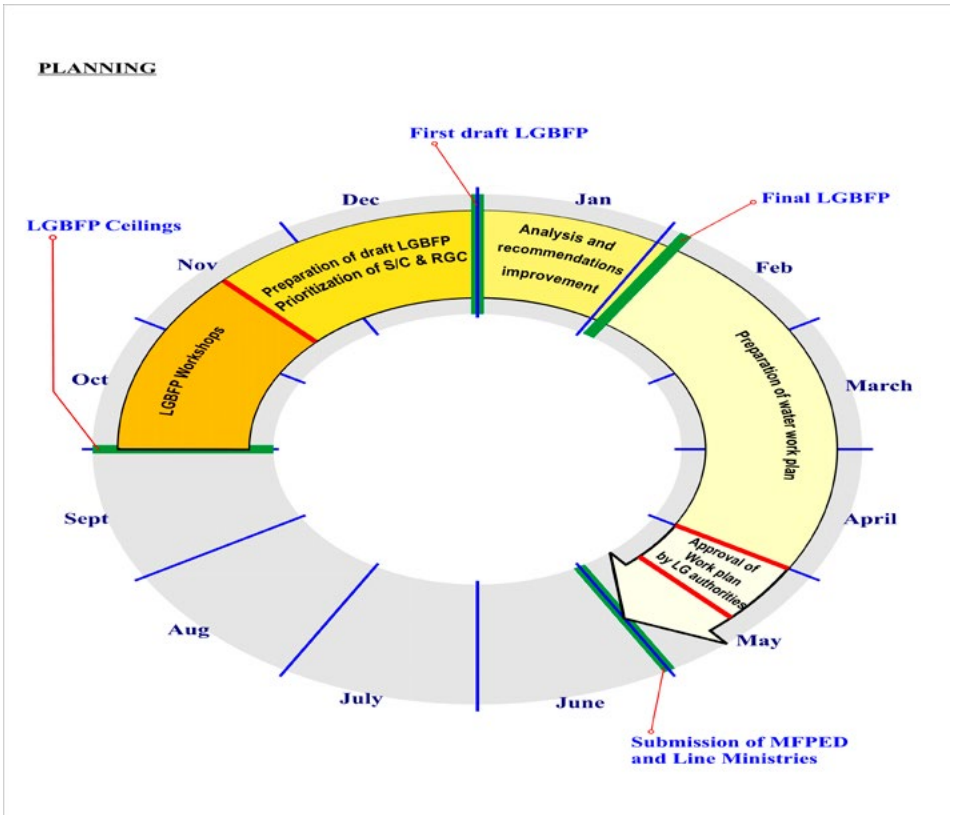
The cycle of water and sanitation events that take place in the LGs commences in October with planning for the subsequent financial year. The planning cycle for DLG is divided into four phases that are further divided into steps and activities as set out in Table 4.1.

Table 4. 1: District Government Planning Cycle

PHASE ONE (Situation Analysis) – July to September
Step 1 - Preparation for the planning cycle
Step 2 - Feedback to the lower local government
Step 3 - Situation analysis
PHASE TWO (Strategic planning) – September to October
Step 1 – Review of District Local Government performance
Step 2 – Strategic planning
PHASE THREE (Formulation of the Budget Frame work Paper) – October to January

Step 1 – Preparation for Budget Framework Paper process
Step 2 – Local Government Budget call
Step 3 – Compile Budget Frame work Paper
PHASE FOUR (Consolidating the plan) – January to June
Step 1 – Produce draft District Development Plan (DDP)/Municipal Development Plan (MDP)
Step 2 – Preparation of summary budget
Step 3 – Approval and submission of plan and budget to MoFPED

Figure 4. 1: District Planning Cycle



Below is an outline of the activities that should be undertaken in each phase of the planning process:

Phase 1: Situation Analysis (July- September)

This is the first stage of the local government development planning cycle. During this stage, districts and Sub-Counties review the existing water and sanitation situation and review previous strategies and activities to determine what worked or did not work and to identify better ones for the following year. Participants in this process should include relevant district staff or Sub-County staff. Participants may ask and try to answer the following questions as shown in box 4.1:

Box 4. 1: Possible Questions by participants in Phase 1 of Situation Analysis

10. What is the current situation/where are we now and how did we get here?
11. What was planned and what was achieved?
12. How much of what was planned was carried out successfully?
13. What was planned but not achieved and why?
14. What can be done to avoid or eliminate these factors?
15. What new gaps or needs have come up recently?
16. What is the way forward and what direction do we go, what is needed to get there, whom do we work with, in what time period?

Phase 2: Strategic Planning (September to October)

Step 1: Community Participatory Planning

The process of planning should start at the community level, and should be participatory, involving community members in order to ensure that the activities undertaken are demand responsive, and to provide a basis for sustainability of facilities. At this stage, the following activities in Box 4.2 should be undertaken:

Box 4. 2: Activities at Community Participatory Planning

17. Hold village level consultations to identify priorities of the community in water and sanitation.
18. Generate a list of local investment priorities and ideas by the community.
19. Work with local communities to rank different needs against each other in order of their perceived Importance in their local community
20. In order to transform these local priorities into community wide priorities, Parish development Committee (DPC) adds together all the projects from each village and sets priorities according to the needs of the communities.
21. The Sub-County Councils discuss the proposal from parishes and integrate them into the Sub-County budget including the proposed water projects. The projects should take into account the adjustments for population density, vulnerability, deprivation, possible poverty indicators to be used, gender disparities, number of people not accessing safe clean water, number of people with disabilities, number of people with HIV/AIDS etc.

Phase 3: Formulation of the Budget Framework Paper (October - January)

Step 1: Local Government Budget Call.

Between October and November of each year, the Ministry of Finance, Planning and Economic Development (MOFED), in preparation for the budget process sends out "budget call circulars to all Ministries. The call is disseminated to the district local governments, who ensure these reach the lower local governments. This call kick starts the budget preparation process for the subsequent year.

Step 2: Regional Local Government Budget Framework Paper Conference: The Local Government:

Budget Framework Paper (LGBFP) conference (sometimes referred to as the LGBFP workshop) is held in October/November. This comprises several regional workshops attended by representatives from District local Governments, central Government, line ministries, Civil Society and development partners. At the workshops, the following should be done:

- Review sector performance
- Specify medium-term objectives and outputs for the sectors in view of the available resources
- Identify funding sources

Once District local Governments have been made aware of the medium term objectives and outputs, they start the process of prioritizing what they plan to achieve in all sectors given the indicative resource envelope for their Districts. The sector Budget Framework Papers (BFPs) provide detailed sector priorities and activities geared towards achieving sector objectives in line with the National Development Plan and sector Strategic Investment Plans. The water and Sanitation sub sector District Conditional Grant allocations are set out in the BFP.

Step 3: District Budget Conference/Consultations and Drafting of the District LGBFP:

Immediately after the regional workshops, each DLG holds its own Budget Conference. The Districts/Municipalities organise their budget conferences bringing together stakeholders from the different levels of local government and civil society. Key activities during this conference should include:

- Explaining and discussing the implications of the policy guidelines from the MoFPED in relation to local needs and priorities
- Dissemination of indicative planning figures to the sub counties

At this level also, District/Municipality level meetings are held with the various Sectoral Committees of the Council, for the purpose of both preparing of the sector components of the Local Government Budget Framework Paper, and updating the District Development Plan (DDP). It is important to emphasize that the DDP is prepared taking into account the resources available over the medium term. The Planning units and the District Technical Planning Committees play a crucial role in coordinating this process.

Step 4: Community Level Consultations and Prioritization of Plans:

After the district Budget Conference, lower local governments hold planning meetings and their own budget conference to discuss their priorities in the different sectors for both recurrent and development activities, taking into consideration community requests. Key activities during these processes should include:

- Parishes and Sub-Counties identifying investment activities to be carried out in the next financial year and in the medium term, taking into account the resources available and the medium term indicative planning figures

- On the basis of these discussions the parishes and sub counties should update their Development Plans and forward them to the Districts/Municipalities, along with any sector issues relating to recurrent expenditures
- Sub-Counties should review the plans submitted by the Parish Development Committees (PDCs) against the budget allocated to them
- Sub-Counties select the communities in which they will undertake water source improvements
- After the Sub-County council has debated its budget (revenue and expenditure, recurrent and development) estimates, they should be submitted to the DTPC to be integrated into the district development plan and budget.
- The budget estimates debated and approved by the Sub County councils and with guidance from the DTPC are included in the DLG annual work plan and budget.

The planning schedule,as outlined above, allows Sub-County governments to incorporate the plans of parishes, and for the Sub-County plans to be integrated into district plans. Planning activities take place throughout the FY. Table 4.2 shows key planning activities for sub county governments and their timing.

Table 4. 2: Key Planning Activities and Scheduling of Sub-County Planning Activities

Month	Activity
July	Review Sub-County Technical Planning Committee (STPC) functionality
August	Dissemination of Planning Information for Parishes / Wards
September	Support to Villages / Parish level Planning
October	Situation Analysis at lower local Government (LLG) level
October	Discussion and Prioritization of LLG Strengths, Weaknesses, Opportunities and Threats (SWOT Analysis) i.e., Challenges/ Obstacles and Strengths/Opportunities
October	LLG Visioning and Goal setting
November	Identification of LLG investment priorities
November	LGBFP Conference (Regional workshops as outlined in Section 4.2.1)
December	Forwarding projects for District/Municipal consideration
January	Development of the project profiles
January/February	Review of project profiles by Standing Committees
February	Compilation of the draft SC Development Plan
March	Review of the SC Plan by the SC Executive
March	Refinement of the Draft SC Development Plan by the SC TPC
April	Discussion and approval of the SC Development Plan by the Council
April	Finalization of the SC Development Plan
April	Submission the Approved Sub-County Development Plan to the District local Government (also known as Higher local Government)
May/June	Final feedback to the Lower LC (parish/wards and villages/cells/zones)

Phase 4: Consolidating the Plan – (January to June)

Sept 1: Drafting the Local Government Budget Framework Paper.

At the district level, the process of the preparation of development plans will be integrated into the LGBFP. The development components of the LGBFP will reflect the activities identified in the updating of the Sub-County development plan and district plans. At this stage, planning officers in the district should consider the vulnerability issues such as gender, HIV/AIDS, disability, populations with low access to safe water and so on. The budget framework should:

- Set out the Local Government Recurrent Transfer Budget (LRTB)
- Highlight changes to the RTBs
- Show justification for the changes in the RTB
- Show preliminary planned outputs from development grants for the medium term.
- Show details of any other local government issues that are of concern to central Government.

Step 2: Finalisation of the Local Government Budget Framework Paper (LGBFP):

The LGBFP is finalized through the following process:

- The draft LGBFPs are discussed by the DPTC
- The Local Government Budget Committee holds follow-up visits to Local Governments to ensure that RTB amendments are in line with the allowed levels of flexibility
- Any queries are clarified and recommendations for improvement provided
- The LGBFP is finalised by the local government before being discussed and approved by the district executive committee
- The Local Government should then submit it to the LGBC by mid January.

Step 3: Work Plan and Budget Preparation:

After the District Budget Framework Paper (BFP) has been prepared; the DWO uses it to prepare the DWSCG work plan and budget. Districts submit the DWSCG annual work plan and budget to MWE/DWD (and a copy to MoFPED) at the beginning of each financial year. The work plan is prepared in consultation with other sectors and builds on experiences and lessons learned in the previous financial years. Preparation of the work plan and budget considers four overarching issues including the District and National Plans and Sector Guidelines, the Water & Sanitation Sector Strategies, the water and sanitation development issues and costs as well as the recurrent activities and costs.

Other considerations include Sanitation and hygiene promotion requirements, borehole rehabilitation needs, Supervision of construction activities and water quality monitoring activities

Step 4: Finalisation of the Budget

On receipt of LGBFPs, MoFPED will then check if the allocations are according to guidelines and it will accept or reject (with proposals for amendments) the submission. The LGBC will then aggregate the amended sector budget and sector budget-line allocations and feed the numbers back into the MTEF in early March, in time for inclusion in the National BFP.

At that time, the Final RTB and DTBs are disseminated to Local Governments. Districts then immediately disseminate the indicative development planning figures to Sub-Counties and parishes, to initiate the adjustment of annual work plans. The work-plans should be submitted to their respective local councils for approval in conjunction with the budget. Local Governments will sign letters of understanding with central government in which they agree to adhere to sector policies and guidelines, and pursue national sector goals. Local Governments will also be required to inform central government of their overall RTB and DTB allocations (as laid out in their LG

budgets),and planned sector outputs for the financial year, before they are allowed to access funds.

The District work plans are finalised by June and the first release of funds to the District should be done in July.

The district undertakes M&E throughout the year, and M&E data, along with information on expenditure, is reported on a quarterly basis. More details on the above process can be found in the Simplified Guide to LG Development Planning, Budgeting, Monitoring, and Reporting Cycle produced by UWASNET.

4.1.2 Civil Society Participation in District Planning and Budgeting

Civil society organizations (NGOs, CBOs, FBOs) involved in water and sanitation activities in the districts are required to take part in the district planning and budgeting process and to integrate their plans with those of the districts. The Local Governments Act provides the legal basis for this level of participation. Other government frameworks, such as the National NGO policy, recognize the role of NGOs in service delivery., The NGO policy specifically requires the CAO, as the top executive of the district and chair of the DTPC, to provide guidelines to NGOs in a district to enable them participate effectively in district planning and implementation. The role and involvement of CSOs should entail the following:

i. Participate in the situation analysis exercises at community level.
ii. Actively participate in the budget conference.
iii. Provide information about their past targets, achievements and gaps to the district.
iv. Share information about their program activity plans and budgets for the FY being planned for.
v. Discuss and agree with district key priorities during the FY being planned for.
vi. Discuss and agree on common strategies, geographical areas of operation and other elements of harmonization.
vii. As may be appropriate, sign MOUs with district local governments with respect to programs or projects jointly implemented.

4.2 District Work plan and Budget

4.2.1 Work plan and Budget Preparation

LGs receive funding from central government in the form of conditional grants as follows:

- District Water and Sanitation Development Conditional Grant (DWSDCG).
- District Sanitation and Hygiene Promotion Conditional Grant (DSHPCG).
- Environment and Natural Resources Conditional Grant to cover forestry, wetlands and lands was established in 2004. Although funds for forestry were allocated for 2004/05 FY, it was not accessed and has subsequently ceased. There is limited funding for wetlands management under the grant.

Apart from conditional grants, LGs can also mobilise additional resources for water and environment related activities.

After the DBFP has been prepared, the DWOshould use it to prepare the DWSDCG workplan and budget. The District Health Office should also prepare a workplan and budget for the newly

introduced District Hygiene and Sanitation Conditional Grant. Districts submit the DWSDCG annual work plan and budget to MWE/DWD (and a copy to MoFPED) at the beginning of each financial year.

The workplanshould be prepared in consultation with other sectors and builds on experiences and lessons learned in the previous financial years. Preparation of the workplan and budget should take some overarching issues, as detailed in Table 4.3.

Table 4. 3: Issues to be considered in preparing District Water and Sanitation Sector work plans

District & National Plans and Sector Guidelines	Water & Sanitation Sector Strategies	Water and Sanitation Development Issues and Costs	Recurrent Activities and Costs
• Current three-year District Development Plan (DDP) • Water and Sanitation Sector Schedules/ Guidelines for the given financial year	• Gender • HIV/AIDS • Operation and Maintenance (O&M) • Pro-poor • Water Quality Management • Emergency and IDP camps • Rural Growth Centres (RGCs)	• Community requests • Access and equity information • Groundwater maps • Technology options and costs • Rural Growth Centre (RGC) plans • Community mobilisation and follow-up requirements • Sanitation and hygiene promotion requirements • Water sources rehabilitation needs • Supervision of construction activities • Water quality monitoring activities	• Office overheads • Monitoring and Evaluation

4.2.2 District and National Plans and Sector Guidelines relevant to Planning and Budgeting

i. The Three-year District Development Plan (DDP): The DDP indicates what the district has planned to have implemented over three years. It includes the district water sector strategic objectives, priorities, targets, strategies, approaches and opportunities. It sets out a medium-term (3-year) strategy to improve water and sanitation in the district. The DDP details the amount of resources, the funding gap and technology mix proposed for different sub counties in the district. In addition to District Water and Sanitation Conditional Grant (DWSCG), the DDP considers contributions by development partners, NGOs, Local Government Development Programme (LGDP) and other sector players.

ii. Water and Sanitation Sector Schedules (sometimes referred to as the Sector Guidelines), are prepared annually by MWE/DWD. The schedules guide the DLG in the implementation of water and sanitation sector activities. They include references to sector policies and strategies; provide guidance on workplan and reporting requirements; and set sector standards, principles and procedures. The guidelines also include recommendations for the DWSCG allocations. This includes guidelines for allocations to lower LG, water supply facilities, software activities, borehole rehabilitation, sanitation facilities, water quality surveillance, supervision, monitoring and water office overheads.

4.2.3 Water and Sanitation Development Activities, Requirements and Costs

(i). Community Requests: To ensure that the activities undertaken are demand-responsive, the process of improving water sources should be participatory. To provide a basis for sustainability of facilities, the workplan should be based on community written requests to LG. More details regarding this are given in section 5.6.

(ii). Planning Information: Access and Equity Data - The MWE published the **Uganda Water Atlas 2010** based on the information collected during a baseline survey also known as the WATSUP project. The WATSUP had the central objective of improving the accuracy, validity and accessibility of information about water sources by:

(i) strengthening capacity in data management at district level,
(ii) up-date of the water sources baseline inventory (last carried out between 1998-2002),
(iii) production and dissemination of an updated National Water Atlas.

The water source information has been stored in the **Water Supply Data Base** (WSDB). Every year the MWE, through the DWO will carry out a water source status update for the Sector Performance Reports covering the addition of new water sources (or sources not yet captured during the baseline survey) and changes in the functionality, gender and management status.

The WSDB can be accessed by anybody through the MWE website. The website also gives the opportunity to download manuals on how to produce reports. Approximately 25 standard reports have been included and a query tool can be used to prepare custom made reports. The database will be linked to a mapping interface that will enable the user to generate maps with water sources, equity and access per Sub-County. The WSDB replaces the earlier District Management Information System (MIS) and Geographic Information System (GIS). DWOs are responsible for updating the database on a quarterly basis. The WSDB can be accessed through the MWE website (www.mwe.go.ug) under the heading "Resources". The Guideline for updating the WSDB gives an overview of the update information flow and responsibilities of the various stakeholders in this updating procedure.

The groundwater resources maps indicate the area's water resources potential. Groundwater maps should be used by DWOs to guide efficient and cost-effective groundwater resources planning and development. For each district, six types of maps are produced. Namely:

i. Water source location and water supply coverage,
ii. Hydro-chemical characteristics,
iii. Water quality,
iv. Groundwater supply technology options,
v. Hydro-geological characteristics,
vi. Groundwater potential.

District Groundwater maps and reports are available for most districts and using them will lead to an increase in drilling/construction success rates, reduction in failure of wells, reduction in cost of water supply systems, increase in water supply coverage and hence more benefit to the people and increase in number of sustainable water sources. The groundwater maps can be accessed through the MWE's website: www.mwe.go.ug or can be obtained through the Directorate of Water Resources Management.

(iii). Technology Options and Costs: The advantages and disadvantages of different technology types should be considered in planning. Chapter Six of this Manual describes the improved water supply technologies that are constructed using the DWSCG. The cost of investment and maintenance should be explained to the beneficiaries/end users and used for decision-making. Previous district reports and information from neighbouring districts should be used in estimating construction costs. Supervision costs and construction costs are to be budgeted for separately. Details of the technologies on which the investment plans are based on are indicated in the SIP-15 (outlined in Section 3.3.1)

(iv). RGC Plans: RGCs require pre-feasibility studies. This includes preliminary reconnaissance survey, preliminary water demand assessment and rapid water resources assessments. This will help to estimate the preliminary cost. More details can be obtained from MWE/DWD.

(v). Community mobilisation and follow-up requirements: DWD has developed a document entitled Steps in Implementation of Water and Sanitation Software Activities (2004) referred to as the Software Steps to guide district and sub county local governments in planning, advocacy, pre-construction mobilisation and training, construction and post-construction support. The Software steps are outlined in Chapter 5.

Before construction of a water source, it is essential carry out the software steps be carried out with communities. It should be noted that the budget figures given in the Software Steps are only indicative. The DWO should liaise with the District Directorate of Health Services and Community Development Office to properly plan for hygiene education. The illustrations below show some of the mobilization activities undertaken as part of the software steps.

vi. Sanitation and hygiene education and promotion requirements must be considered for communities where water source improvements are to be made. This is in line with the MOU signed between MWE, MoH and MES. Pictures 4.3 and 4.4 show some of the recommended hygiene and sanitation practices.

The DWO is responsible for sanitation and hygiene education and promotion at new water sources, and for the construction of

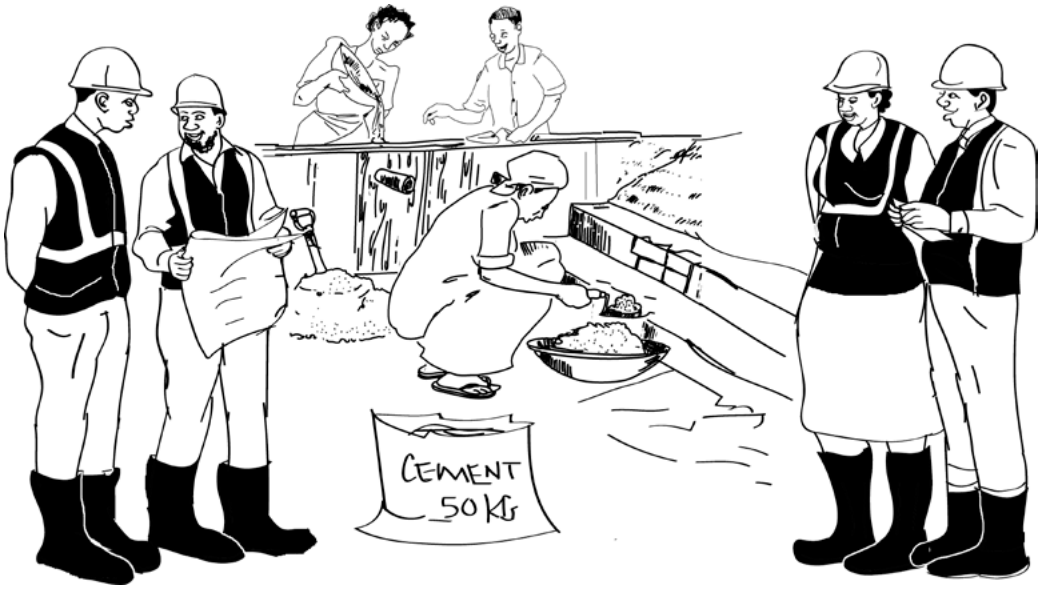
Picture 4. 2: Labour as a form of contribution

Picture 4. 1: Community mobilization

Picture 4. 3:Washing hands after latrine use

Picture 4. 4: Burning household solid waste

sanitation facilities at RGCs. Only these activities should, therefore, be planned for.
MoH, in conjunction with DWD, has developed guidelines for Sanitation and Hygiene education promotion in the districts entitled,Steps for Implementation of Sanitation Promotion Activities outlined in chapter 5.6. The DWO should liaise with the District Directorate of Health Services and Community Development Office to properly plan for hygiene education.



Picture 4. 5: Supervision of works

vii. Borehole Rehabilitation refers to major repairs that are beyond the scope of the community. **Table 5. 3: (Section 5.9)** provides more detailed information on the classification of major repairs. Borehole rehabilitation work should incorporate activities to reactivate Water User Committees. It should be noted, though, that if boreholes have been abandoned because of low yield they will never produce more water after rehabilitation. Only hydro fracturing might be an option. The "low yield" could also be because the contractor never put in enough rising mains. A pumping test could confirm the best pump installation depth.

viii. Supervision of Construction activities: Requirements for supervision of construction activities should be taken into consideration during the planning process. Construction supervision refers to the supervision undertaken by the District Water Office. The cost of citing and supervision of boreholes by the private sector are to be included under the cost of borehole construction. Chapter 8, on contract management, provides further details regarding construction supervision requirements for all technologies.

ix. Water Quality Monitoring Activities are to be undertaken for all newly constructed water sources and must be planned for. Chapter 9 provides guidance for LDG on water quality monitoring requirements.

x. Overhead Activities and Costs: Office running - The District Water Officer should estimate the overhead costs the office needs for a whole year and incorporate them in the budget. This must include office running costs, fuel costs and office maintenance costs. Refer to the Sector Schedules (issued annually) for more details.

xi. Monitoring and Evaluation: This is undertaken to assess progress, measure impact, provide information for planning and future evaluation, and to identify problems and find solutions at an early stage. Monitoring is also required in order to produce information for quarterly and annual reports and to document activities, results and learning. The items to be budgeted for as part of monitoring are photocopying of data formats, fuel for motorcycle/car for accessing sites and day out allowances for staff involved in undertaking field visits.

4.2.4 Annual Workplan and Budget Content

The annual **workplan and budget** should include specific activities with measurable outputs and targets. Information regarding the new annual workplan and budget format is set out in the Sector Schedules, issued annually by DWD/MWE, and in Annex A4.1 and A4.2 (links: DWSCG Workplan and Budget format and DWSCG Workplan and Budget instructions).

The District Annual Workplan and Budget includes a narrative section, which sets out the following (at a minimum):

- Introduction (including background, administrative structure, location, population, land, topography, climate, hydrology and hydrogeology, water and sanitation projects and NGOs in the district).
- Water supply and sanitation status (include water coverage in rural and urban areas including calculation method and data sources; sanitation coverage including calculation method and data sources; status of community management including case studies if appropriate; summary of functionality data and underlying causes, equity data and concerns).
- Budget analysis with clear deliverables (stakeholder coordination; office equipment; general operations and staffing; urban O&M; software activities; sanitation; water supply facilities; facility rehabilitation; water quality surveillance; supervision and monitoring).
- Plans and budgets from other funding sources (e.g., LGDP, Northern Uganda Social Action Fund--NUSAF) and by other stakeholders (e.g., NGOs, individuals).
- Opportunities and challenges (e.g. good practices, self-help initiatives, new players in the district, logistics, human resources, community contributions, challenging parts of the district). Each issue should include a recommendation (primarily addressed to district stakeholders) for the way forward.
- The MOU signed by the CAO and the district chairperson.

Box 4. 3 :Checklist for Budgets and Plans

Budgets and plans should:

- Be based on up-to-date data on access and functionality.
- Be based on thorough analysis of current situation; strengths, weaknesses, opportunities and threats.
- Incorporate plans from lower levels (villages, parishes, Sub-Counties).
- Pay attention to issues of gender, disability and pro-poor considerations.
- Align local priorities to national priorities.
- Adhere to guidelines provided in sector schedules.
- Be prepared according to standard formats.
- Be formulated with the involvement of CSOs and integrate CSO plans

4.2.5 Quarterly Progress Reports, Work Plan and Budget Content

At the end of the quarter, each local government will prepare and submit the following to MWE and to MoFPED;

7. Quarterly progress report.
8. Cumulative progress report and the quarterly budget and work plan for the subsequent quarter.

Progress reports should be submitted to the MWE/DWD, with copy to MoFPED, by the dates as indicated in the guidelines issued annually. More details on reporting formats are given in section 4.6 of this Manual.

4.3 Summary of District Implementation Cycle

The implementation cycle at district level starts with planning, that leads to work plans for district water and sanitation activities. See Table4.4for the sequence of the implementation cycle, which starts in October.

Table 4. 4: Sequence of implementation cycle

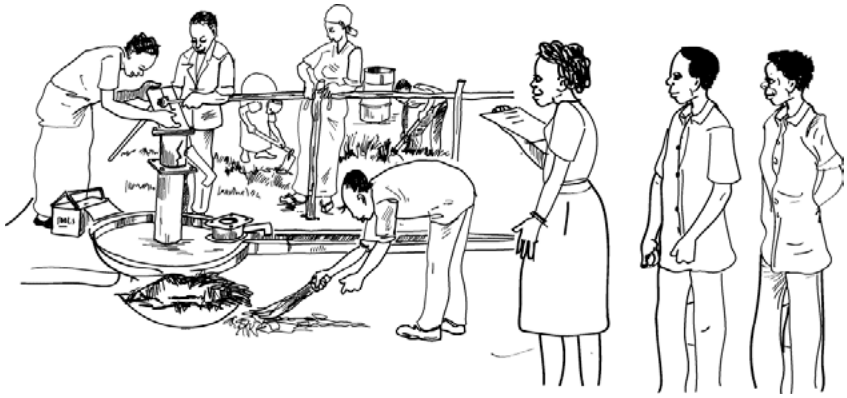
Period	Activity
October	• Development of the District Local Government Budget Framework Paper. • Endorsement of the budget by the DLG authorities. • Submission of budgets to the MoFPED and line ministries in June for approval.
March	• Commencement of procurement at district level when the procurement requirements for the next year are identified and the pre-qualifications process commences. • Consultancy and construction work starts once procurement has been done. Thus, this can be affected by the timeliness and quality of procurement and contract management. • Good supervision and management of contracts is vital to achieve value for money in the sector, which is an ongoing exercise as long as consultancy and construction are taking place.
September	• Presentation of a Sector Performance Report (SPR) by MWE/DWD, which summarises the achievements in the WASH sector and sets out performance against the ten golden indicators. The report entails an analysis of district performance, including comparisons among DLGs.
Quarterly and Annual Reports	• DLGs submit progress of activities and expenditure to MWE/DWD (copied to MoFPED) on a quarterly and annual basis drawing from the findings of M&E that is undertaken at district and Sub-County level throughout the year.
Oct-Sept (Year through)	• Throughout the year, software activities, WASH promotion, as well as O&M activities are undertaken. Note that community mobilisation and training are essential to ensure that the principles of community-based maintenance are understood and followed. • It is important to integrate the cross-cutting issues of gender, HIV/AIDS and land in district plans in general.

4.4 Monitoring and Evaluation

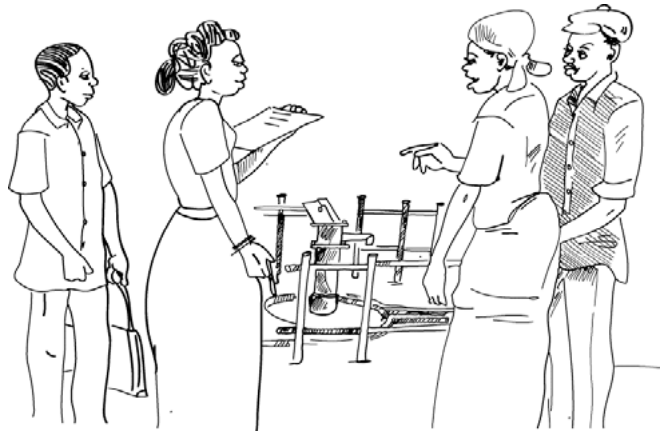
4.4.1 Definitions

Monitoring is the regular collection and analysis of information to assist timely decision-making, ensure accountability and provide the basis for learning and evaluation. Monitoring is an ongoing process that aims at providing management and the main stakeholders of an organisation with early indications of progress and the achievement of objectives.
Evaluation refers to a systematic examination of a planned, ongoing or completed programme. It aims at determining the overall value of an intervention, and providing lessons to improve future actions, planning and decision making.

Each district is expected to have a monitoring and evaluation system which enables it to track, analyse, assess and report on progress, service delivery, performance and results, and ultimately improve performance. Many information collection opportunities are available through ongoing activities, such as community mobilisation and follow-up on support, field visits, and from existing records and reports. Information from monitoring and evaluation processes should be well- tored and accessible.



Picture 4.6: Monitoring Water Sources during Repair



Picture 4. 5: Monitoring Water Sources by LG staff

4.4.2 Performance Measurement and Golden Indicators

DWD/MWE has developed a performance measurement framework for the Ugandan WSS in order to strengthen the management of the sector (especially at national and district levels), enhance policies and ultimately improve service delivery. The focus of the framework is on the analysis of the ten golden indicators for: access to improved water supplies, functionality of water sources, value for money (per capita cost), sanitation, water quality, WfP, equity, hygiene, management and gender.

The indicators capture key technical, social and economic aspects of the water and sanitation sector and are used as part of the monitoring and reporting processes by local governments. They have been incorporated into the Government's Fiscal Decentralisation Strategy (FDS) Formats for WSS activities.

The ten golden indicators are reported upon annually in the WSS Performance Report (SPR), which is published by MWE/DWD. The report is presented at the Joint Sector Review (see section 2.4.5 for details), discussed in detail by sector stakeholders and used as a basis for prioritising key issues to be addressed over the subsequent year.

In the preparation of the SPR, analysis of each indicator is undertaken as follows:

- Trends over time (nationally, by district and by Sub-County).
- Achievement of annual targets (nationally, and by districts).
- Comparison of the situation and performance between LG authorities.
- Comparisons within a particular district (e.g., between Sub-Counties).
- Comparison between relevant data reported by local authorities and that from other surveys (e.g., National Service Delivery Survey (NSDS), Uganda Poverty Assessment Process (UPAP), Uganda National Household Survey (UNHS), tracking studies and technical audits, and other small scale surveys mainly undertaken by NGOs.

Case studies of good or innovative practices are also undertaken (by Government and NGOs) and are included in the sector performance report.

The data that is used for sector performance measurement is primarily obtained from district reports and the WSDB[4]. This is augmented and compared with data and reports from MWE/DWD monitoring visits and that of national surveys. Performance monitoring is not only a national concern but also a useful way for districts to evaluate their performance, and identify ways of improving effective service delivery. Examples of useful analysis that can be undertaken by DLGs include:

- Comparison of access to improved water sources between different Sub-Counties and parishes. The access and equity indicators can both be used for this. Major differences in access can indicate inequitable resource allocation over a prolonged period, or highlight the challenges of improving water supplies in certain areas.

[4]Usually in September, in time for discussion at the Joint Sector Review

It should be noted that the results of the baseline survey (WATSUP) has caused a sudden improvement of the quality (and amount) of data available. However, the fact that still not all data has been captured results in access figures that are not only changing because of implementation performance but also on data collection performance

- Examination of changes in access over time can assist in identifying efficient use of resources, and whether district, and NGO service delivery is able to keep pace with population growth.

- Calculation of per capita costs, analysis of trends over time, and comparison with neighbouring districts, or districts with a similar technology mix can enable an analysis of value for money to be taken. This can assist LGs to take measures to reduce costs, and thus increase the efficiency of service delivery. Clearly, such an analysis also needs to take the quality of works and community mobilisation aspects into consideration.
- Analysis of functionality rates within a district, coupled with analysing whether community management structures are active, can enable the effectiveness of community mobilisation, and post-construction follow-up to be determined. Such an analysis can enable district and Sub-Countygovernments to determine better ways of ensuring sustainability. If functionality rates are very different in different areas, or for different technologies, LG should seek to understand why this is the case. They may even be able to learn about good practices from neighbouring districts or NGOs in the vicinity.

- Comparison of sanitation and hygiene data for different parts of the district and over time. If the situation varies considerably between different parts of the District, what are the reasons for this? Significant increases in latrine coverage may indicate that a particular strategy undertaken by the district or an NGO/CBO has been very effective. Major decreases or minimal changes suggest that efforts are not enough, or are even de-motivating for communities.

- Determining whether gender equity issues are being addressed adequately in the provision of water source improvements by the analysis of the gender indicator.

The methods used to calculate the golden indicators are set out in Table 4.6. It has been noted by MWE/DWD that some Districts use different methods of calculating access to improved water supplies. For comparison purposes, it is essential that all districts use the MWE/DWD standard method when reporting and provide detailed guidance on the calculation of the equity indicator. In order to streamline the sector performance measurement process, district reporting formats (annual reports) have been amended to incorporate the ten golden indicators set out in Table 4.5.

	Indicator	Indicator calculation	Comments
Access (Rural)	% water coverage of rural population	[(Hand pump x 300) + (Springs Constructed x 200) + (GFS Tap x 150) + (pumped piped scheme tap x 150]/[Total District Rural Population] x 100% {Figures for population and population growth rates are issued by UBOS}.	Obtain information from progress figures. Include NGO, Govt & Private Sources. Include non-functional sources unless they have been permanently abandoned.
Access (Urban)	% water coverage of urban population	[(House connections x 6) + (yard taps x 24) + (public taps x 150) + (Hand pump x 300) + (Springs Constructed x 150)]/[Total Population in supply area] x 100% {Figures for population& growth – UBOS}.	District to obtain information from local water authority progress figures.
Functionality	% of improved water sources that are functional at time of spot check	[Total number of observed rural facilities (domestic and water for production) which are functioning]/[Total number of sampled facilities] x 100%	DWO can link collection of data this with follow-on support activities (see Software Steps).
Value for Money	Average investment cost per beneficiary of new rural water and sanitation schemes (UShs)	[Total amount spent on rural water sector activities (total conditional grant spent + district development grant spent + other government funds spent)]/[Total population served by new water and sanitation facilities	Phased construction should be included and commented on.
Sanitation	% of people (households and schools) with access to improved and basic latrines/toilets	[Total no. of households with access to improved and basic latrines]/[Total number of households in the District {Figures for population& growth – UBOS}. Also provide list of pupil/stance ratio for all primary .schools.	For household sanitation – DWO link to DHI. Obtain information from DHI survey reports. For school sanitation – DWO link to District Education Department.
Water Quality	% of water samples taken at the point of collection/discharge that comply with national standards	[Total no. of samples that comply with national standards]/[Total no. of samples analysed]	National Water Quality Strategy will determine further details
Water for Production (Water Quantity)	New storage volume for Water for Production (m^3)	Report new volume constructed	
Equity	Mean Sub-County deviation from the District average no. of persons per water point (no.)	See Box 4.4	Include all NGO, Government and private sources
Hygiene	% of households with access to hand washing facilities	[Total no. of households with access to hand washing facilities]/[Total number of households sampled] Also provide a list of the number of hand washing faculties in each primary school.	Link to DHI and District Education Dept.
Management	% of water points with actively functioning Water and Sanitation Committees (WSCs)	[Total no. of water points with actively functioning Water and Sanitation Committees]/ [Total no. of water points]	This is to be undertaken as part of District follow-on support to communities (see software steps)
Gender	% of water and sanitation committees in which at least one woman holds a key position	[Total no. of committees with at least one woman holding a key position (chairperson, vice chair person, treasurer or secretary)]/Total Number of committees sampled	This is to be undertaken as part of District follow-on support to communities (see software steps)

Box 4. 4: Rural Equity – An Explanation of the Mean Sub-County Deviation from the District Average

The equity indicator is not based on the conventional way of considering access (i.e. the % of the population with access to safe water). Instead it is based on the number of people per improved water source. This indicator enables you to examine the mean deviation between the number of people per improved water source in the District with that of the Sub-Counties. To determine the indicator:

- Step 1 – calculate how many rural people there are, per improved water source in an entire District (ie District rural population divided by number of improved water sources).
- Step 2 - calculate how many rural people there are, per improved water source in each Sub-County
- (ie Sub-County rural population divided by number of improved water sources in the Sub-County)
- Step 3 – calculate the difference between the District people per improved water point and the Sub-County people per improved water point
- Step 4 – calculate the absolute value of the difference obtained in step 3.
- Step 5 – add up the absolute values and divide by the number of Sub-Counties.

The table below uses data from Sembabule District (2006 Data) as an example.

			Step 1 & 2	Step 3	Step 4
Sub county (S/C)	Population (June 2006)	Total No of Improved Sources	Ave. no of persons per improved source	District average minus S/C averages.	Absolute value of difference between S/C and District averages
1. Lwemiyaga	21,005	32	656	-163	163
2. Ntusi	12,922	27	479	-340	340
3. Lugusulu	23,236	22	1056	+237	237
4. Lwebitakuli	53,151	42	1266	+447	447
5. Mateete	58,764	95	619	-200	200
6. Mijwala	25,748	20	1287	+468	468
Total	194,826	238	819 (Ave)	N/A	N/A
Sum of Sub-County Deviation					1855
Step 5. Mean Sub-County deviation from the district average i.e., sum of Sub-County deviation/no of sub counties				=1855/6	309

In Sembabule District as a whole, there is an average of 819 people per improved water point. In Ntusi Sub-County, there are only 497 people per water point (340 less than the district average), whereas in Mijwala there are 1287 people per improved water point (468 more than the district average). The mean Sub-County deviation from the district average is 309.

4.4.3 Information Management

4.4.3.1 Management information system

Collection, storage and analysis of data to generate the golden indicators (as described in section 4.5.2) are part of the district M&E system.

Management Information System (MIS) refers to the mechanism for identifying, collecting, storing, analyzing, transferring and disseminating data and information used for reporting and decision-making. The MIS can be used for planning and assisting in the day-to-day implementation of activities as well as policy and strategy formulation and review. The District MIS is based on information collected by the DWO and stored in the WSDB. The WSDB can be used to print information on the golden indicators.
The DWO collects the information for the MIS through Form 1 and Form 4. Form 1 is for new water sources or sources not yet stored in the WSDB while Form 4 is for marking changes in functionality, management and gender; and Form 2 for piped water supply systems. The forms can be downloaded from the WSDB section of the MWE website. Global Positioning System (GPS) devices have been issued by MWE/DWD to all Districts in order to obtain GPS locations/references.

The MWE is working on an update of the piped system database as prepared during the WATSUP project and will soon launch an update of all schemes in Uganda.

Table 4.6 sets out the key data (with respect to the WSS) that should be part of a district-based MIS. The district may collect additional data, as required. Data on ALL water sources should be included. This includes works undertaken by NGOs, as well as works undertaken through all district funding channels (e.g., DWSCG, LGDPand NUSAF). For each source not included in the WSDB yet, the DWO will have to fill Form 1, which means s/he has to visit the source to verify its status. The NGOs have been requested, through UWASNET, to also fill Form 1 for the sources they constructed. They will send one copy to the DWO and one copy to UWASNET who in turn will provide this information to the WSDB as well.

Table 4. 6 Useful Data for District – based MIS (WSS)

Data	Purpose
Source identity number	Record-keeping and data retrieval.
Global Positioning System (GPS) location	Identification of the water source improvement Establishing access & equity. Mapping of access to improved water supplies. Planning.
Name of water source, village, parish, Sub-County, county and district	Enabling comparisons in access and equity. Supporting decision making and planning.
Type of water source	Establishing access & equity. Mapping of access to improved water supplies. Planning.
Date of construction	Mapping of trends in access to improved water supplies.
Contract Number under which the source is constructed	Tracking of funds. Determining value for money. Improving efficiency. Planning
Technical details of the water source (e.g. yield, depth, soil strata details, water quality)	Mapping of access to improved water supplies. Decision-making with respect to technology options. Value for money. Planning.
Proximity to potential contaminants (see monitoring templates, chapter 9)	Consideration of environmental issues. Planning.
Number of users (actual if possible)	Establishing access & equity. Enabling comparisons with official methods for estimating coverage with field realities.
Population of lowest administrative local government (LC 1)	Establishing access & equity. Enabling comparisons with official methods for estimating coverage.
Water source functionality at time of spot check	Determining O&M status.
Presence of water user committees	Evaluating community mobilisation performance. Enabling planning regarding follow-on support to communities.
Functionality/Activeness of water user committees	Evaluating community mobilisation performance. Enabling planning regarding follow-on support to communities. Early warning with respect to O&M.
No of women with key positions on water user committees	Evaluating community mobilisation performance. Enabling planning regarding follow-on support to communities.

The construction reports as provided by the contractors and/or consultants should also be kept in the office of the DWO. The information provided in these reports is valuable to the DWO and the consultants involved for future water development projects. The Environmental Templates provide a format for data collection. MWE/DWD can provide further guidance to LGs on the establishment and maintenance of a district level MIS.

4.4.3.2 Data Collection Activities

In the context of a district implemented water and sanitation programme, the district council develops and modifies its programme on the basis of analysis of information collected and analysed through regular monitoring by the DWO, CDO, DDHSs, private sector organisations, NGOs/CBOs, politicians and communities themselves. District council should be fully informed on a timely basis on project progress performance against expected results and expenditures against the budget.

There are a number of data collection activities that take place in the WSS Sector at DLG level as follows:

1. Poverty Action Fund monitoring is undertaken on a quarterly basis by politicians, heads of technical departments, chief administrative officer (and/or assistants) and the internal audit department. A team reviews the work plans and reports for the current financial quarter/year. A sample of works is selected and field visits are undertaken. The field visits are intended to verify the infrastructure. Funds for this are under the CAO's office.

2. DWO monitoring of district water and sanitation programme. The DWSCG has a budget provision for this. A percentage of the grant is suggested in the sector schedules, prepared annually by DWD/MWE. Key stakeholders in the sector (e.g., DWO, Sub-County extension workers, NGOs/CBOs, communities and private sector organisations) can undertake this data collection.

3. Data collection during community mobilisation and follow-up activities. In order to maximise efficiency, the DWO should encourage stakeholders to collect data when undertaking other activities in the district. Fieldwork to re-train WUCs, for example, can be optimally linked to data collection regarding issues of source functionality, access to spare parts, community management and gender.

It is the responsibility of the DWO to ensure that data collection, collation (in the WSDB), and analysis is budgeted for and carried out as planned. Items to be budgeted for are: (i) stationery; (ii) fuel for accessing sites and; (iii) day out allowances for individuals involved. The data collection tools can be downloaded from the WSDB.Data Collection Formats and Storage

Although districts are encouraged to develop data collection formats according to their own needs, DWD/MWE has provided districts with guidance as follows:

- Formats given in the Extension Workers' Handbook;
- Formats given in Environmental Templates (regarding water source location, functionality, community management and environmental issues).
- Village file, containing information on community mobilisation, training and follow-up, source sighting(including drillers log, spring details), community management structures and other relevant data.
- The WSDB is intended to be used for data storage.
- Data collected can also be entered into a multi-sectoral MIS Programme called the Local Government Information, Communication System (LoGICS), which comprises of data for health, water, education, production, revenue and environment. Monthly and quarterly updates of the database are essential to ensure reliable data for planning purposes. More information on LoGICS can be obtained from the Ministry of Local Government.

Data collected and analyzed should be compared against the district targets for the sector golden indicators.

4.5 Reporting

4.5.1 Reporting Schedule

The DWO prepares reports for the district Council as well as regular reports to MWE/DWD, with copies to MoFPED as follows:

- Quarterly progress reports (end of each quarter).
- Semi-annual progress report (31st December).
- Annual report (30th June).

The quarterly and semi-annual reports are primarily financial reports, with numerical indicators regarding activity progress. The annual report is more comprehensive. CSOs report to the districts local governments and also to UWASNET. UWASNET annually produces the NGO performance report which then feeds into the overall Water and Environment Sector Performance Report (SPR).

4.5.2 Content and Format of Reports

As part of the current implementation of the FDS, MoFPED introduced a standardised reporting format. One of the purposes of FDS is to reduce the reporting burden on LGs by harmonising and standardising the reporting formats from different sectors. The plan is for all districts be part of the FDS.

In order to ease the transition to FDS by DLGs, DWD/MWE introduced a new reporting format, which is similar to the FDS format in layout, but uses Microsoft Excel spreadsheets. Although activities are specified (called model activities), there is also a provision for additional activities to provide flexibility to DLGs.

4.5.2.1 Quarterly Progress Reports

Quarterly progress reports state progress against the annual work plan and budget and provide a brief narrative. The format of the workplan and budget is given in the Sector Schedules, issued annually by DWD/MWE.

The district is also expected to provide additional information regarding new sources and rehabilitated sourcesevery quarter. This information is given as an attachment to the quarterly progress report. In addition, the district has to print Form 4 quarterly and send it to DWD with the changes in functionality, gender and management. For each new source, Form 1 is supposed to be filled. Both forms will be attached to the quarterly progress report.

Table 4. 7: Location of New Water and Rbilitated Water Sources (to be attached to all quarterly reports)

4.5.2.2 Annual Reports

Quarterly progress reports state progress against the annual work plan and budget. The format of the workplan and budget is given in the Sector Schedules issued annually by DWD/MWE . Annual reports include a narrative section, which should include the following information (as a minimum):

1. Introduction (including background, administrative structure, location, population, land, topography, climate, hydrology and hydrogeology, water and sanitation projects and NGOs in the District).

To be attached to every DWSCG quarterly progress report

Location of new /rehabilitated water sources

District: .....

Quarter no... ..... - ..... ,20É É
month - month year

New water sources constructed this quarter (specify technology [1])	Sub-county	Parish	LC1	Source number	Name of water source	GPS coordinates		Investment costs [2]	Source of funding [3]
						Eastings	Northings		
Water sources rehabilitated this quarter (specify technology [1])	Sub-county	Parish	LC1	Source number	Name of water source	GPS coordinates		Costs of rehabilitation [2]	Source of funding [3]
						Eastings	Northings		

Remarks:

[1] Types of technologies are; protected spring, shallow well (with hand pump), deep borehole (with hand pump), Gravity Flow System (GFS), GFS tap stand, pumped piped water supply system (PPWSS), PPWSS tap stand, rainwater harvesting tank of less than 10 m^3, rainwater harvesting tank of more than 10 m^3, valley tank, and dam.

[2] Investment costs and costs of rehabilitation is the total cost for contractors and consultants.

[3] Source of funding should indicate any of the following: District Water and Sanitation Conditional Grant (DWSCG), LGDP, NUSAF, NGO or CBO (indicate NGO/CBO: and name of the NGO/CBO), individual (private funding), and institutional (private funding). If not applicable indicate "other".

2. Water supply and sanitation status based on information provided through Forms 1, 2 and 4 (include water coverage in rural and urban areas including calculation method and data sources; sanitation coverage including calculation method and data sources; status of community management including case studies if appropriate; summary of functionality data and underlying causes, equity data and concerns).

3. Achievements from DWSCG (stakeholder coordination; office equipment; general operations and staffing; urban O&M; software activities; sanitation; water supply facilities including GPS references; facility rehabilitation including GPS references; water quality surveillance; supervision and monitoring).
4. Achievements from other funding sources and by other stakeholders (e.g., NGOs)
5. Opportunities and challenges (e.g., good practices, self help initiatives, new players in the district, logistics, human resources, community contributions, parts of the district which pose challenges). Each issue should include a recommendation (primarily addressed to District stakeholders) for the way forward.

Details of locations where activities were undertaken should be reported on. In the case of construction and rehabilitation form 1 and form 4 of the WSDB have to be submitted. For community mobilisation and follow-on support the village, parish and Sub-Counties should be clearly stated. In the case of training of caretakers, scheme attendants and pump-mechanics, names and locations where they operate are to be included. Results from Water Quality Surveillance (with data, source type, location and GPS reference) should also be included.

As part of the annual progress report, districts are requested to submit the following attachments to DWD/MWE:

- Form 1 and Form 4 for point water sources and Form 2 and Form 5 (not yet available but soon to be designed for updates) for piped water supplies.

- Contracts financed by DLG: A list of all contracts entered into with DWSCG funding, as set out in Table 4.8

In order to enable monitoring and mentoring of districts, DWD may require access to additional information. Copies of district internal reports should be made available to DWD (in particular the technical support units, i.e. TSUs) on request.

Table 4. 8: Contracts entered into which have been financed under the DWSC

To be attached to the DWSCG progress report for the 4 th Quarter (annual report)

Contracts entered into and financed under the District Water and Sanitation Conditional Grant (DWSCG)

District: ..... **Financial year: July 1 st 20 É .. to June 30 th 20....**

Contract number	Name of contractor or consultant / Company name	Country of origin of contractor or consultant	Description of goods, services or works procured	Contract sum (UGX)	Actual payment under contract (UGX)

Chapter Five: Community Mobilisation and Sensitisation

5. Introduction

Community mobilisation and sensitisation are important components in the implementation of WASH activities. Through community mobilisation and sensitisation, users are informed of the critical requirements to obtain a water source, the various software steps and the importance of sanitation and hygiene. This chapter describes the critical requirements, processes and activities relevant to mobilising and engaging communities to participate in safe water and sanitation activities, sanitation and hygiene promotion, issues of operation and maintenance (O&M), follow-up support, and funding for software activities; all of which constitute critical issues for community mobilisation and sensitisation.

5.1 Critical Requirements and Software Steps

5.1.1 Critical Requirements

Provision of improved safe water and sanitation services to communities should follow a demand-responsive approach (DRA). DRA requires that community members are primarily made aware of the benefits of improved water supplies and good sanitation so that they can demand service improvements with the support of LGs and NGOs/CBOs. The DRA is also reflected in a set of Critical Requirements to guide LGs and other stakeholders in providing water and sanitation services. These critical requirements were set out in The Rural Water and Sanitation Operation Plan (OP5). The critical requirements are summarised in Box 5.1. They provide the basis for the software activities to be carried out in the sector.

Box 5. 1: Summary of critical requirements

1. Signed MOU, which specifies roles and responsibilities of the signatories. MOUs are required between
   a. GOU and districts;
   b. Districts and Sub-Counties;
   c. Communities, Sub-Counties and districts
2. Meaningful involvement of women. Before any construction goes ahead, community mobilisation should have achieved the following requirements:
   a. The composition of WUCs/WSCs shall include at least 50% women;
   b. Women should take up key positions in the WUC/WSC (i.e., chair, vice-chair, secretary, treasurer);
   c. Half of the water point attendants and hand-pump mechanics shall be women;
   d. Training shall target women and their male colleagues;
   e. The entire community shall be involved in discussing the sighting of water sources with men and women consulted separately;
   f. All communications to communities shall be to both men and women
3. Hygiene Promotion and Sanitation.
   a. All households of community leaders shall have latrines that are safe, clean and used;
   b. A plan should exist of how the communities set their own targets and strategies for increasing latrine coverage
   c. There should be evidence that districts and Sub-Counties are putting health and sanitation ordinances in place and enforcing them.
4. Community Contributions. A minimum community contribution towards the construction cost is required in cash. The Sector Schedules (2010/2011 and previous ones) further specify that if items are given in-kind, they must be sold (for cash) by the community themselves.
5. Settlement of Land and Ownership Conflicts. Communities shall be required to satisfactorily prove (e.g., with written agreements, land titles) that all potential and foreseeable land access and ownership issues have been resolved beforehand.
6. Operation and Maintenance Plan. There must be a 3-year realistic[5] and viable plan to ensure continuous and reliable operation of the completed facilities. The community 'O&M Plan' shall be prepared by the community. The process is to be facilitated by district and Sub-County officials.

5.1.2 Software Calendar and Activities

Table 5.1 sets out the calendar of software activities which are undertaken annually. The cycle of software activities commences in April, with awareness creation and promotion for DLG stakeholders and communities for the following financial year. These activities are intended to generate demand from communities and promote sanitation and hygiene in areas where water source improvements will be made. It is, therefore, essential that DLGs budget accordingly for these activities.

[5]The OP5 states that the O&M plan should be for 8-years. However, this was revised in 2006 in light of lessons learned from DLGs.

Table 5. 1: Calendar of "software activities"

	Apr	May	Jun	July	Aug	Sept	Oct	Nov	Dec	Jan	Feb	Mar
Awareness creation, promotion & advocacy												
Pre-construction activities												
Construction activities												
Post-construction support & follow-up on sanitation												
Monitoring												

5.1.3 Water and Sanitation Software Activities

Software activities should be guided by the Software Steps (Steps in Implementation of Water and Sanitation Software Activities, 2012). The software steps were developed harmonise approaches to awareness creation and community mobilisation used in the districts. They provide guidance awareness creation, capacity building, and provision of services and follow-up of communities in the water and sanitation sector. There are 19 steps, which are grouped into four phases as summarised in Box 5.2.

Box 5. 2: Summary of the software steps

General Planning and Advocacy Phase

1. Advocacy planning meeting for district council.
2. Meeting with Sub-County leaders.
3. Submission of applications.
4. Meetings for Sub-County sectoral committees.
5. Announcement of short- listed communities.

Pre-construction Mobilisation and Training Phase

6. Meeting with short-listed communities.
7. Training WUC.
8. Conducting a sanitation baseline survey.
9. Mobilising communities to fulfil critical requirements.
10. Field verification of communities that fulfilled the critical requirements.
11. Meeting for Sub-County sectoral committees (responsible for water) on communities verified.
12. Announcement of successful communities.
13. Meeting with successful communities to sign MOU and plan for construction.

Construction Phase

14. Mobilisation of communities to participate in construction activities.
15. Training of water source caretakers on preventative maintenance.
16. Training of WUCs on O&M.
17. Commissioning of water sources.

Post-construction Phase

18. Continuous follow up/mobilisation on O&M, behaviour change and environmental issues.
19. Continuous replacement and training of WUCs that disintegrate.

Picture 5. 1: Participatory Selection and decision-making

General Planning and Advocacy Phase is in line with the Demand Responsive Approach (DRA), which requires that communities submit applications for improved water services. During this phase, meetings shall be convened at various levels to review the water and sanitation situation in the district. Applications from communities should be screened in order to identify the neediest areas. An announcement of the short listed communities should be made, clearly showing the evaluation criteria used.

Pre-construction Mobilisation and Training Phase ensures that the critical requirements (see Box 5.1:) are fulfilled and enables construction activities to be planned. The training of WUC on their roles shall be done before the actual construction work begins. The field verification of communities to ensure that they have fulfilled the critical requirements is important.

Construction Phase: During this phase, the communities require mobilisation in order to participate in construction activities. The water source caretakers should be trained in preventive maintenance of the system and the WUC will be trained in O&M.

Post-construction Phase: During this phase, regular follow up of communities and mobilisation regarding O&M, behaviour change and environmental issues is very important in order to maximise the benefits of the installed water and sanitation facilities. Committees may require re-training in their roles and responsibilities. LGs should also support communities to replace committees that have disintegrated.

The Extension Workers' Handbook provides techniques and tools for extension workers that can assist in the implementation of the software steps. This handbook is only available in hard copy.

5.2 Sanitation and Hygiene Promotion

Specific sanitation steps, sometimes referred to as the Hygiene Education and Sanitation Promotion Template may be applied. It should be noted that the budgets given in the document are indicative. Districts are expected to develop their own budgets in accordance with the particular situation in the area to enable them implement activities as per the steps shown in Box 5.3.

Box 5. 3: Summary of steps for hygiene and sanitation promotion

Step 1: Advocacy/planning meeting for district councils.

Step 2: Advocacy/planning meeting for the Sub-Countycouncils.

Step 3: Advocacy/planning meeting for the parish councils.

Step 4: LC1 community advocacy/planning meetings.

Step 5 Training of village health teams (VHTs) in sanitation mobilisation skills (if feasible).

Step 6: Conducting sanitation baseline surveys.

Step 7: Mobilising communities to improve on their hygiene and sanitation situation.

Step 8: Follow up on communities/households for hygiene and sanitation improvements.

Step 9: Periodic monitoring of proper use and maintenance of the sanitation facilities, behaviour change and other environmental issues.

Step 10: Production of information, education and communication channels and materials.

Please note that step 1 and step 2 are to be conducted together with the district and Sub-County advocacy meetings under the water grants.

Key activities to promote hygiene and sanitation are integrated into the WSS activities. Additional district-wide sanitation and hygiene activities are undertaken every year during the Sanitation Week and through other mechanisms such as radio, drama shows and home improvement campaigns.DWOs are expected to collaborate with district health authorities to ensure harmonious and effective implementation of sanitation and hygiene activities.

One of the key tools used to enhance visualisation in participatory sanitation planning is the sanitation ladder. The ladder may be presented as a pictorial ladder or as a kit. It allows people to visualise what level they are on the ladder and where they would like to be, to set targets and then monitor progress. The ladder moves from high risk (unsafe practices) to lower risk (safe practices). The steps of the ladder are indicated in Figure 5.1.

Figure 5. 1: Sanitation ladder

Improved Sanitation and Hygiene Ladder
Lower risk (safe practices)
• High volume flush with HWF
• Pour-flush and hand washing facilities
• Eco-san with HWF
• Improved latrine (slab, vent pipe) with HWF
• Traditional Pit latrine (TPL) with HWF
• Flying toilets (defecation in plastic bags) common in urban informal settlements
• Cat method/trench
• Defecation in the open/open defecation (indiscriminate)
• Defecation(young child) in the compound
High Risk (unsafe practices)

Several approaches and tools have been developed to support extension workers in their effort to promote sanitation. Some examples are given bellow:

5.2.1 Community Led Total Sanitation (CLTS)

This is a methodology for mobilising communities to completely eliminate open defecation (OD). Communities are facilitated to conduct their own appraisal and analysis of OD and take their own action to become open defecation free (ODF). At the heart of CLTS lies the recognition that merely providing latrines does not guarantee their use, nor result in improved sanitation and hygiene. CLTS focuses on the behavioural change needed to ensure real and sustainable improvements – investing in community mobilisation instead of hardware, and shifting the focus from latrine construction for individual households to the creation of 'open defecation free' villages. CLTS is based on undertaking certain activities with the community that will stimulate a feeling of shame or guilt for open defecation thereby triggering a positive response. Such activities include:

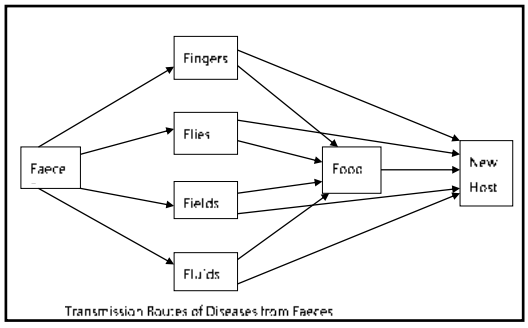
- Defecation Mapping: This activity will enable the community members to visualise the defecation areas and see the close proximity of these areas to their homes
- Transect/Walk of Shame: To walk along with community members through the village, observing sanitary conditions including open defecation areas, asking questions, and listening
- Shit Calculation: To quantify the magnitude of open defecation in the village; this will make them realise the scale of the problem

You may contact MOH, Environmental Health Division for further assistance. The Division has got specially trained CLTS facilitators who can help with the CLTS training.

5.2.2 Participatory Hygiene and Sanitation Transformation

Participatory Hygiene and Sanitation Transformation (PHAST)is an innovative approach designed to promote hygiene behaviour, sanitation improvements and community management of water and sanitation facilities using specifically developed participatory techniques. One of the underlying principles of PHAST is that no lasting change in people's behaviour will occur without understanding and believing. Graphic materials (set of tools kits) developed by trained artists are modified and adapted to reflect the actual cultural and physical characteristics of the target communities. These are then used by trained extension workers to facilitate community members in visualising their current sanitation situation and how to improve it. Although today the PHAST principles could be used to address different situations, the original purpose was to use participatory approaches to explain the Faecal – Oral Route and in a participatory manner community members identify the necessary barriers to sever the route. See Figure 5.2.

Figure 5. 2: Faecal-oral route



After understanding the disease transmission routes, the community members will use appropriate tools from the PHAST kit to identify the necessary barriers to the disease transmission routes such as latrines, hand washing, food hygiene, protective clothing, and personal hygiene and so on. You may need to contact the Ministry of health – EHD or WSP/World Bank to identify for you specialists in PHAST methodologies to assist you.

5.2.3 Sanitation Marketing

Sanitation Marketing (SanMark)is the application of social and commercial marketing practices to change behaviours and to scale up effective and sustainable demand and supply for improved sanitation and hygiene. The components of SanMark include; consumer research, identifying the sanitation commodities/products, supply chain and effective marketing strategy.

5.3 Sanitation during Emergency and Disaster Situations

Emergencies and disasters fall into two main categories, natural or man made. Depending on the time frame, they can further be classified as either of sudden or slow onset. In Uganda the causes of disasters or emergencies include civil conflicts, landslides, and flooding among others.

Disasters and emergencies often precipitate a situation where water and sanitation infrastructure is over-burdened, destroyed, or devastated. Urgent and appropriate response is therefore required in order to protect public health. The characteristics of emergency and disaster situations include unhygienic conditions, contaminated water, poor sanitation, and spread of vectors

Depending on the situation on the ground, a conventional response for water, sanitation and hygiene in emergency situations should encompass the following package either in whole or in part:

- Water supply.
- Hygiene promotion.
- Excreta disposal.
- Vector/vermin control.
- Solid waste management.

The main principle in waste management during emergencies is burning what can be burnt and burying the rest. Excreta should be buried in holes or trenches. Solid waste should be buried in temporary landfills. These should be at least 60cm deep and, when the contents reach 30cm from ground level, the pit should be backfilled with excavated earth and tramped down.

Where the evacuation is likely to take several days, the use of temporary toilets should be considered. Where evacuation is on foot as is often the case, rest-stops should be provided forevery two hours' walk, if possible, and evacuees should be given information about road conditions and access to water, food, shelter and medical assistance on the next section of the route. Special precautions may need to be taken to protect the people living along evacuation routes from possible health risks due to the passage of evacuees, particularly from defecation on roadside, which may require clean-up activities. There are principles and priorities in the acute emergency phase and these include:

- Ensuring that the people have the knowledge and understanding that they need to avoid diseases.
- Providing facilities for people to excrete safely and hygienically. This might include digging defecation trenches below and away from the water points (minimum of 30m).

- Ensuring that people have soap for washing their hands to remove sources of possible contaminations.
- Ensuring that people have sufficient cooking utensils, equipment and fuel for cooking food and storingit safely.
- Ensuring that people have enough containers to collect and store water in a clean manner.
- Evacuating peopleto ensure that they are no longer exposed to potential hazards (water, Sanitation and Hygiene).
- Provision of ample shelter to the affected communities.
- Clean up and control open defecation.

Further priorities in the emergency response phase include:

- Assessing the vulnerability of water and sanitation components,
- Defining how systems will operate during emergencies,
- Developing a plan for restoring services promptly during the emergency,
- Ensuring that water supplies are protected from contamination,
- Ensuring that there is at least a minimum amount of water for drinking, cooking and personal and domestic hygiene.

The most common sanitation option during emergency is the trench latrine. You will read more about trench latrines in Chapter Six

5.4 Sanitation for Persons with Disabilities and the Elderly

Water supply and sanitation services and facilities are traditionally designed for the "average" person and tend to ignore the needs of people with disabilities. As a result, large numbers of these people are often excluded from normal services and facilities. PWDs are a part of every community in the world. The water and sanitation programmes should, therefore, aim at serving everyone in the community. In particular, improved access to water and sanitation facilities brings a range of benefits to people with disabilities and their families, including dignity and self-reliance as well as improved health and nutrition.

The following should be done to ensure inclusion of disability perspectives in all water and sanitation programmes:

i. Recognise and implement policy provisions – The Constitution, the NDP, the Pro-poor etc., call for addressing the needs of PWDs. These legal and policy provisions should be adhered to in the planning and implementation of sanitation and hygiene services.

ii. Inter-sectoral collaboration - Relevant sectors should work together to address needs of PWDs. The water and sanitation sub-sector should understand the broader issues and needs of PWDs. Where necessary borrow knowledge from other sectors in order to serve the needs of PWDs well. Disabled Peoples Organisations (DPOs) where they exist should be on board and get involved in the consultation, collaboration and coordination processes.

iii. Collect and utilise baseline data - Providing disability inclusive water and sanitation programmes requires relevant baseline data. During community assessments undertaken as part of the planning process, these should include information related to PWDs. For example, data on women should identify the number of disabled women, data on households should identify the number with a disabled person, data on poor households should identify the number of poor households with a disabled person and so on. Since people with disabilities are not identical, disability data needs to be differentiated to identify women, men, girls and boys of different ages with different types of impairment.

At implementation stage at household level, the following principles should be taken into account:

iv. PWDs themselves can be resourceful in supporting each other. Persons with disabilities and their families should be involved in problem-solving and identifying the best sanitation options for them. The water and sanitation issues should be looked at in the context of the whole family situation, not in isolation

v. Find out what solutions the disabled person has already tried – what worked and what didn't work. They may have their own ideas about how they could adapt to their environment. Listen to their ideas and find ways to build on them.

vi. Many people are not aware of what solutions are possible. In this case provide information and examples; show pictures of different solutions say; different latrine options and let them ask questions

Examples of sanitation options for the PWDs (PWD-friendly technologies) are given in Chapter 6.

5.5 Sanitation on Fish Landing Sites

Landing sites have unique sanitation and hygiene needs because:

- They are typically occupied by mobile populations (consisting mainly of fisher folk and traders)
- They are usually people of divergent ethnic and cultural back grounds who may, therefore, be difficult to mobilise
- The housing settlements are often constructed of temporary materials and are usually overcrowded
- They often lack latrines due to low awareness of associated risks
- They experience latrine construction problems due to high water tables, loose collapsing soils or hard rocks. As a result people often practice open defecation while others use basins and polythene bags during the night. The contents of these basins and polythene bags are then discharged into the lake which also serves as the source of drinking water (UWASNET Study).

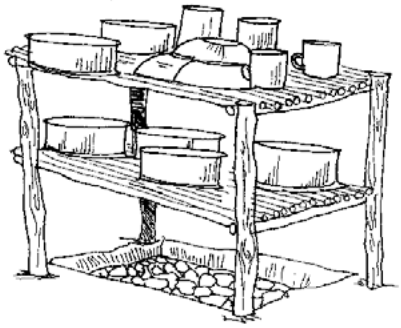
Unfortunately, no appropriate, affordable and nuisance-free alternative latrine technology option has been developed. As research continues to identify the most suitable technology for landing sites, the most viable option available is the EcoSan toilet. Technical specifications about EcoSan toilets are given in Chapter Six under the section on 'Sanitation Technologies'.

5.6 The safe Water Chain

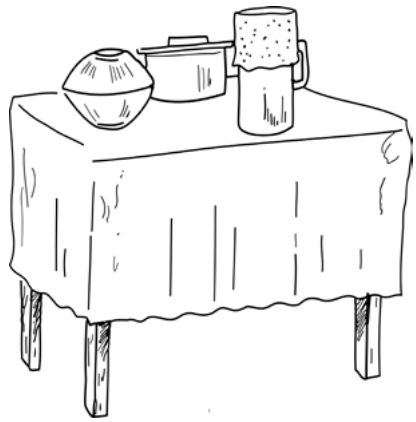
Water quality should always be an integral part of any water supply programme. Water has profound effect on human health as a means to reduce disease and a medium through which disease-causing agents may be transmitted. The impact of water on health derives mainly from consumption of water containing disease causing organisms or toxic chemicals and the use of inadequate volumes of water that leads to poor hygiene. It is therefore a basic right that people access and use safe and adequate water.

Safe water chain is the process of ensuring the safety of the water from the source to the time of consumption or use for other domestic purposes. This is done by collecting water from a safe source, using clean containers or vessel, transporting it safely, storing it in safe containers and drawing it from such containers in a hygienic manner.

Sometimes water may be collected from unsafe sources in which case such water should be treated at home. The most common method of treating water at home is by boiling it or disinfecting it with chlorine tablets. In the year 2005, the Ministry of Health/EHD produced a hand book on safe water chain which among other things presents various methods and techniques of domestic water treatment.These include; sedimentation, filtration, boiling, simple chlorination, Solar disinfection.



Picture 5. 2: Cover all food and water utensils



Picture 5. 3: Washed containers on a drying rack

In summary, water should always be collected from safe sources. The safe sources are
i) tap stands from treated pipe networks
ii) boreholes
iii) shallow wells
iv) protected springs
v) rain water.
Water must remain safe at all stages right from the source up to the time it is consumed. To ensure this safety, Table 5.2 shows the stages and required conditions for ensuring safe water chain.

Table 5. 2: Stages and conditions for ensuring safe water chain.

S/N	Stage	Required conditions
	The water source	Well maintained fence around the catchment area to keep off animals and other trespassers
		Storm water diversion to avoid contamination by surface runoff
		Pit latrines located at least 100 ft away from the source to avoid contamination through underground seepages
		Sound state of repair and maintenance to avoid surface water leaking into the source and loss of water due to leakage
		Effective drainage of the spilt away from the source to avoid stagnation and flooding at the collection area.
		Effective water source committee and care taker to ensure proper operation and maintenance at all times
	Collection at source	Only clean containers should be used to collect the water
		Containers should be washed away from the catchment and water collecting areas
		Wash hands before filling the containers to avoid contaminating the water with dirty hands
		While filling the containers, always use clean funnels; avoid funneling the water with hands or touching the water as it fills the container.
	Transportation	Transport water in closed containers with clean tight fitting lids/covers to keep out germs, dust and dirt. Avoid using leaves,
	Storage at home	When water is at home awaiting its different uses, it should be kept in clean covered containers in clean surroundings and away from animals and pets
		Be careful that water for drinking is given appropriate treatment and stored in separate clean covered containers
		Always wash storage containers before refilling
		Always guide the children on proper handling of drinking water
	Consumption	Wash hands before drawing drinking water from the containers
		Use a separate cup for drawing the water and another cup for drinking the water
		Preferably store drinking water in a container that provides for pouring from it rather than dipping from it when drawing the water to avoid the risk of contaminating the water with the drawing cup

Responsible authorities (MWE and MOH) should undertake routine water quality surveillance of all water sources to be sure that tthey are safe. Sanitary risk assessments of all the water sources should also be done. Particular attention should be given to springs and shallow wells whose water quality often fluctuates. If the water is from an unsafe source, it should be boiled or disinfected with chlorine tablets at home.

5.7 Cross-Cutting Issues

5.7.1 Gender Mainstreaming

In the context of rural water supplies, the Water Sector Gender Strategy sets out that capacity building of DLGs should be undertaken so that the workforce at district, county, Sub-County and parish level, have the competence to:

- Ensure that technology selection is based on knowledge and demand from the communities, in particular women.
- Improve the position of women in society through water activities such as gender sensitive bye-laws for good governance within WUCs and protecting participation of all groups and at least 50% representation of women. In addition women should be encouraged to hold key positions on the WUC.
- Give importance to the participatory processes in ensuring full participation of the poor, illiterate and women.
- Harmonise community contribution to capital costs, and a fair access to the land that hosts the water supply will need to be established. This includes preconditions to protect access by the community and ownership by women and men.
- Support women specific initiatives such as women's groups involved in roof catchment on a self- help basis (e.g., as done in Rakai District).
- Realise change in attitude at community level regarding roles, responsibilities and opportunities of men and women, challenging stereotypes.
- Monitor gender and other activities by involving communities in monitoring their own projects, improving value for money and success in the district auditing process.
- Plan and budget the incorporation of gender activities within the workplans.
- Give importance to affirmative action and diversity in recruitment at district level.
- Undertake close planning with the line ministries for synergy, effective utilisation of resources.

5.7.2 HIV&/IDS Mainstreaming

Section 3.2.2 outlines the Water and Sanitation Sector strategy for mainstreaming HIV/AIDS in the sector at central and local government levels. At District LG level, the entry point for the HIV/AIDS prevention strategy is the district HIV/AIDS Focal Point Person.

HIV/AIDS can be mainstreamed through incorporating HIV/AIDS prevention and safe sex messages into community sensitisation and training activities. Likewise, contractors should be informed about HIV/AIDS prevention in order to influence their behaviour in the communities that they operate. HIV/AIDS related activities can be budgeted for and included in the yearly work plan and budget if any funding is needed.

Picture 5. 4: Testing for HIV status

5.7.3 Land Issues and Water Rights

Land issues should be settled where the water and/or sanitation facility is to be located. Agreements should be signed with the land owners to allow access to the community. For large schemes, such as GFS and RGCs, the land should be gazetted and agreements signed. Any location of a water supply project must respect the proprietary rights of the landowner or occupier as protected by the Constitution (1995) and the Land Act (1998).

5.7.4 Environmental Mainstreaming

The increased pressure on land due to population growth, industrial development and poor land use practices are affecting the sustainability of water resources in terms of quantity and quality. Chapter 9 provides information regarding environmental issues.

5.8 Operation and Maintenance

Operation refers to the everyday running and handling of a facility for its optimum use, and contributes to a reduction in breakdowns and maintenance needs as well as to the facility's life cycle. Maintenance on the other hand refers to the activities required to sustain the facility in a proper working condition. Maintenance does NOT necessarily mean carrying out repairs when a facility finally breaks down, BUT periodically inspecting an installation and replacing parts that are worn or show other signs of deterioration. Its aim is to prolong the life of the facility and avoid unexpected breakdowns.

The National Framework for Operation and Maintenance of Rural Water Supplies (MWE, 2011) sets out the rules and procedures of the game for operation and maintenance (O&M) of rural water supplies in Uganda. As stated in the introduction, O&M starts with the generation of demand by communities. The implementation of the Software Steps prepares the communities for their role in Uganda's CBMS in rural water supplies.

5.8.1 The Community-Based Maintenance System

A CBMS for rural water supply is the preferred option for the O&M of rural water facilities to be promoted by all stakeholders in Uganda. Under CBMS, communities with support from other actors are responsible for management and maintenance of their water facilities, specifically the point water sources (protected springs, shallow wells, boreholes). This is undertaken through participation in planning, preventative maintenance and repairs, and payment of funds for this. O&M of piped water supplies may involve a private sector operator, but in many gravity flow

schemes (GFS), it is the communities that undertake O&M. The others actors in O&M include Sub-County local governments, districts, CSOs and the central government. The respective roles of the various actors can be summarised as shown in Box 5.4.

Box 5. 4: Roles of various actors in the O&M under the CBMS

Community Members
• Select a WUC/WSC (and replace where necessary)
• Use the water source responsibly
• Attend meetings related to O&M
• Pay contributions towards O&M
• Make by-laws to govern the use of the water source
• Maintain good household hygiene and sanitation
WUC/WSC (including water source caretakers & GFS attendants)
• Promote improved sanitation and hygiene behaviours and practices
• Maintain an up-to-date list of water users
• Mobilise users to contribute towards O&M and collect these funds on a regular basis; open a bank account for O&M Funds
• Regularly visit and monitor the performance of the water source
• Ensure preventive maintenance is carried out; purchase spares and grease for the maintenance of the hand pump
• Engage and pay the hand pump mechanic in case of a breakdown; sign repair agreements on behalf of the community
• Ensure the water source environment and the drainage channel are kept clean
• Propose, enact and enforce by-laws to govern the use of the water source
• Report any major breakdowns to the Sub-County
Sub-County LG
• Plan and budget for follow-up activities on both software and hardware issues concerning O&M (e.g. training and re-training of WUCs and caretakers, monitoring visits, and co-financing of major repairs); plan and budget for the training and re-training of hand pump mechanics
• Supervise the hand-pump mechanics
• Ensure safe custody of the tools for hand pump mechanics
• Enact by-laws for O&M

District Local Government
• Provide back-up support and technical guidance to the Sub-Counties regarding O&M (in planning, budgeting, and monitoring)
• Provide guidance and co-funding in case of major repairs
• Plan and budget for refresher courses for extension workers, hand pump mechanics, and scheme attendants in O&M, and tool kits for sub counties and or parishes
• Verify water sources that require rehabilitation and budget for them
• Stock spare parts that are not readily available on the local market and sell them to the WSCs
• Enact by-laws regarding O&M
NGOs/CBOs
• Mobilise communities to improve hygiene and sanitation
• Training of WUCs/WSCs; training and re-tooling of HPMs
• Co-finance major repairs
• Monitoring functionality of water facilities and conducting studies/research
• Implement any other software activities; harmonize approaches to O&M in the same area so that they do not undermine CBMS
Private sector (HPMs, Masons, Plumbers, Spare part dealers)
• HPMs, Plumbers and Masons - Undertake maintenance and repair work at the request of WSC, Sub-County or district local government
• Manufacturers - manufacture, supply and distribute of materials and components needed for maintaining and repairing water source facilities
• Spare part dealers – stock, retail and distribute spare parts for water facilities
• Suitable private sector organisations can also undertake community mobilisation and training activities in the sector
• In the case of piped water supplies in Rural Growth centres, private sector organisations manage water supplies on behalf of water users.
Central Government (MWE and line ministries)
• Provides the overall policy framework for O&M and publish guidelines for use by other stakeholders
• Monitor the functionality of rural water supplies nationally and take action to improve the situation through information dissemination, documentation and changes to policies and guidelines
• Mobilize funding for O&M
• Provide capacity building to local governments

Picture 5. 5: Fetching Water in Moyo

Picture 5. 6: Borehole blowing/cleaning in Pader

5.8.2 Key O&M issues

i. **Ownership:** The National Water Policy (1999) states that the communities are the owners of the improved communal water facilities whereas the Water Statute vests the ownership in DWD, with the community managing and maintaining it for their joint benefit. The involvement of communities in the planning process and payment of user contribution is intended to create a sense of ownership of the facilities by the community.

ii. **Technology Choice:** Communities should make an informed decision on the type of technology that they would like based on suitability, cost and maintenance requirements. Hurried community mobilisation means that communities are often not involved in selecting the technology. This contributes to poor O&M.

iii. **Community Mobilisation and Training:** It is important for communities to receive sufficient mobilisation and training to enable them to define their problems, examine options and understand their roles and responsibilities. The Software Steps outline mobilisation and training activities before, during and after construction. In order to provide a firm basis for sustainability, these activities should not be hurried.

iv. **Replacement of non-Functional Committees:** The WSCs/WUCs are to manage the water source on behalf of the community. This includes the collection of user fees and payment for maintenance and repair. Inactive or non-functional committees can result in the source breaking down, or even being abandoned completely. There is thus need for follow-up of committees by LG, as well as retraining and re-activation.

v. **Supply of Inputs:** Following an initiative by DWD, the number of spare parts dealers in the country has been increased. The district and Sub-County staff need to sensitise communities regarding their most accessible supplier.

vi. **Financing:** Users are expected to mobilise and manage funds for maintenance of their water facilities. Communities that collect funds regularly must keep good records and should be encouraged to open bank accounts either with banks or other deposit taking institutions such as SACCOs. Major rehabilitation of boreholes and shallow wells (as defined in Table 5.3) can be financed from the DWSCG. However, in addition to the hardware improvements, software aspects should be addressed to ensure good O&M. Major rehabilitations should be planned properly by districts, to include:

i. thorough assessment of problems of individual water sources and details included in terms of reference (ToRs) for rehabilitation. Water sources earmarked for rehabilitation should be cross-checked with DWRM database or district records to ascertain yield of the source, and should be above the minimum standards. It should be noted that, rehabilitation of a water source does not increase its yield.

ii. **Co-funding:** This should not be confused with O&M funds paid in post construction phases, although it has been used in some cases for this purpose. However, experience has indicated that communities which pay co-funding before construction have in most cases been able to contribute O&M funds and thus able to manage their water sources.

iii. **Gender:** The election of women onto WSC/WUC contributes to improving their status in society. As women are often considered to be more trust worthy than men, they are often given the position of treasurer. They also tend to be responsible for domestic water supply within the home. Furthermore, some have been trained as hand pump mechanics, GFS attendants and caretakers.

iv. **Follow-up and Back-up Support:** In order to ensure success of CBMS, it is important to establish back-up mechanisms to communities that have benefited from water source improvements. Necessary support should be given to ensure continued functioning of established structures and facilities. HPMs, GFS attendants and caretakers may require re-training. Follow-up of communities is required to ensure that they are undertaking their roles and responsibilities and to reactivate dormant committees, or re-elect new ones.

v. **Monitoring:** This is key in order to provide information for reporting and planning. It is particularly important with respect to O&M, and source functionality, which can change over time. Chapter 4 provides further information about monitoring.

5.8.3 O&M Planning

Key O&M issues should be discussed with communities from the early stages of planning the water source improvement. The Critical Requirements (see section 5.2.1) need to be fulfilled, and Software Steps (see 5.2.2) carried out. These should help the community to plan for their O&M activities. One of the critical requirements is a 3-year O&M plan that should be prepared by the community (with the support of LG extension staff). Box 5.5 summarises the main contents of the 3-year O&M plan. The LC I or the village should ideally ratify the O&M plan.

Box 5. 5: Main contents of 3-year O&M plan

Description of the facility

- Location, name, type of technology, geographic location, GPS coordinates (for piped water supplies specify taps also)

Management structure

- Details on users/beneficiaries, statistics, sanitation status
- Committee composition, term, roles and procedures (meetings, sanctions)
- Replacement mechanism for the WSC/WUC
- Other actors and their roles

Description of O&M activities

- Type of activity and frequency
- Requirements (personnel, cost, materials, equipment)
- How to ensure users participate in O&M activities and make contributions? How to handle those that don't comply
- Where and how to access mechanics, plumbers, masons and spares? What are the anticipated costs?
- Where and how to access extension workers when required for training and follow-up support?

O&M budget

- Expected income and sources
- Expected costs (preventative maintenance and repair)

Strategy for increasing household latrine coverage

Regulatory Issues (by-laws, agreements with mechanics, masons, plumbers)

Environmental Issues

5.8.4 Financial Management

Communities need to be supported to establish transparent and suitable financial management systems and be equipped with sufficient skills to manage them. Clear systems and procedures of accountability are key to preventing mismanagement.

Users are expected to meet the costs of repair and replacement of worn out parts; labour costs of O&M, administration and logistics (e.g., stationary, public transport). External support may be provided to the community for borehole rehabilitation (i.e., desilting, fishing of dropped hand pump parts and replacement of the entire riser pipe) major extensions of pipes systems, refresher trainings for committees, caretakers and technicians and major repairs on piped system components in case of natural calamities like; landslides, earthquakes, flooding plus lightening.
User fee collection mechanisms vary and include: fixed fee per household per month/year; fee per jerrycan; taxation; donation and auctions; selling of produce; revolving fund. Where possible, O&M funds should be kept in the bank with the account operated by the community.

5.8.5 Classification of Maintenance and Repairs

Table 5.3: provides a classification of typical maintenance and repair requirements for the four main technologies. The community should undertake maintenance and minor repairs with inputs from the caretaker or scheme attendant, hand pump mechanic/plumber/masons. Major repairs may require support from DLGs.

Table 5. 3: Classification of typical maintenance and repairs by technology[6]

Technology	Maintenance	Minor Repair	Major Repair
Borehole and shallow well (with hand-pump	▪ Clearing drains and surroundings ▪ Maintaining fence ▪ Periodical checking and service of hand-pump ▪ Periodical replacement of fast wearing parts (buckets, valves, etc) Responsibility: Water Source Caretaker, under supervision of WUC	▪ Repair of damaged parts outside routine service ▪ Replacement of damaged slow wearing parts (handle, chain, few pipes and/or rods, cylinder) ▪ Repair of cracks to platform or drain Responsibility: HPM, through contract or engagement by WUC	▪ Fishing of dropped pipes and rods ▪ De-silting of borehole ▪ Repairs to borehole casing and screens ▪ Replacement of platform and drain ▪ Replacement of rising mains Responsibility: Drilling or Water Engineering company under contract by district
Protected Spring	▪ Clearing intake area, drains and surroundings ▪ Maintaining fence Responsibility: Caretaker, under Supervision of WUC	▪ Repair of cracks to retaining wall, platform or drain Responsibility: Mason, through contract or engagement by WUC	▪ Re-rotection(-due to diversion or major failure) Responsibility: Water Engineering company under contract by district

[6]Extracted from the Updated National Frame work for O&M for Rural Water Supplies, 2011 (Table 1)

Technology	Maintenance	Minor Repair	Major Repair
Gravity Flow Scheme	▪ Clearing intake area, drains and surroundings ▪ Maintaining fence(s) ▪ Periodical checking of components for proper functioning. ▪ Periodical replacement of fast wearing parts (taps, etc. Responsibility: GFS Attendant	▪ Repair of minor leaks in structures or components ▪ Repair of pipe bursts. Responsibility: Plumber through contract or engagement by WUC	▪ Rebuilding of intake works or other major structures ▪ Replacement of long pipeline sections damaged by landslides, etc. Responsibility: Water Engineering company under contract by district
Pumped and Piped Scheme	▪ Clearing intake area, drains, fence and surroundings ▪ Periodical checking and service of pump Responsibility: Water System Caretaker/ Attendant	▪ Repair of minor leaks in structures or components ▪ Repair of pipe bursts Responsibility: Plumber, through contract or engagement by WUC	▪ Rebuilding of intake works of other major structures ▪ Replacement of long pipeline sections damaged by landslides, etc. Responsibility: Water Engineering company under contract by district
Rain water harvesting tank	▪ Cleaning gutters ▪ Cleaning inside of tank ▪ Clearing drains and surroundings Responsibility: Household Members	▪ Re-tightening of gutters ▪ Repair of cracks on the tank ▪ Repair of cracks to platform and drain Responsibility: Mason, paid by household	▪ Replacement of platform and drain ▪ Replacement of gutters Responsibility: Mason, paid by household

5.8.5.1 Boreholes and Shallow Wells

Selected district and Sub-County staff should be trained in areas regarding pump parts, as well as installation and maintenance techniques. District Local Government should ensure that each community have access to a hand pump mechanic who can readily assist in the O&M of the facility.

Installation and maintenance of pumps follows specific steps depending on the type of pumps and pipe material (e.g. stainless steel, galvanised iron (GI), PVC) and other components. Hand pump mechanics should be trained by DLG in the key requirements for handling, maintenance and repairing of hand pumps.

Community members, especially caretakers should be conversant with the operation and maintenance of the pump type installed in their community. Caretakers are expected to undertake preventative maintenance. Caretakers should be sensitised so that, together with support of hand pump mechanics, they are able to differentiate borehole breakdowns that require major repairs and those that require minor repairs. It is also important for districts to set minimum requirements for contractors for rehabilitation, to include possession of a compressor and rig to aid de-silting, and development for deep and shallow boreholes.

5.8.5.2 Gravity Flow Schemes

DLG and user communities need to work hand in hand in GFS design, planning and construction, and to establish management mechanisms for O&M. Roles and responsibilities are as follows:

i. **Communities** are to contribute towards the capital costs of construction and the total operation and maintenance of the facilities after construction. Guidelines for the amount of capital cost contribution are given in the OP5. Communities also provide most of the social economic data required for the design of the system.
ii. **A private sector contractor** constructs the scheme in accordance to the approved design and ensures that it is fully functional before the handover. For contract management information, see chapter 8.
iii. **District Local Government** is to provide technical assistance and guidance to communities in setting up modalities for scheme management, monitoring, and operation and maintenance. This technical assistance comprises of:

- Identification of requirements for effective management with the community.
- Establishing the role of all the players in decision-making.
- Making schedules for monitoring efficiency and functionality of the system.

The step-by-step approach for GFS development, sets out the steps that should be followed in order to ensure adequate O&M of GFS.

5.8.5.3 Rainwater Harvesting Systems

Water users are responsible for the maintenance of rainwater harvesting systems. In the case of domestic roof water harvesting, which is generally owned by the household, the maintenance does not suffer the same management challenges as those of systems which are used by a diverse group of people. Guidelines for communal rainwater harvesting should be developed by DWD to harmonise practices in O&M with this technology

5.8.5.4 Springs

O&M of springs is to be conducted at community level mainly by the communities, water user committees and caretakers with the DWO and community development staff. Sub-County extension staff and NGOs/CBOs provide support in terms of mobilisation, training and follow-up.

5.9 Follow-up and Back-up SupportActivities

After training, construction and commissioning of water sources, the community formally takes on the role of management and maintenance. Communities often face challenges in this regard. In order to support communities as they learn their new roles and responsibilities, and to re-establish water user committees, district departments (DWO, DCBS) and Sub-Countygovernments should provide follow-up support.

Such support can be provided in the form of monitoring visits to communities, relevant training, use of other fora to reiterate roles and responsibilities, facilitating linkages between communities and support agencies (e.g., Government, NGOs, private sector) and setting and enforcement of byaws and regulations to reinforce community management. The Water and Sanitation Schedules allow DLGs to plan for these activities. They are also included in the Software Steps.

During review of the DIM, it was reported that financing for this activity has not been catered for in some programs, and yet this is the only way sustainability of the new sources can be checked. It is, therefore, important for districts to budget for follow up and back-up support activities every year.

5.10 Funding for Software Activities, Sanitation and Hygiene

The Water and Sanitation Sector Schedules set a limit on how much of the DWSSCG can be spent on software activities. The figure set may change from one year to another and district staff should check the guidelines set in the sector schedule//ww sanitation and hygiene to finance sanitation and hygiene activities in the sector. Details of how the funds should be managed are given in the DSHCG.

Chapter Six: Water Supply and Sanitation Technologies

6. Introduction

In Uganda, the main sources of water supply for rural areas are; protected springs, shallow wells, deep boreholes, piped water schemes, rain water harvesting, valley tanks and dams among others. The water supply technology selected for a particular area depends on user preference; O&M considerations; and the hydrological and/or hydro- geological potential.

Groundwater forms a major source for water supply in Uganda, mainly through drilling and digging of shallow and deep wells equipped with hand pumps or motorised pumping equipment. There are numerous springs in the country some of which are protected for direct use while others feed into piped water supply systems. Rainfall is abundant in most parts of the country and rain water can be collected and stored at household level (domestic roof water harvesting), on rocks (rock catchment), and in valleys forming valley dams/tanks.

The construction of water and sanitation facilities is mainly undertaken by the private sector supervised by central government (CG), DLG and other development partners.

This chapter provides a description of the technologies that can be used to provide improved water and sanitation services in the sector and recommendations for further reading. Particular guidelines on design can be found in the Water Supply Design Manual (draft 2012).

6.1 Water Supply Technologies

Descriptions of main water supply technologies that are constructed or promoted under DWSCG and Local Government Development Programme (LGDP) are provided in Table 6.1 below.

Table 6. 1: Definition of Main Improved Water Supplies[7]

Facility	Definition	Population Served
Small Spring	Construction of collection box with one spout delivery (1 - 2l/s)	200
Medium Spring	Construction of collection box with two spouts delivery (2 - 4l/s)	200-300
Large Spring	Construction of collection box with three spouts delivery (> 4l/s)	200-300
Shallow Well - Hand dug	Construction of max 15m depth at 1 - 2m diameter using hand tools in high water table area, installed with hand pump.	300
Shallow Well - Hand augured	Construction of max 15m depth at 200mm diameter using a tripod and winch with drill bits and rods in high water table area, installed with hand pump.	300
Shallow Well - Motor drilled	Construction of max 30m depth at 200mm diameter using drilling rig in high water table area, installed with hand pump. Can be consolidated or unconsolidated formation.	300

[7] This table is extracted from the RGC Strategy, MWE/DWD, 2005 and the Uganda Water Supply Atlas 2010

Facility	Definition	Population Served
Deep Boreholes (Hand pump)	Drilling more than 30m depth, abstraction is by a hand pump. Can be consolidated or unconsolidated formation.	300
Deep Borehole (Motorised pump)	Drilling more than 30m depth, abstraction is by powered motorisation (usually a submersible pump).	200
Piped Water Supply System (Gravity Flow Scheme)	Protection of the spring, construction of treatment plant, laying of pipes and construction of taps	200[8]
Piped Water Supply System (Borehole Pumped)	Siting and drilling of borehole, laying of pipes and construction of taps	200[8]
Piped Water Supply System (Surface Water)	Construction of treatment plant, laying of pipes and construction of taps	200[8]
Domestic roof water harvesting	Collection of rainwater from household rooftops and storage at the home.	3 & 6[9]
Valley Tanks	Construction of tank with a volume of maximum of 3,000 m^3	N/A
Dams	Construction of a dam	N/A

6.1.1 Protected Springs

Springs form when a subsurface aquifer meets the ground level. Spring protection is a low cost technology and can yield good quality water in rural areas. Protection of a naturally occurring spring prevents contamination of the water, eases access and collection of water, improves hygiene and safety around the spring and can increase yield. Pictures 6.1 and 6.2 show unprotected and protected springs.

Picture 6. 1: Unprotected spring in Lira District

Picture 6. 2: Protected spring in Lira

[8] Yard tap for private use, 24 people; yard tap for public use, 150 people; public stand pipe/kiosk 150 people; institutional connection 100 people.

[9] For a RWHT <10,000 liters, 3 users; and >10,000 liters, 6 users.

6.1.2 Spring Protection

Spring siting involves determining the feasibility of the site. Prior to protection, the area around the spring should be surveyed to identify pollution sources (e.g. latrines, kraals, graves, flood plains and ponds, the soil conditions, and the drainage pattern around the spring). In addition, springs should be a distance from the flooding zone to provide sufficient drainage to the free flow of water. Another pollutant source could be agricultural activities upstream the source, especially if there is fertilizer application on the farm upland. Springs should only be protected if they are at more than 50m from a pit latrine (80m if the latrine is uphill from the spring); 50m from a graveyard and 50m from a Kraal. Guidance on environmental protection and post construction management is given in the Environmental Templates. Further discussion on Environmental issues can be found in chapter 9.

Spring construction stages comprise: setting out, excavation, spring eye capping; channelling spring flow; and construction of spring structures, drainage and springs compound. The Springs Construction Manual (Water Aid/DWD, 2007)(Annex A6.1; Link: Springs Construction Manual) provides details on spring types, site surveys, spring designs and protection/construction of the spring.

The size of the catchment area and aquifer, the percolation rate of water into the ground and the storage capacity of the soil govern the flow of a spring and must be protected. The bacteriological quality of springs is generally good, with most contamination a direct result of human activities in the spring vicinity. Proper source protection and good management can enhance the bacteriological quality. Poor chemical water quality is usually caused by the chemical nature of the aquifer and soil, and requires considerable water treatment to improve it. The immediate catchment should be properly protected. Water quality and quantity should be measured, and the number of users ascertained. Minimum water quality requirements for untreated point sources are given in section 9.2.

Issues of water rights of the community living near the source and on the land where the source is located should be solved (by the community and local leaders) prior to construction. The software steps (section 5.2.1) set out the recommended approach to community sensitisation and mobilisation, while Section 5.9.5.4 discusses the O&M requirements of protected springs. Pictures 6.3 and 6.4 show the spring construction and a constructed spring.

Picture 6. 3:Spring construction in Oyam

Picture 6. 4:Newly Protected springwith steps, and hedge in Oyam

6.1.3 Shallow and Deeps Wells

6.1.3.1 Shallow Wells

A shallow well comprises a dug or drilled hole that penetrates the water table, enabling water to be drawn up to the surface. In Uganda, a shallow well is defined as a well to a maximum depth of 30m, irrespective of the construction method; it may penetrate consolidated or unconsolidated formation. Ground water is often found within the overburden materials that overlie hard bedrock[10]. The overburden materials are referred to as unconsolidated formation, whereas the bedrock is referred to as consolidated formation. The required depth and type of formation determine the construction method. In cases of unconsolidated formations to a depth of 15 m, shallow wells can be constructed by hand digging or hand-auger equipment. Wells that are more than 15m depth, or penetrate consolidated formation require use of a light motorised drilling machine. All shallow boreholes should be deeper than 10 meters, and should be dug/drilled to the interface between bedrock and overburden (weathered zone) if they are to withstand seasonal yield fluctuations. The advantages of shallow wells are that:

i. They are cheaper to construct than deep wells. Shallow depths require fewer pipes than deep boreholes easing operation and maintenance requirements.
ii. The required pump handle is light and does not require much energy to operate.
iii. The required community contribution is less than that for deep wells.

The disadvantages of shallow wells are that:

i. If poorly constructed and not adequately sealed, they can be contaminated.
ii. They are more sensitive to fluctuation of the ground water table than deep wells. If not sited properly, the wells can run dry during the dry periods
iii. The yield may not be adequate for piped water supplies.

The construction of a shallow well will follow five major phases; site selection/siting; digging/auguring/drilling; test pumping and water quality analysis; platform construction/head works and hand pump installation. The phases are discussed in detail in subsequent sections.

1. Siting and Selection of Shallow Well Location

Prior to construction of a shallow well, a suitable location must be found. This usually involves balancing favourable hydro-geological conditions against the community's location desires. These may be contradictory. Negotiation and careful explanations are required. The siting procedures for shallow wells comprise of;
(i) desk study and information gathering;
(ii) geophysical survey (if appropriate)
(iii) selection of site and technology.

The Shallow Wells Technology Manual (DWD/MWE, 2007) provides more detailed information on siting of shallow wells and construction using hand auguring or motor drilling machines.
The client and contractor need to be flexible, since some of the communities initially selected for a specific technology may be recommended for another technology. In this case, the client would have to adjust the budget to accommodate the recommendations.

In case another technology is recommended, then the extension worker and the technical person need to thoroughly explain this to the community since it may have an implication on future O&M, and contributions for co-funding where applicable. Currently, once the client has selected a specific technology, there is no flexibility before drilling trials are made.

[10]In Uganda saturated soils, sand and weathered rocks (collectively termed 'overburden') frequently constitute shallow aquifers, which will yield water to shallow dug or drilled wells.

2. Shallow well digging, auguring and drilling

i. Hand-Dug Well

Construction of a hand dug well involves using hand tools to dig to the required depth. In order to accommodate the people digging, the well is at least 1m in diameter (Fig. 6.1). A tripod stand with a mechanical pulley or an improvised pulley system is used to hoist out dug out materials to the surface.

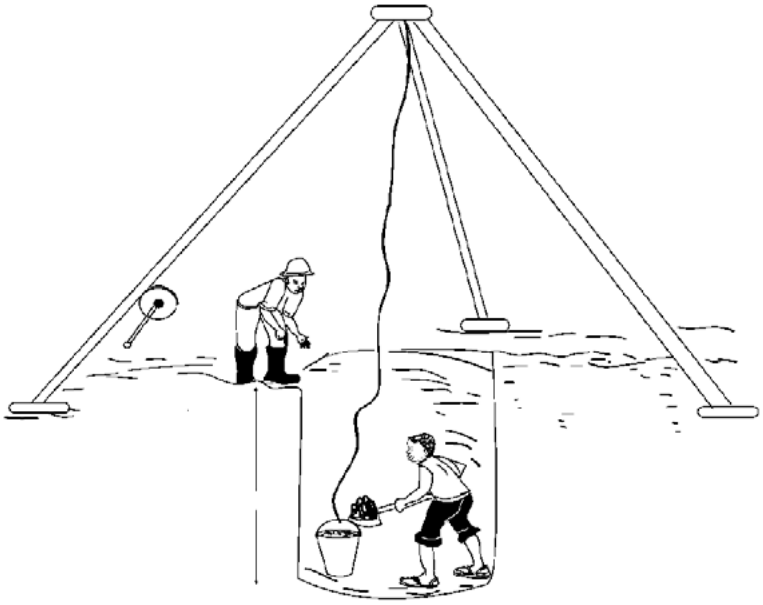


Figure 6. 1: Construction of hand dug well

The well should be deep enough to provide water throughout the dry season when the water level might drop. Construction of a hand-dug well includes the installation of perforated or permeable pre-cast concrete or PVC plastic rings below the water level to enable water to enter the well. In sandy materials, the pre-cast concrete rings may be lowered as digging progresses to avert the risk of collapsing sands burying the digging staff. All concrete should be properly mixed, reinforced and properly cured. Gravel should be placed on the base of the well to avoid silting. The surface of the hand dug well should be covered with a manhole to allow continued access to water if the pump breaks down. *The book Hand dug Wells and their Construction by Watt and Woodpublished by the Intermediate Technology Development Group (ITDG) provides more information.*

ii. Drilled Shallow Wells

Drilled shallow wells can be constructed using hand auger equipment or light motorised rigs. Hand auger drilling is human operated. An augur bit is twisted into the ground by turning to make a hole. The material stays on the flights or in the bucket, which is subsequently pulled out of the ground. As the equipment is turned, it penetrates deeper, making a hole. The equipment is periodically lifted out of the ground to remove the material before going deeper. It is analogous to a drilling wood with a hand drill. Light motorized drilling involves the use of a small motor-driven drilling rig.

After drilling is completed (using the hand auger or light motorised rig), permanent casings and gravel pack are inserted. The well is then developed and the yield of the well is estimated (referred to as air lift or drillers' yield). If the yield of the well estimated is equal to or above 300 l/hr, then sanitary seals are cast and the well left for at least 24 hours before a test pumping test is carried out. A water sample for physio-chemical water quality analysis is picked at the time of test pumping and sent to the laboratory, while bacteriological analysis is done on site or following specific sampling guidelines. If the water quality and quantity meet the required standards the apron is cast (Figure 6.7) and well installed with a hand pump. Details on water quality requirements and testing are given in Chapter 10. Shallow wells are usually constructed in unconsolidated formations.

6.1.3.2 Deep Borehole Siting and Construction

Deep boreholes in Uganda are defined as those with a depth of 30m or more[11]. The advantage of deep wells is that the fractured (bedrock) aquifers will most often provide relatively higher yield than shallow wells, since fractures allow easier and more rapid groundwater flow than overburden materials. Deep wells can also be sited in relatively high altitude areas which are also the common settlements for the larger population, as opposed to shallow boreholes which are normally sited in low lying areas that are less in habited by the community. They are thus more acceptable and most convenient, compared to shallow boreholes, especially for institutions like schools and health centres, as they are normally within reach. However, they are considerably more expensive to construct than shallow wells.

1. Deep Borehole Siting

The objective of borehole siting is to minimise the risk of drilling dry wells. As in the case of shallow well sighting, desk studies and information gathering involving analysis of
(i) existing data/records,
(ii) water resources maps (where available),
(iii) data from village identification and information gathering visits
(iv) environmental issues, are essential.

Once this has been undertaken, field geophysical surveys can be executed. However, there needs to be a balance between the cost and benefits of these surveys. Consulting firms or hydro-geologists generally undertake borehole sighting, well design and supervision at DLG level.

To streamline the sighting standards and to avoid under-performance and non-professionalism, guidelines and minimum standards for borehole siting shall be developed by DWD and enforced by districts through terms of reference for consultancy contracts and drilling contracts. All stakeholders consulted during the update of this manual concurred that, minimum qualifications be set for ground water professionals as well as standard sighting guidelines. This was also noted in the study by DWD/UNICEF in 2010 for the "assessment of ground water investigations and drilling capacity in Uganda". The study further proposed the licensing of consultancy firms and ground water professionals involved in geophysical borehole surveys in Uganda in order to improve success rates and professionalism.

[11] In the case of the basement complex of Uganda, comprising of massive consolidated rocks such as granite, gneiss and quartzite (collectively termed bedrock), where there are no pore spaces, groundwater can only infiltrate into and exist in such rocks in fractures and other fissures. Any aquifers in these formations are termed 'fracture aquifers'. Such fracture aquifers are usually relatively deep (30–100 meters below surface), are usually of limited dimensions and may, or may not, be interconnected with other similar aquifers.

In the mean time a minimum of 600 m of resistivity traversing (commonly referred to as a profiling) followed by Vertical Electrical Sounding (commonly referred to as VES) on selected anomalies in the basement complex may be used. For purely sedimentary or unconsolidated formations, only spot VESes may be carried out. In geological boundaries where the hydro-geologist is not certain of the geology, it is advisable to begin with the latter, and change to the former if the resultant geophysical field measurements do not justify resistivity traversing.

Experience with this approach has given good results over the years; however, a more elaborate standard approach shall be developed to guide the sector in contract formulation. Without these standards and guidelines, some unscrupulous individuals pose as consultants or ground water professionals resulting to shoddy work (including the use of dousing methods) in some places, leading to a number of dry wells that have depicted such areas to have a very low ground water potential, causing the affected communities to suffer, and further straining the meagre resources at the districts.

Picture 6. 5: A consultant doing a VES using a Terrameter

2. Deep Borehole Drilling and Construction

In Uganda, drilling is generally undertaken by private sector contractors (and by some NGOs). The borehole can be drilled using percussion or mud drilling methods (in soft formation with a lot of caving), air/fluid flush Down-the-Hole (DTH) and rotary drilling (in hard formation), odex drilling (in soft formation with boulders) or using a combination of different methods as discussed bellow. Table 6.2 presents the drilling methods in more detail.

Table 6. 2: Main drilling methods used in Uganda

Drilling Method	Description and applicability
Mud rotary drilling,	The borehole is created by a drilling bit attached to the bottom of a set of drilling rods which are rotated by a hydraulically driven drive unit on the drilling rig. The rotation of the bit together with the weight of the drilling 'string' (i.e. the drill rods, drilling collars and the bit itself) cuts and breaks up the rock/soil as it penetrates the formation. In order to remove this broken material, a circulating fluid (loosely termed 'drilling mud') is pumped via a number of 'mud pits'.
Air rotary drilling	The essential components of the air rotary method are the same as the mud rotary method, except that compressed air is used as the circulating fluid that circulates down the drill string, through the drill bit and back via the annular space to the surface. The drill cuttings are forced up through the annular space by the pressure of the ascending air, and carried to the surface. At the surface the cuttings are collected either in a bucket trap or 'extractor'. This drilling method requires no mud pits or pump. The efficiency of the hole cleaning and hence drilling penetration is greatly influenced by the volume and pressure of the air. This is determined by the capacity of the air compressor.
Air percussion drilling	This is currently the most commonly used method in Uganda and is similar to air rotary drilling, except that air pressure is used to operate a down hole percussion 'hammer'. The hammer relies upon percussive impact and rotation rather than solely rotary action to break up the rock and create the borehole. Cuttings produced by the hammer are returned to the surface by the rising column of air. The rate of penetration and the efficiency of the hole cleaninggreatly depend on the pressure and volume of the compressor. A very significant advantage of this method of drilling is that the percussive action of the hammer bit (which is usually tipped with hardened tungsten carbide 'buttons') allows the rapid penetration of hard formations that may not be easily penetrated by the rotary method.

Picture 6. 6: Air percussion drilling with a big KLR rig in Luwero district

Picture 6. 7: Air percussion drilling with a light PAT 401 rig in Nwoya district

3. Well Development

Borehole development is done to remove finer materials like native silts, clays, sand, drilling fluid residues deposited on the borehole walls during the drilling process from the borehole and immediate surroundings that include the gravel pack and the aquifer. The pack and the aquifer are not opened up so that water can flow into the well more easily. Before the borehole is backfilled up to ground level, the well should be developed. Well development can be undertaken using continuous airlift until water is clean or there is intermittent airlift development. Even if the water is clean at the end of drilling or after 30 minutes of development, drillers and supervisors should always develop further for at least a total duration of 2 -3 hours to ensure the aquifer opens up, and all the drilling fluids have been cleaned out

Picture 6. 8: Borehole development

Picture 6. 9: Borehole drilling and development with a PAT 301 rig and an ELG 15 bar compressor

4. Placement of Sanitary Seals

Both shallow and open hole designs require sanitary seal at specific depths along the annulus as seen in the typical well designs in figures 6.5 to 6.7. The purpose of a sanitary seal is to prevent ingression of unwanted contaminants from the overburden and the surface. For shallow well designs, the bottom should also be sealed using a cap or cement. For an open hole design and the modified open hole design, the first cement sanitary seal should be cast at the bottom of the lining/casing within the counter sunk hole (this process is at times called grouting). In both designs, at least 1 m of clay seal should be cast above gravel. Clay is preferred because it does not dissolve to clog the gravel and the screens. In the absence of clay, thick cement balls should be rolled and thrown down in turns after development. The final seal is cast 3-0.5m below ground level using strong cement/grout.

6.1.3.3 Borehole Test Pumping

All boreholes with airlift yields above 300 l/hr should be test-pumped to ascertain the sustainable yield of the borehole. For hand pump boreholes, test pumping is done to establish the sustainable yield of the well, the optimum installation depth of the hand pump, and pick a water sample for water quality analysis. For boreholes to be installed with submersible pumps; test pumping should be purpose made to establish the sustainable yield of the borehole, size of submersible pump and its optimum installation depth, provide data on aquifer performance and related hydraulic characteristics of the well, as well as collection of a water sample for water quality analysis.

The capacity of the India Mark II hand pump is about 800-1,000 litres per hour when pumped constantly. For boreholes to be installed with hand pumps, a three (3) hour constant rate test at a rate of 1,000 l/hr for boreholes with airlift yields above 1,000 l/hr is recommended, while boreholes with airlift yields between 500 and 1,000 l/hr, a 3 hour constant rate at 800 l/hr is recommended, while for boreholes of airlift yields between 500 and 300 l/hr, a constant rate of 500 l/hr is recommended. The water level-time measurements are recorded on pre-designed aquifer data test sheets, as well as drawdown-time graphs. After 3 hours of constant pumping, recovery monitoring of the water level should be done till 90% of the drawdown is achieved, or till 50% of the pumping time (90 minutes) is achieved; whichever comes earlier.

In some low ground water potential areas, even after drilling more than one attempt in a village, the only yielding boreholes may not sustain 500 l/hr, but may sustain 300-400 l/hr. In such circumstances, the client (district or the implementing agency) may weigh the option of accepting a low yielding borehole or back-filling even the low yielding well and leave the community without water. In case there are 2 low yielding boreholes, it may be an option to consider installing 2 low yielding boreholes than leave the community without water.

For boreholes to be installed with submersible pumps, the test pumping program is designed based on the intended purpose of the borehole. In general, the test will comprise of a minimum of 4 step tests, each of at least 60-90 minutes, followed by a recovery monitoring of at least 90% of created drawdown or 50% of the pumped time, then followed by a long duration constant rate test and recovery monitoring. The step test yields are dependent on the airlift yield of the borehole. As a guide, the first step test can be put at 30% of air lift yield, 2nd step at 60%, 3rd step at 90%, while 4th step can be put at 120% of the airlift yield respectively. The test pumping supervisor and technician should aim to draw the water level towards the pump or the last water strike in the last step, otherwise, make a 5th step at 150% of the airlift yield until the water level is drawn closer to the pump or the last water strike level. The time for the long duration will depend on the intended purpose of the well; but will generally range from 12-24 hours for solar powered systems to 72 hours

or several days for institutional water supplies, rural growth centres or town water supply systems. It is highly advisable to engage the services of an experienced hydro geologist/water engineer to design supervise and analyse test pumping program for high yielding boreholes involving step tests and longer pumping durations.

While carrying out long duration test pumping, the water levels and quality of both the pumped well and any nearby water sources should be monitored concurrently to infer any relations of the aquifers or change in quality with increased pumping.

A platform, drainage channel and a soak-away pit should be constructed around the casing for sanitary reasons, and also to provide a firm base for the users while drawing the water. This should be done for all boreholes to be installed with hand pumps whose sustainable yield, as established from the test pumping data analysis and whose water quality meet the national standard for potable water.

6.1.4 Shallow and Deep Well Design and Specifications

Boreholes can have a number of different designs depending on the geology and hydr-ogeology. The design depends on a number of factors including the nature of the formation, water bearing layers and amount of water required from the well.

Figure 6.2 and 6.3 set out the overall shallow and deep well borehole designs for drilled wells in unconsolidated and consolidated formations as required by MWE/DWD. These standard designs should be extracted and adopted by DLG/Consultant/NGOs and other implementing agencies and included in contract documents for drilling. It should be noted that these two designs are relevant for both shallow wells and deep boreholes, depending on the formation. The detailed well design is made on site by the driller in consultation with the consultant/supervisor, with consideration of well log data collected in a minute-by-minute log as drilling progresses. The final design should also have consideration of the pump to be installed later, especially for wells to be installed with electric pumps.

Deep wells drilled in unconsolidated material should follow the guideline design in Figure 6.3, while deep wells that are drilled into basement rock should follow the guideline design given in Figure 6.4. In cases where there is water in the overburden as well as in the bedrock, the borehole should tap both aquifers. This requires the installation of screen in the water-bearing formation of the overburden. Due to the nature of the basement material in Uganda, the hard rock does not require casing. This minimises drilling costs.

A modified version of the deep well design (Figure 6.6) is to drill through the hard rock and finish with a 6" or 6.5" button bit, and install 5" ID PVC casings and screens (if there were productive aquifers in the overburden) and dress a 7" OD PVC nipple/parker/reducer on the bottom PVC casing, allowing the tail of the nipple/parker/reducer to enter and hung in the 6 or 6.5" open hole. See Figure 6.6. The advantage of the modified open hole design is that the borehole can be drilled in one day since you do not have to grout and wait for the cement to set overnight before further drilling in the hard rock. In addition, the open hole is bigger (6 or 6.5") and can accommodate a very big submersible pump. The challenge with the design is that, care must be taken to ensure that the tail of the nipple enters the open hole and that the nipple used is big enough and sits properly at the end of the 8" hole. If this calculation is messed up, the borehole is likely to silt up.

A shallow well or deep borehole for a hand pump is considered to have been successfully developed and ready for test pumping if the driller's yield is greater than 300 litres per hour. In the case of boreholes to be fitted with motorised pumps, the acceptable yield depends on the requirements of the water supply system. Minimum water quality requirements for untreated point sources are given in Chapter 9. The minimum acceptable yield, for a shallow/deep borehole, should be standardized within a district or Sub-County based on the available data of the ground water potential in the area. This information should be included in drilling contracts and used across the district. It is common to read ToRs for rural water shallow and deep boreholes differing from one implementing agency to another within the same district, and differing greatly from those used by the DLG where the agency is operating, but this should be avoided.

During emergency situations, there can be acceptable flexibility to facilitate prompt responses to the needs of the communities, but this should not be allowed to be the standard procedure. The design guidelines set should be adhered to if the objectives of the sector are to be achieved.
The minimum drilling diameter in the overburden should be 200mm, while the minimum diameter in the consolidated hard rock should be 114mm. The casing diameter for shallow and rural water boreholes to be installed with hand pumps should be at a minimum 4" or 100mm internal diameter (ID), while gravel should be 2-6mm. 5" ID casings and screens are used for both deep and shallow boreholes in case the borehole turns out to be high yielding and would be considered for a motorization program in future, and also makes it easier during rehabilitation incase the lining breaks, a smaller one of 4" ID can be installed. The bigger the casing diameter, the higher the cost, hence, big casing diameters should only be used after assessing the merits and demerits.

A platform, drainage channel and soak pit should be constructed. Platforms should be 1.85 m external ring diameter, 6m long drainage channel at a gradient of 1:30. It is recommended to use concrete of ratio 1:2:4/20mm size aggregates (1 part cement: 2 parts sand: 4 parts 20mm size aggregates). Brick work platform rings and channels have been known to wear easily due to their abilities to absorb moisture from the ground over time, thus requiring frequent repair. Un-reinforced concrete has been found to be sufficient considering there is no other load on the platform and drainage channel other than that caused by the pumping strokes, which is also spread and distributed through the pedestal legs and foundation base., The use of reinforced concrete is,therefore,a luxury on a borehole platform. Figure 6.7 presents the platform design and the dimensions.

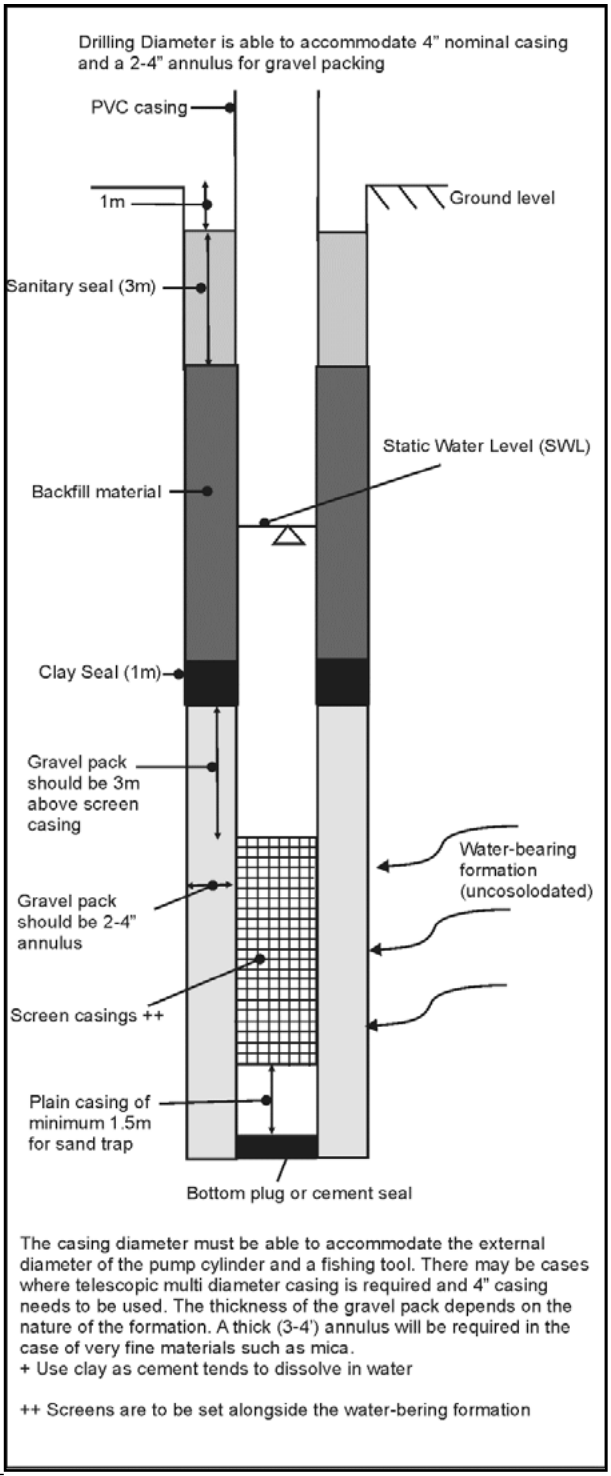


Figure 6. 2: Drilled well design (shallow well design) for both shallow and deep wells in unconsolidated formation

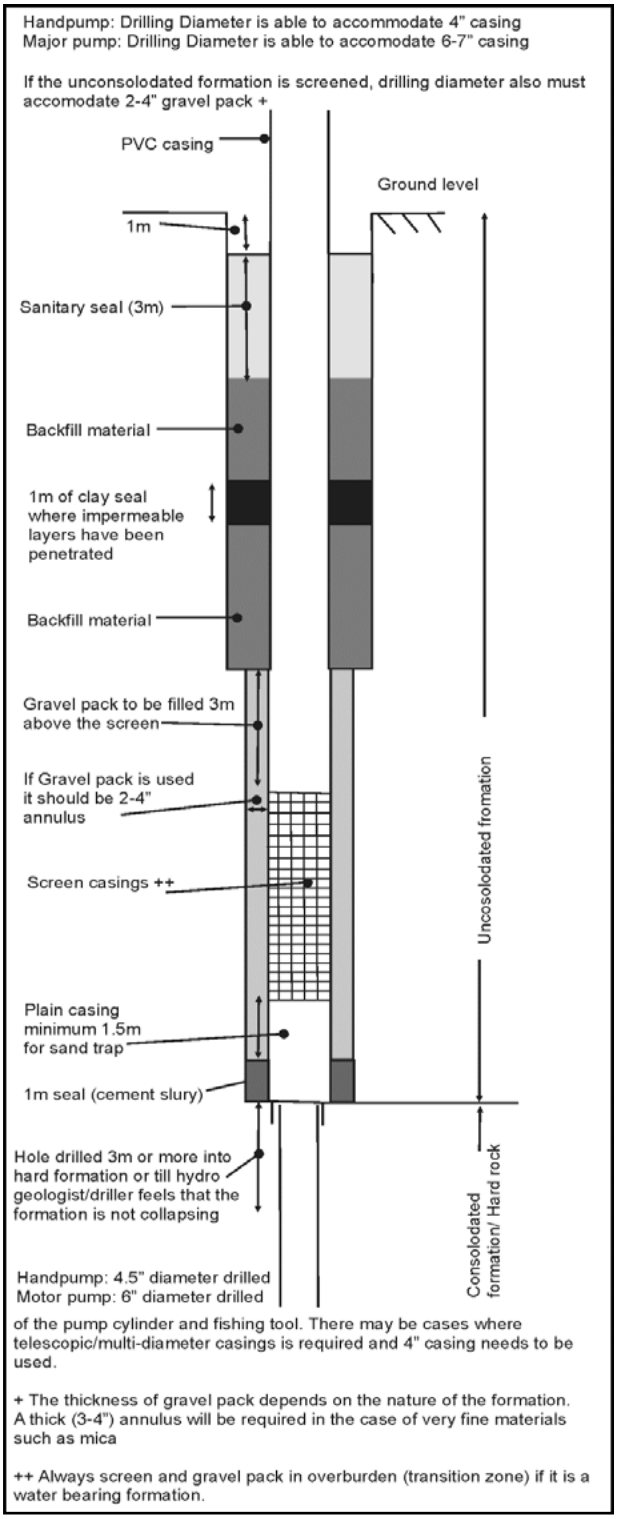


Figure 6. 3: Drilled well design for consolidated formation/hard rock (open hole design)

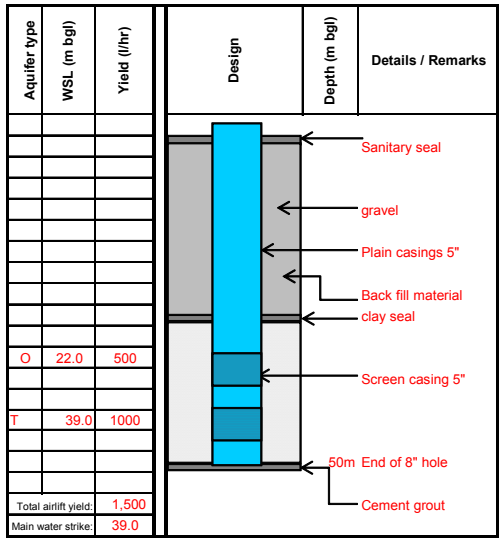


Figure 6. 4: Typical shallow well design in un consolidated formation

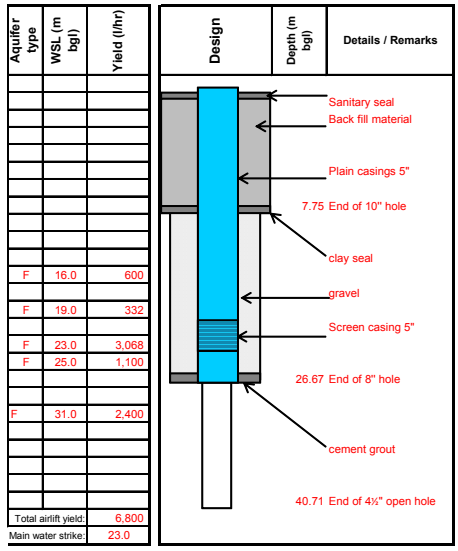


Figure 6. 5: Typical deep well (open hole) design in consolidated formation

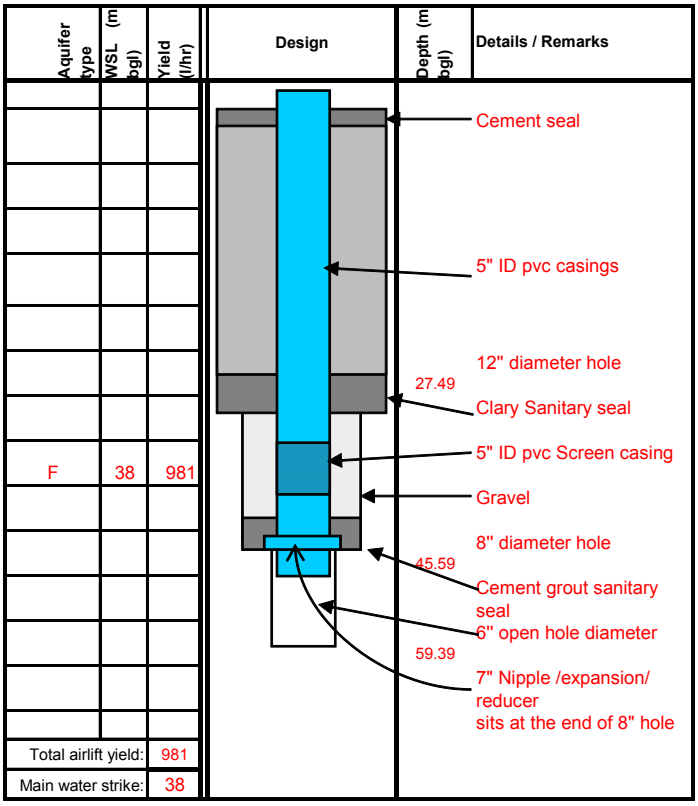


Figure 6. 6: Typical deep well (modified open hole) design in consolidated formation

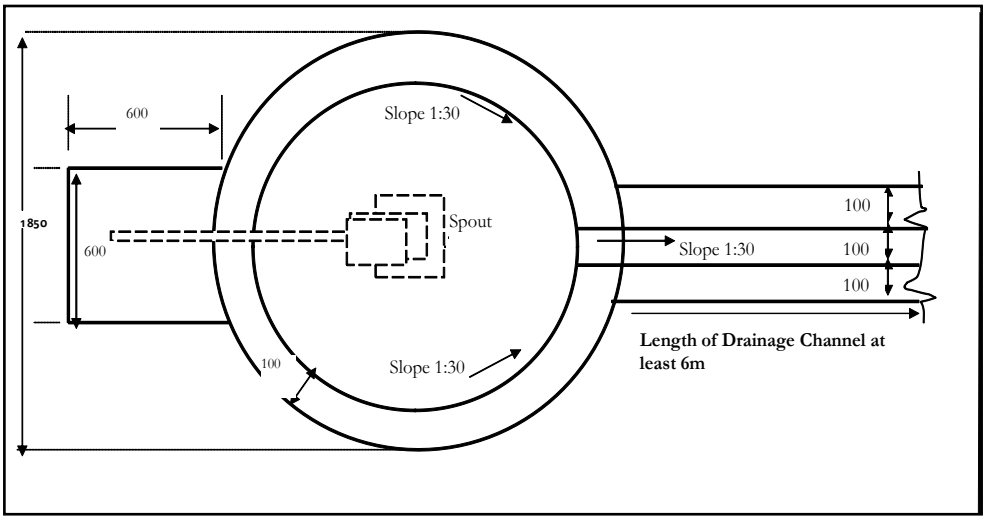


Figure 6. 7: Drilled Well Platform Design Dimensions in mm

6.1.5 Pumps

6.1.5.1 Hand Pumps

The GOU requires that shallow wells and deep boreholes that are funded through DLG are covered and fitted with a hand pump. Currently, the standard hand pumps in Uganda are:

- The U2 (Deep well Hand pump), as specified by the Uganda National Bureau of Standards (UBS) - US 406:1995;
- The U2/U3 (Shallow well Hand pump), as specified by the UBS - US 405:2002; and
- The Modified U3 (Deep well CBMS Hand pump) as specified by the UBS - US 471:2002.
- Installation depths of hand pumps are based on analysis of test pumping data.

6.1.5.2 Diesel, Electric and Wind Pumps

In the case of pumped piped water supplies (e.g., for RGCs), diesel, electric, solar and wind powered pumps can be utilised. The sizing and designing of the pumps should be done by an experienced water engineer and or hydro geologist.

6.2 Rehabilitation of Boreholes and shallow wells

With proper utilisation and preventive maintenance systems in place, boreholes and shallow wells are designed to last upto 10 to 25 years. Eventually the borehole may silt up and the effectiveness of the moving parts will reduce. Even a properly designed well will thus require rehabilitation at one point in time. However, minor repairs to a borehole or pump (such as replacing seals) do not constitute borehole rehabilitation. Table5.3: defines maintenance, and minor and major repairs. More details are given in the "Updated National Frame Work for O&M of Rural Water Supplies, 2011". Communities may seek assistance from DLG towards undertaking major repairs.

The DLGs are mandated to use private contractors to carry out rehabilitation. This may require de-silting of the borehole by air flushing to the original total depth of the hole, and/or fishing of lost equipment and/or other blockages in the borehole. When the borehole is clean and open to the total depth indicated on the original completion records, the Contractor may re-align the borehole by installing appropriate PVC casing and screens and gravel pack if the original diameter permits. Therefore, borehole rehabilitation should be differentiated from minor repairs (like seal replacement, pipe replacement, etc.) These activities should be managed by the community with the help of trained sub county hand pump mechanics, while the communities seek the help of the district for major works like de-silting and well re-alignment, etc as assessed by the sub county mechanic. This requires districts to make thorough assessments of boreholes to be included on the list of rehabilitation, to avoid including boreholes that do not qualify to fit in this category. ToRs and information contained in adverts and tender documents should equally spell out clearly what will be expected of the contractor.

Caution has to be taken on the use of bentonite mud, lost circulation agents or any form of plugging material that may ultimately affect the production capacity of the water bearing strata. They have to be of a low solid, degradable type and the contractor must carry out proper development and test pumping to establish the well hydraulic parameters. The borehole has to be properly installed with an appropriate pump and all the structures; apron, drainage; repaired.

6.3 Rainwater Harvesting

Rainwater harvesting refers to the collection and storage of rainwater for domestic, municipal and agricultural purposes. A rainwater harvesting system consists of the following components:

- A catchment surface where rainwater is collected (e.g., rooftop, rock surface, etc).
- A storage reservoir where the rainfall is stored until required (e.g. tank made of polythene, ferrocement, brick masonry, galvanised iron, concrete, etc).
- A delivery system for transporting the water from the catchment to the storage reservoir (e.g. gutters or drains).

Storage facilities constitute the biggest cost component of a rainwater harvesting system.

There has been considerable experience of communal rainwater harvesting and domestic roof water harvesting, with the latter being the preferred option.

In Uganda, Government has for long not put much emphasis on rainwater harvesting as preference was accorded to the construction of springs, shallow wells, deep boreholes, and piped water supplies. However, it is now increasingly being recognised as one of the key solutions to providing accessible and safe water, particularly in rural areas. There is a deliberate effort by MWE to promote RWH for household, institutional and communal water supply systems mainly for domestic purpose.

Several pilot projects have been implemented in schools, villages, and at community levels. Experience from the pilot projects compelled the MWE to design a strategy for up scaling DRWH. DWD is, therefore, in the process of developing guidelines needed by all partners interested in the implementation of RWH programs/projects mainly for domestic water consumption. The role of respective stakeholders, design considerations, cost sharing issues, etc are covered in the guidelines, which should be consulted whenever implementing RWH projects in Uganda.

6.3.1 Implementation

MWE encourages the district to include RWH activities in its work plan. The target beneficiaries, at the moment, are recommended to be at community level. That is, communal RWH facilities in schools, health centres and markets. Planning for beneficiaries at household level should only target the disadvantaged groups such as the widows, HIV/AIDS patients, extremely poor homes, etc. The RWH is a technology option and can be chosen objectively in comparison to other viable options.

The household contribution can be raised by; revolving funds, where each member contributes as work is ongoing; microfinance institution where each one gets and pays the loan individually; group gets loan from microfinance institution and pays as group. This will be determined during mobilisation but should not exceed 40 % of the cost of the tank.

Tendering of contracts for construction of RWH facilities should be to NGOs/CBOs and costs are recommended to be shared based on the principle of 60% government funding, and 40% beneficiary house hold. This is in a situation where the government (CG and LG) has a project for constructing RWH facilities at household level. Under this arrangement, the recommended size of the tank to be supported by Government is 6 m^3. Beneficiaries can contribute higher to get bigger sizes like, 8 m^3, 10 m^3, 12 m^3 and 20 m^3. Normally, beneficiaries are expected to provide locally available materials and some form of human labour. The choice of the construction team (whether women groups, trained masons or existing masons), depends on the socio-economic and cultural setting of particular community. This should be determined during mobilisation of the community by the DLG through DWO.

6.3.2 Communal Rainwater Harvesting

Government intervention may cover full costs of the RWH facilities forexample, in institutions (schools) and communal water supply systems (community, health and public centers) where it has been identified as one of the feasible technology options for safe water supply. Under the new (based on draft by Sept 2012), RWH guidelines being developed, GoU recommends the implementation of RWH projects through NGOs. This is because of the fact that NGOs/CBOs are non profit organisations and are exempted from payment of some taxes. Credibility and integrity are key factors in the selection of the NGOs. The NGOs should be registered with UWASNET.

6.3.3 Domestic Roof-Water Harvesting

Domestic roof water harvesting involves the collection of rainwater from a household roof and collection in a vessel. Some households have undertaken their own innovations, and use jerry cans or oil drums to store water. Clearly, the larger the storage vessel, the more water is made available to a household in between rainy seasons. NGO programmes and GoU pilot projects have involved the construction of masonry.

Given the high levels of rainfall in most parts of Uganda, dispersed nature of rural settlements and increased number of households with corrugated iron (mabati) roofs, improved domestic roof-water harvesting (DRWH) is an ideal way of providing access to safe water within the home. DRWH can make a tremendous impact on the rural poor by alleviating the drudgery of collecting water from distant, and often polluted sources.

An additional advantage of DRWH is that it can be maintained by the household, and thus does not suffer from the difficulties of community managed O&M associated with point water sources. In some areas, where options for improving water sources are lacking (referred to as water stressed areas), DRWH is the only alternative.

Despite the tremendous potential for DRWH in Uganda, only a very small proportion of the population have accessed this improved water supply. The up take of DRWH is constrained by a shortage of experienced professionals to do the designing, the relatively high costs, lack of specialist components on the market, unsuitable designs, uncertainties regarding partial supplies and inexperience on how to handle inequity of roof ownership.

To encourage the DRWH, extension officers should encourage communities to include rain water harvesting systems while constructing individual roofs (self supply). This, in the end, reduces pressure on communal sources, but may be a hindrance to O&M of the communal sources.

Picture 6. 10: Domestic roof water harvesting with an oil drum in Kapchorwa

Picture 6. 11: Domestic roof water jar (0.4m^3) in Kabale District

Picture 6. 12: Ferrocement Tank (4m^3) in Kapchorwa

Domestic roof-water harvesting facilities can improve water security at household level. The environmental impact of the technology is minimal as it is a renewable source. A challenge of the technology is to ensure sufficient water can be stored to take a family through the dry season, which requires adequate storage volume. However, this needs to be offset against the cost of the storage, as smaller vessels may be more affordable.

Further information about domestic roof water harvesting, including the challenges of project implementation can be found in the report: Piloting domestic roof water harvesting in Bukanga and Isingiro counties of Mbarara district and Sheema south in Bushenyi district (URWA, 2006) (Annex A6.3, Link: Roof water Pilot Project).

The book published by the Intermediate Technology Development Group (ITDG) provides extensive information on rainwater harvesting: "Rainwater catchment systems for domestic supply, design construction and implementation" by John Gould and Erik-Nissen-Petersen.

6.4 Piped Water Supplies

Piped water supplies comprise of a water source (spring, surface or borehole), storage tank and pipe distribution network. Where a spring water source is at a higher altitude than the supply network, it may be possible to pipe the spring water into a storage tank and subsequently feed the distribution network. This is called a gravity flow scheme (GFS). Where the supply water is pumped into a storage tank, the system is referred to as a pumped piped water supply scheme. Piped water supplies can be constructed for rural communities. The beneficiaries may inhabit a wide area. In general, only Gravity Flow Scheme (GFS) systems are constructed for such scattered populations.

Picture 6. 13: GFS Tank in Kabarole

Rural growth centres (RGCs) are defined as an area in which a population of 500 to 5,000 people are concentrated in close proximity. They are essentially small trading centres, which are expanding in terms of population. Rural growth centres are neither completely rural nor urban. They are between a rural area and a small town in terms of population and population density. Both GFS and pumped schemes may be constructed in rural growth centres. The "Rural Growth Centre Strategy" (summarised in chapter 3) was released by DWD/MWE in 2006 and sets out the technological options for RGCs.

The planning, design, financing and implementation of improved water sources in RGCs is done by MWE through the WSDFs in coordination with DWOs as enshrined in the WSDF operations manual 2009. WSDF's will provide technical and managerial support services, while other services will be outsourced from the private sector under contractual arrangements. MoUs will be signed between districts and WSDFs to allocate detailed roles and responsibilities between key players in implementation.

6.4.1 Gravity Flow Schemes

The gravity flow schemes are the cheapest piped water supply in terms of operation and maintenance. They are formed when water from the springs is collected in a tank and supplied to the beneficiaries.

Note that the source is at higher elevation than all other structures including tap stands. In order to construct a protected spring, it is important to protect the intake from erosion floods and contamination by surface runoff or rain. A dam and drainage channel may be required during construction. Further protection from animals and curious community people from tampering with the works should be considered. More details regarding spring protection and specifications are given in the Springs Construction Manual.

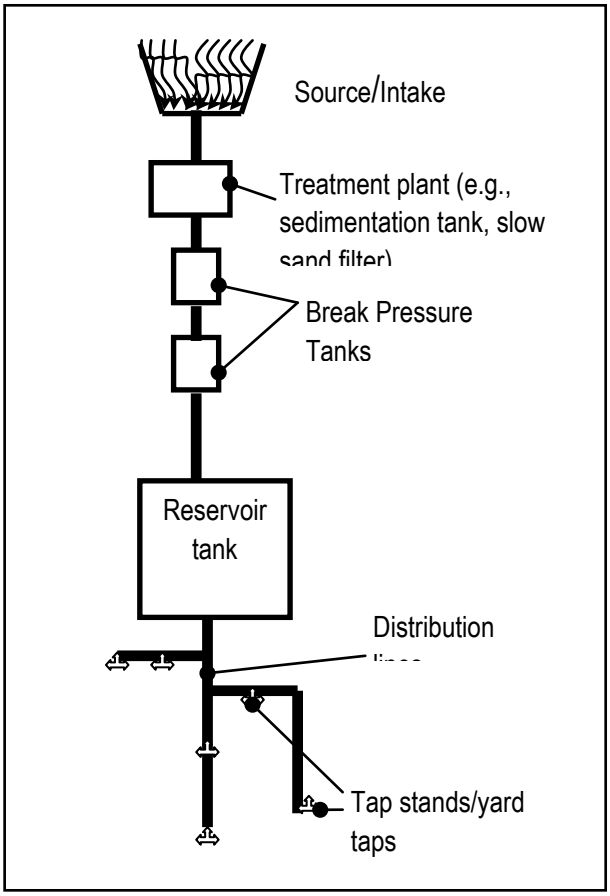
The issue of water rights of the community living near the source is crucial. Issues regarding the land on which the source is located must be solved before construction.

The water quality of the source will determine the treatment to be used. However sedimentation is preferred to settle the solids if the bacteriological content of the water and other parameters are within the limits. Break pressure tanks are usually used to control the pressure and thus reduce pressure in the pipe network.

The reservoirs are usually used to stabilise the flow and store water needed when the demand is high. In GFS it usually stores the yield at night, which can be used in the day during peak hours. Any type of pipes can be used depending on the pressure in the mains, the soil characteristics and cost. Air valves are usually used to avoid air blocks/locks, which may impede the flow of water located in high points in the system.

GFS are usually located in hilly areas and therefore more attention should be paid to the topographical survey done. Inaccurate data may lead to non-flow of water which may lead to loss of money, vandalism and contract abandonment.

Figure 6. 9: Schematic diagram of a Gravity Flow Scheme



6.4.2 Motorised Pumped Piped Water Supply Systems

In the rural water and sanitation sub-sector, motorised pumped piped water supply schemes may be utilised in some RGCs. Table 6.3 provides an overview of the economically feasible options for RGC water supply. Motorised pumped pipe supplies should only be considered for categories 2 and 3*.

Table 6. 3: Feasible Options for RGCs[12]

Technical Solutions	Supply	Appropriate for
Surface Water Systems		
Conventional treatment, pumping	Piped	Category 3
Conventional treatment, gravity	Piped	Category 2 and 3
Natural treatment, pumping	Piped	Category 2 and 3
Ground Water Systems		
Boreholes, motorised pump	Piped	Category 2 and 3
Springs, pumping	Piped	Category 2 and 3
Springs, gravity system	Piped	Category 1, 2 and 3
Point Sources		
Borehole, motorised pump, storage	Tap at source	Category 1 and 2
Upgradeable borehole with hand pump	Tap at source	Category 1 and 2
Boreholes with hand pump	Tap at source	Category 1
Rainwater harvesting	Tap at source	Category 1
Category 1: 500 – 1,500 people *Category 2: 1,500 – 3,000 people *Category 3: 3,000 – 5,000 people		

The advantage of groundwater is that it usually requires minimal or no treatment. Surface water from a river or lake (used as a last resort) will require considerable treatment, which increases the capital and O&M costs of the system. The water tariff will be correspondingly higher than that of a scheme which requires no treatment.

Section 6.2.3 provides guidance on borehole siting, drilling, design, specifications, development, test pumping, water quality and yield. The water source must be assured prior to design and construction of the pipe network. Preparation for management of a motor pumped piped water supply system needs to commence prior to construction. The management has to ensure that the water users pay a tariff that reflects the unit cost of the water (pumping and treatment).

[12]This table is extracted from the RGC Strategy, MWE/DWD, 2005

Picture 6. 15: Reservoir tanks for an institution in Oyam

Picture 6. 14: An existing borehole installed with a solar pump in Oyam

Picture 6. 16: Tap Stand construction in Oyam

Picture 6. 17: Tap stand with 4 taps under use by students in Oyam

6.5 Self-Supply Initiatives

Self-supply initiatives refer to local-level or private initiatives by individuals, households or community groups to improve their own water supplies without waiting for help from Government or NGOs. The individual, household or group provides the investment cost of the water source, either in cash or kind. While ownership may or may not be clear in law, there is no perception that Government or an NGO has either partial or total control of the source.

Self supply initiatives take many forms, including any of the above technologies, but may also include: a few logs across a waterhole; an earth bund around a waterhole to divert runoff; a natural spring or shallow groundwater source protected by the community; a hand-dug well constructed by a householder and shared with his/her neighbours; a simple hand-pump to lift water from very shallow depths; the widespread use of rainwater; even some cases of private individuals drilling deep boreholes for their own and neighbours' benefit.

Self supply initiatives may not meet the minimum service level in Uganda (i.e. clean water within 1.5km from the home). However, it is essential that LGs do not undermine these efforts but rather encourage water users to continue to improve their own water supplies.

6.6 Water for Production

Water for Production (WfP) is water required primarily for agriculture and livestock production. Technologies used for WfP are mainly dams and valley tanks. Water from these sources can either be used separately or combined, for fish farming and domestic water purposes, drainage sumps, groundwater recharge, flood control and conservation storage. Development of dams and valley tanks require, detailed technical investigations followed by hydraulic and structural designs accomplished through; Topographical surveys, Geotechnical Investigations, Hydrological analysis, Hydraulic and Structural designs, Preparation of BoQs and Preparation of Technical Drawings. The technical guide for dam and valley tank construction (under development) provides the following safety considerations, and cautions that construction of these structures should be managed by an experienced and qualified engineer.

Picture 6. 18: Akwera multi-purpose dam in Otuke district

6.6.1 Safety Considerations for Dam and Valley Tank Construction

6.6.1.1 Dam Construction Projects

i. Developers should restrict themselves to the construction of earth dams no higher than 5 m from streambed to the crest level.

ii. Dams on catchment areas exceeding 5 km2 or with reservoir areas storing more than 50,000 m3 should acquire the advice of a qualified Hydraulic Engineer for technical guidance in the design and construction of embankments, spillways and other outlet structures.

iii. No spillway should be less than 10m wide and 1m deep for catchments up to 5 km^2. For catchments exceeding this limit, please consult a qualified dam Engineer.

iv. Any dam that involves out of the ordinary topography (i.e. steep slopes upstream, risks of landslips), hydrology (i.e. flash floods, droughts, snowmelt) or soils (i.e. poor quality soils, sodic soils, permeable layers in the soil, bare earth surfaces in the catchment) should only be designed and constructed under the supervision of a qualified dam Engineer.

6.6.1.2 Valley Tanks Construction Projects

i. Valley tanks should only be constructed in catchment areas with almost flat terrain
ii. Valley tanks on catchment areas exceeding 2 km^2 should be sited off the main stream channel to avoid rapid sedimentation and limit damage to inlet and outlet structures due to excessive hydraulic loading.
iii. Valley tanks with reservoir areas storing more than 5,000 m3 should acquire the advice of a qualified Hydraulic Engineer for technical guidance in the siting, design and construction of the facility including overflow channels and abstraction systems.
iv. Users should restrict themselves to the design and construction of valley tanks with maximum reservoir depth not exceeding 4m from ordinary ground level.
v. No overflow channel should be less than 2 m wide and 0.5 m deep for catchments up to 2 km^2. For catchments exceeding this limit please consult a qualified Engineer.
vi. Valley tanks that involve out of the ordinary topography (i.e. steep terrain, risks of landslips), hydrology (i.e. flash floods, extreme droughts, big catchment areas) or soils (i.e. poor quality soils, sodic soils, permeable layers in the soil, bare earth surfaces in the catchment) should be designed and constructed under the supervision of a qualified Engineer.

More information and guidelines on WfP is under development by DWD (WfP department) and should be consulted every time the DLG or other Agencies are developing projects on WfP.

6.7 Sanitation Technologies

There are several sanitation technology options. The choice of an option will depend on circumstances such as topography, underground conditions (loose soils, rocky soils, high water tables), type of settlement patterns (household versus communal), emergency conditions and landing sites. Examples of sanitation technologies in rural settings include; pit latrines (line and unlined), ecological sanitation toiled (urine diversion dry toilet, Aborloo & Fosa Alterna) and trench toilets. While designing sanitation facilities especially for communal settings, special consideration is made for persons with disabilities (PWDs) to ensure that they have enough space to allow them manoeuvre easily in and out of the toilet.

6.7.1 Pit Latrines

This is the most commonly used type of latrine in Uganda and it consists of a pit and a super-structure. Its basic use is based on the drop and store principle. The conventional pit latrine can have an unlined pit where the soil conditions are stable.

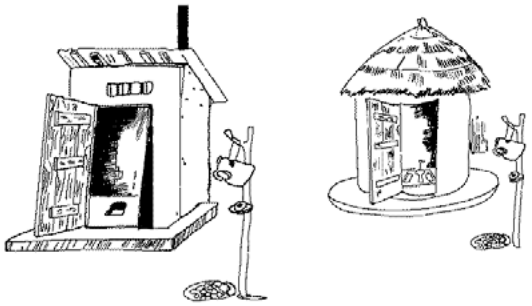


Figure 6. 10: Pit Latrine options

6.7.2 Lined Pit Latrine

The lined pit latrine takes the same shape and structure as the conventional pit latrine. However, where the soil conditions are unstable with loose and collapsing soils, the sides of the pit are lined with brick work or stone work fixed with cement mortar but can also be of cement or plastic culverts. . A lined pit is also recommended when there are plans for emptying the latrine. The best procedure for lining the pit is as follows:

i. Provide a 3 inch concrete base at the bottom of the pit to receive the brick works.
ii. Both vertical and horizontal joints are mortared up to the 3rd course.
iii. From the 3rd course onwards only the horizontal joints are mortared to facilitate percolation through the vertical joints

Please see illustration below (Figure 6.11). You may also check for more details available in the National Sanitation Guidelines and the School Sanitation latrine options.

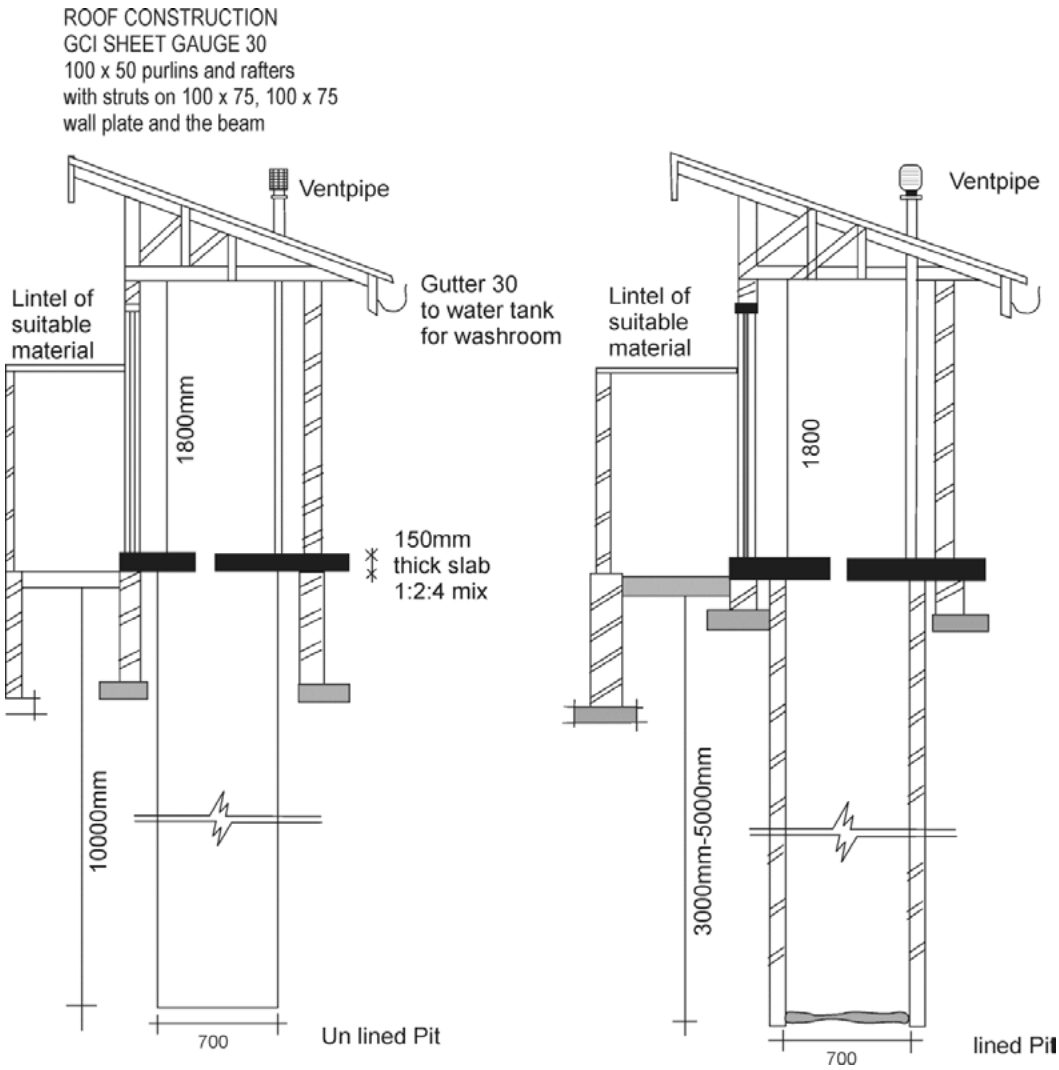


Figure 6. 11: Unlined pit latrine (left) and lined pit latrine (right)

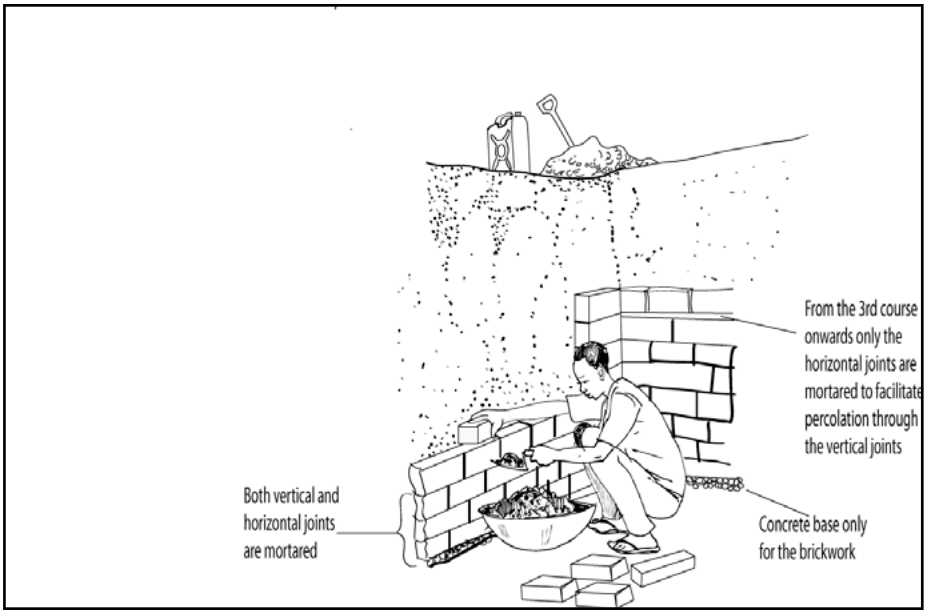


Figure 6. 12: Construction of lined pit latrine

6.7.3 Ecological Sanitation Toilet

6.7.3.1 Urine Diversion Dry Toilet

Ecological Sanitation Toilet (EcoSan) is a relatively new concept being promoted in many developing countries to improve sanitation coverage and recycle nutrients in the excreta for agricultural production. In Uganda, the promotion and implementation of Ecological sanitation programs started in 1997, in Kisoro and Kabale districts, located in south western Uganda. In 2008, the Ministries of Health, Water and Environment, and Education and Sports, alongside support from Water and Sanitation Program of the World Bank and National Sanitation Working Group, developed the 10-year national strategy on ecological sanitation to be carried out from 2008–2018. EcoSan toilets have been used successfully in landing sites by sanitation projects of MoH, Uganda Red Cross Society and NETWAS, among others.

EcoSan is a closed-loop system, in which human excreta is considered not as waste material but as a resource that can be recovered, treated and where necessary safely used again. It is based on the idea that urine and faeces are resources in an ecological loop. The most common EcoSan in Uganda is the Urine Diversion Dry Toilet (UDDT). It has a faecal chamber and urine collection container or urine diverted into a soak pit. EcoSan toilets are recommended for areas which have poor soil formations that are not suitable for the construction of the conventional pit latrines. The faeces are separated from urine and processed locally on site until they are free of pathogens.

The Ecosystem loop forms a set of barriers between faeces, flies, fields and fluids by containment of the faeces in a chamber or shallow pit where pathogens are reduced to an acceptable level before use as fertilizers or soil conditioner. Like a pit latrine, it is also a drop and store method but the storage is only for a specific period. In this period the waste is sanitised and then recycled. The sanitisation is aimed at destroying the pathogens and easing the formation of compost that can be safely utilised as a soil conditioner.

As a new technology in Uganda, it is associated with many challenges in relation to operation and maintenance. The merits and demerits of EcoSan toilets are summarised in Table 6.4.

Table 6. 4: Merits and demerits of EcoSan toilets

Merits EcoSan latrines	Demerits EcoSan latrines
• It is a permanent installation • It can be emptied and allow continued use • Will not contaminate underground water • Plant nutrients can be recycled • Sanitised vault contents may be used as a soil conditioner • If it is messed up by careless users, it can be closed temporarily, cleaned and use re started.	• It is not self operating, there has always got to be a caretaker • People need to be trained on how to use it • It is subject to abuse and may become a nuisance if it is not properly managed

Different design options and construction details of Eco-San toilets are available in the National Strategic Plan for the Promotion of EcoSan in Uganda. Some of the types are illustrated below.

Picture 6. 19: Newly constructed EcoSan Toilet (left) in Oyam

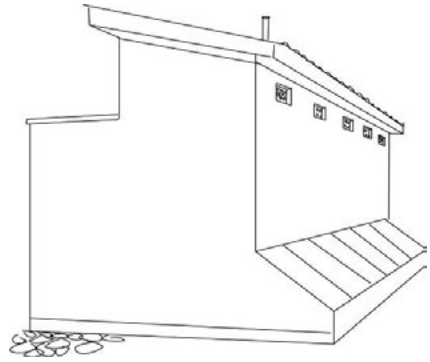


Figure 6. 13 excreta chambers

6.7.3.2 Aborloo and Fossa Alterna

These are forms of Ecological Sanitation toilets; different from the conventional EcoSan, that is, they have no urine diversion devices.

i. The Aborloo

The Aborloo is essentially a shallow pit of 1.5 metres deep and 80cm diameter fitted with a slab and super-structure. When using the aborloo, dry soil, wood ash and leaves are added to the excreta. The mix of excreta, soil ash and leaves, helps to make good compost in the pit. When the pit is full (1ft of ground level), the super structure and slab are moved to a new pit. The filled pit is covered with soil and leaves and left to settle for sometime depending on the weather. A tree is then planted in the pit. The common ones are mulberry, guava, mango, pawpaw or banana

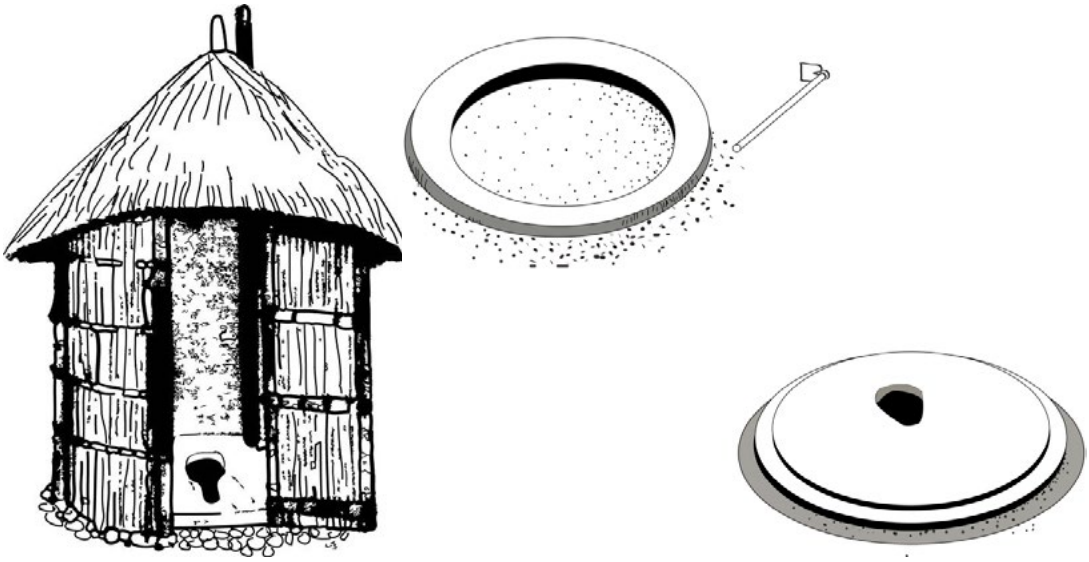


Figure 6. 14: Aborloo (source IRC, SNV and Netwas publication)

ii. The Fossa Alterna

The Fossa Alterna involves alternating between two pits. The two pits are permanently sited and the users alternate between them at yearly intervals. Please refer to Aborloo and Fossa Alterna joint publication by IRC, SNV, and Netwas for design and construction details as well as operation and maintenance procedures.

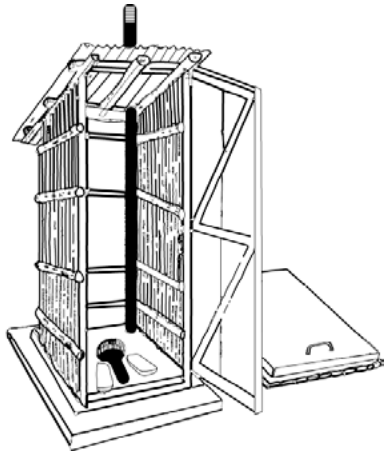


Figure 6. 15: Fossa alterna toilet (source IRC, SNV and Netwas publication)

6.7.4 Sanitation Technologies for Persons with Disabilities

The toilets should be designed in such a way that there is enough space for easy manoeuvrability of wheel chairs. The toilet cubicle should be 180cm wide, 80cm between toilet hole and back wall; 150cm between toilet hole and door; the pedestal should be 41cm high. The pedestal hole should be 25cm long and 18cm wide (Hazel Jones & Bob Reed; WEDC). Two examples/options are given bellow in Figure 6.16

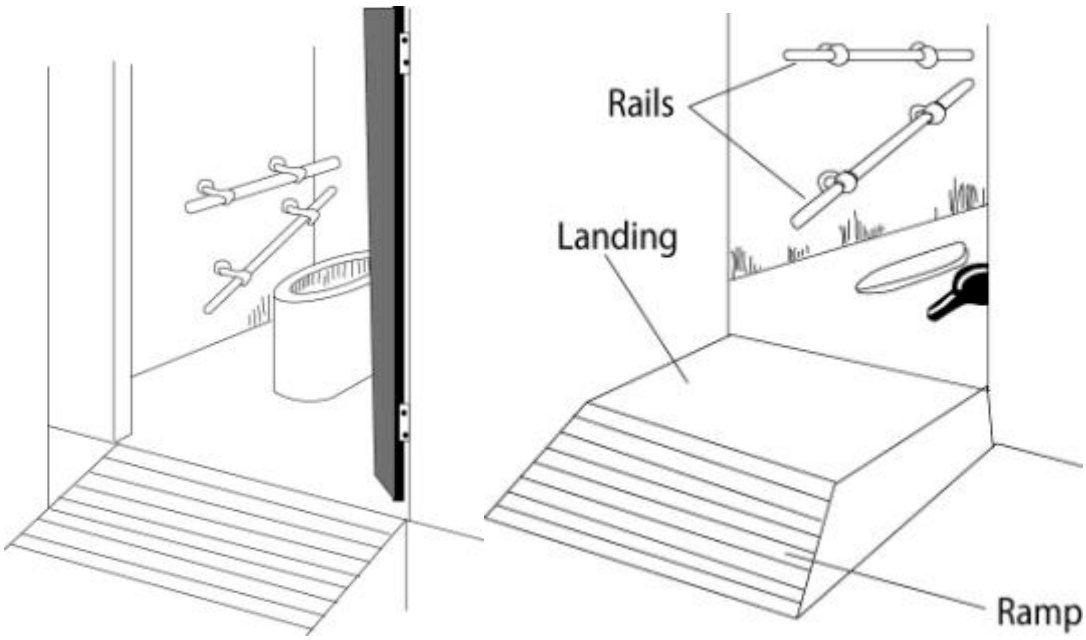


Figure 6. 16: Sanitation structures for persons with disabilities: left- pit latrine fitted with hand support and a pedestal and right- pit latrine fitted with a landing, rails for hand support and a squat hole

6.7.5 Trench Latrines

A trench latrine is a rectangular hole in the ground. The hole should be dug as deep as possible – about 2m and may be lined with timber where there is a risk of collapse. It may be of any convenient length, usually between 5 to 10m, and between 1 and 1.5 width. The trench is spanned by pairs of wooden boards on which the users squat. There is a gap between the boards through which the users excrete. Each pair of the boards is separated by a wooden screen to provide privacy. The trench latrine is provided with a roof to prevent the trench from filling up with rain water. A drainage ditch should be built to divert surface water.

Each week, the contents of the trench are covered with 100 to 150mm deep layer of soil. This will reduce the smell and prevent flies from breeding. When the contents of the trench have risen to approximately 300mm of the surface, the trench is filled and the latrine is closed.

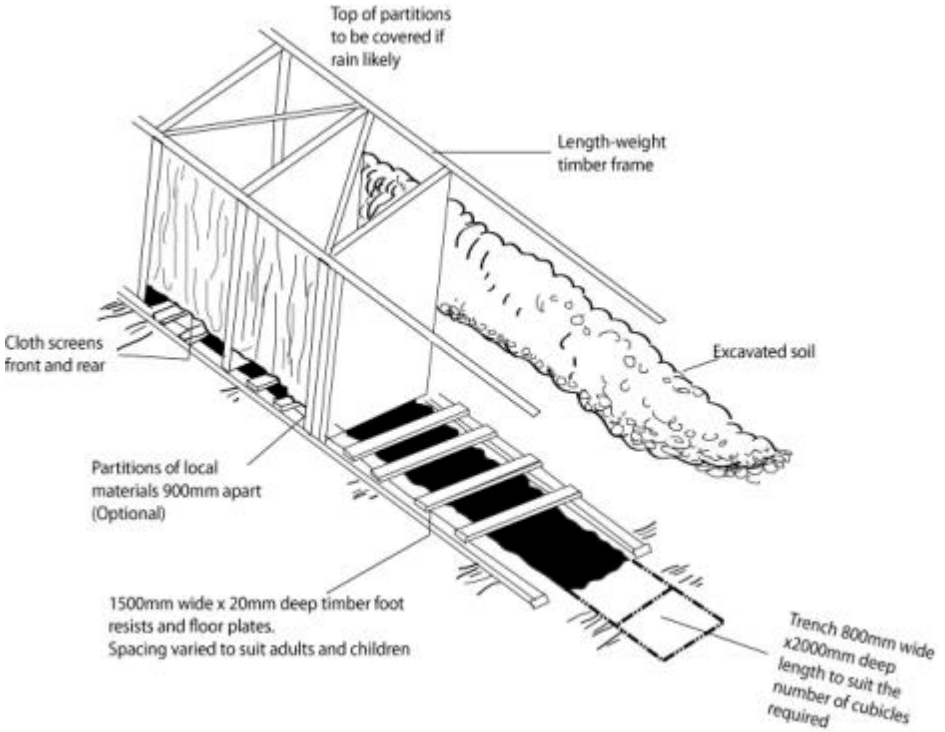


Figure 6.17: Trench Latrines

6.8 Appropriate Technologies

In order to guide and improve the implementation of water and sanitation activities, the Rural Water Supply and Sanitation department has been carrying out Research, Development and Promotion of Appropriate Technologies in the Rural Water Supply and Sanitation sub-sector. These include Domestic Rainwater Harvesting, Iron Removal Plants, Pounder rigs, self supply technologies, shallow well development, rope pump, EcoSan, etc. Some of these have been piloted, demonstrated and are being scaled up.

Although it is necessary to carry out R&D to reduce the cost of service delivery and to get more appropriate technologies for the water sector, DWD as an institution does not have a research and development department and is more suitable for implementation than R&D. The situation is complicated further by the fact that the private sector in Uganda is not well equipped to carry out R&D; and is more suitable to carry out development activities. Therefore, there was need to identify and support an alternative arrangement to undertake this vital activity of R&D for the water sector. The Appropriate Technology Centre (ATC) was established and started operations in May 2010 to undertake this mandate in action research, development and promotion of appropriate technologies in the water and sanitation sector through activities within its five main objectives.

It is recommended that any other technologies being developed by sector players including CSOs, and the private sector can be shared and tested at the ATC before they are scaled up.

6.8.1 Appropriate Technologies under Research at ATC

In addition to furthering research, promotion and scaling up technologies started under earlier projects before its formation, ATC has currently initiated the following projects.

6.8.2 A Sprinkler Irrigation System

This was installed for demonstration purposes at the ATC in 2011/2012. This is in addition to the already existing treadle pump and bucket irrigation kit. The irrigation demonstrations are used to study the effectiveness of applying urine as fertilizers together with irrigation water. Currently at the centre, there are irrigation demonstrations covering an area of approximately 400sq. Metres. Crops under study include water melon, cabbages, green paper, tomatoes and onions. These demonstrations have attracted interest from the NARO research zones of BUZARDI, MUZARDI, and University of California.

6.8.3 Fossa Alterna

Three (3) sanitation facilities (Fossa alterna) were installed in Kikandwa model village at the homes of Erisa Miro, Kironde Yunus and Namwandu Miidu. These facilities are used as demonstrations and learning platforms for training and promotion of adaptation by other community members.

15 masons and community members were trained during the installation of these demonstrations in construction techniques, low cost sanitation using locally available materials such as ordinary burnt bricks and Interlocking Soil Stabilized Blocks (ISSB). This research village will continuously be used for learning lessons for improvement in other communities and will be developed into a real model which should be used as a benchmark for improvement in other communities.

6.8.4 Training and Development

District extension workers from 17 districts under TSU 5 were trained in Monitoring and Evaluation for implementation of WASH projects. The participants included Water Officers, District Health Inspectors, Community Development Officers, Health Assistants and pump mechanics. The training was as a result of needs assessment from the TSUs and was facilitated jointly by ATC, TSUs and Ministry.

i. Improving Access of WASH for PWD

In partnership with Leonard Cheshire Disability (LCD) and Water Aid, ATC is carrying out research on how to improve access of WASH for disabled people in Amuria and Katakwi districts. Currently, information from about 200 households with people with disabilities has been collected from Katakwi and Amuria and is being analysed jointly by research partners (University College London, WaterAid, WEDC and ATC). Preliminary findings reveal gaps in access and service delivery to the disabled people.

Chapter Seven: Procurement

7. Introduction

Procurement of goods and services is an essential aspect in the execution of all District activities. Procurement is the process of purchasing, hiring, or obtaining by contractual means, goods, construction works and services following defined procedures. The quality of the procurements made impacts on the value for money of the service provided. Although a distinction has been made between procurement and contract management for emphasis, the former is part of the latter. For cost-effective outputs in all District Water and Sanitation Programs, the procurement process must ensure that competent firms and, or individuals provide goods and services. The procurement type, evaluation method and criteria used must ensure the selection of high quality service providers.

The Public Procurement and Disposal of Public Assets Act 2003 and Local Governments (Public Procurement and Disposal of Public Assets) Regulations 2006 (often referred to as the PPDA Regulations) provide the legal framework and regulations for procurement. PPDA procurement charts and LG forms provide the guidelines and tools for an efficient procurement. These forms can be viewed from the authority's website, while most procuring entities have them pinned on their notice boards. The LGs implement all works and services through the private sector in line with Governments privatization policy. For Rural Growth Centres, the management of the water supplies is implemented through public private partnerships. This chapter sets out the procurement planning, methods and processes that are established for use by LGs for the WSS.

7.1 Procurement Planning

Proper planning is a pre-requisite for successful and efficient procurement. The DWO should prepare a procurement plan based on the approved work plan. The procurement plan is submitted to the District Procurement and Disposal Unit for consolidation and it helps the district to schedule the implementation of required activities. It should include a breakdown of activities, schedule of procurement requirements, statement of required resources and planed procurement method(s). The procurement plan is discussed by the district contracts committee and then submitted to the accounting officer after which it is submitted to the district council for approval. If this does not happen,the procurement plan is then taken back to the district contracts committee.

7.2 Procurement Methods

Public Procurement and Disposal of Public Assets Act 2003 and Local Governments (Public Procurement and Disposal of Public Assets) regulations 2006 set out the procurement practices or methods and the conditions under which they may be used. The most common procurement methods used by DLGs in the sector are described below:

7.2.1 Pre-qualification Method

The pre-qualification method is commonly used in the LGs whereby the interested bidders are first subjected to pre-qualification on technical and financial requirements before bidding for the actual services to be provided. It is a cost effective method and helps to ensure quality from the onset. It is important for procuring entities to ensure efficiency with this approach. Firms, once pre-qualified, should be called upon to submit quotations from time to time, without re-submission of all documents earlier handed in during the pre-qualification exercise.

Figure 7.1 shows the recommended cycle of activities/milestones for the pre-qualification method. The detailed process in each activity can be found in the local government regulations provided to the entities by PPDA. In order to execute construction activities in a timely manner, the preparation of pre-qualification documents should commence in March, with advertisements placed in early April. Evaluation of pre-qualification documents should take place in May so that bids can be distributed in June, and evaluated and approved in late August/early September. This enables contracts to be signed and construction work to commence in mid September. The preparation of pre-qualification documents coincides with awareness creation, promotion and advocacy activities (i.e., phase 1 of the software activities). These are described in see section 5.6 of this manual.

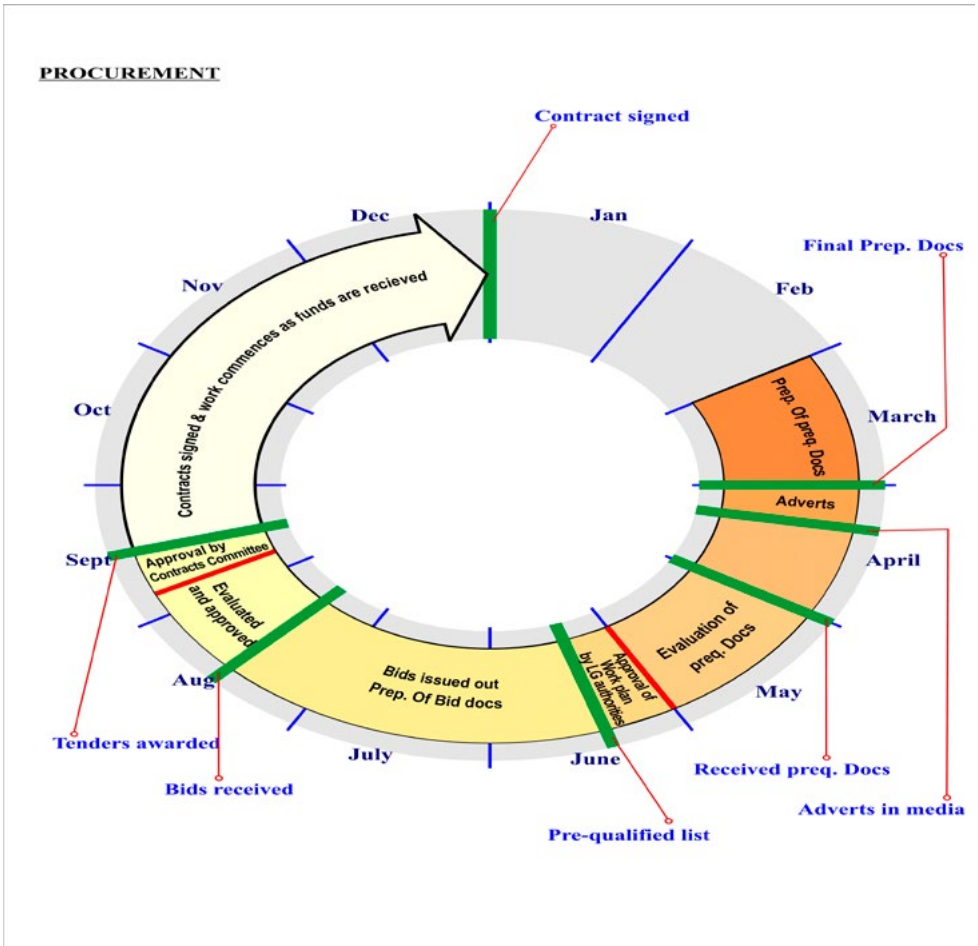


Figure 7. 1: Overview of Procurement Cycle

7.2.2 Open National Tendering Method

This is where the bids are openly advertised and whoever is interested has the right to bid. This makes the evaluation process harder because more tender documents are issued than in the prequalification method. However, its main advantage is that it is all-inclusive. The threshold for this type of procurement is UGX 100,000,000 for works; 50,000,000 for services, and 70,000,000 for supplies.

7.2.3 Open International Tendering Method

This method of tendering may be used instead of open national tendering where it is believed that competition will not be effective and value for money may not be achieved without foreign tenders.

7.2.4 Selective Bidding

This method refers to a situation where few companies are invited to bid for provision of specific services. Selective bidding may be used where:
(i) the supplies, works or services to be procured are available only from a limited number of providers;
(ii) there is insufficient time for an open bidding procedure e.g. in an emergency situation
(iii) the estimated value of the procurement does not exceed the threshold stated in the procurement guidelines issued in the LG Procurement Regulations.

The advantage of selective bidding is that it is a faster method but can easily be abused. It is important to know the financial and technical capabilities of the firms invited and to obtain approval to use the method from the District Contracts Committee.

7.2.5 Direct Procurement

This method of procurement or disposal is a sole sourcing procurement which may be used in exceptional circumstances where competition has to be avoided for specific reasons. It may be used on approval of the contracts committee, in circumstances when there is insufficient time (e.g in emergencies), where the goods, services or supplies to be procured are only available from one source, in an ongoing contract, where additional services, works or supplies are better provided by the existing contractor/supplier and no advantage could be achieved by subjecting it to competition.

7.2.6 Micro Procurement

This is a direct type of procurement or disposal which is used for low value procurement requirements to achieve efficient and timely procurement of goods and services whose value does not justify competitive bidding.

7.2.7 Community Procurement

This is used where the procuring and disposing entity purchases goods or services using a community purchase method for community programs or projects in accordance with stated threshold guidelines by the authority.

Each of the above procurement methods stated above is guided by the stated regulations in PPDA, 2003 and 2006 and related thresholds in monetary value.

The convenience of each method should be examined. If the District has undertaken the required steps for pre-qualification and yet has to implement the activities in that financial year, it is advisable to use open bidding other than attempting to pre-qualify and then issue invitations to bid in an unrealistic timeframe. The roles and responsibilities of the District Contract Committee Evaluation Committee, Accounting Officer, and Procurement Unit are set out in section in Local Government Regulations 2006.

7.3 Procurement Process

7.3.1 Preparation and Approval of Bid Documents

The DWO should prepare job-specific technical and financial requirements for the firms that are capable of doing the job. The requirements vary in technology and activity type. For example, the required capabilities for firms that design valley tanks differ from those designing piped water supplies or drilling boreholes. The specific job requirements and technical specifications are also derived from Chapter Six, from individual specifications for each technology, while others are drawn by consultants who are purposely hired to offer consultancies on specific technologies and among other deliverables are expected to draw ToRs and construction specifications for the technology. The ToRs describe the services and state the minimum technical requirements and key personnel for the work, time of completion, and include a brief background.

The ToRs and Specifications should be very clear and unambiguous, feasible and realistic, to enable prospective bidders to bid based on the same understanding and basis but also to avoid unnecessary costs incurred by bidders due to unclear ToRs and specifications. The objective of the procuring entity expected from the service/supply/work to be executed by the bidder should be precise, and clear, rather than emphasising how it will be achieved. The minimum requirements to achieve the deliverables (e.g. borehole, protected spring, gravity flow scheme with say 10 tap stands, etc) should be stated. For example, an advertisement reading, "The contractor should have an all-wheel drive truck mounted rig with 15,000kg capacity mast with an on board compressor capable to deliver 750 cfm" (Field note, RWSN, 2004) might exclude contractors with compressors of 500 cfm.

However, in practice compressors of lower capacity down to 450 cfm have been used to drill up to 120 m in the basement and yet over 90% of boreholes in Uganda are not even drilled to 100m. It is, therefore, very important that adverts and ToRs emphasise end results/deliverables or what the machine should be able to achieve. For example, the advert could read, "A mobile set of drilling equipment, able to drill 8-10" in soft formation and 4.5-6.5" in the hard rock to 100 m." Therefore, adverts and tender documents should not specify unnecessarily higher specifications for the job required.

The Public Procurement and Disposal of Public Assets Authority, has issued documentation to Districts including letters of invitation and bid requirements. However, it is the responsibility of the District Local Government to customise the documents and include items such as specifications. The tender documents are provided by the PPDPA although they should be customised. The requirements should be prepared and submitted to PDU. The PDU in consultation with the DWO prepares the bidding documents and submits to the CC for approval.

7.3.2 Invitation to Bid

The adverts are placed in recognised media/newspapers preferably national papers, websites and notice boards by the PDU. The period of advertising should be in line with the PPDPA regulations.

7.3.3 Issue and Sale of Bidding Documents

Standard bidding documents prepared by the DWO, in consultation with the PDU and approved by the contracts committee, are issued out at a fee agreed upon by the procuring and disposal entity. A record of issued documents according to guidelines is made.

7.3.4 Receiving of Bids

Bids should be received by PDU and recorded in order of their arrival and dropped in a bid box prepared for that purpose. The deadline in terms of date and time of receiving bids should be adhered to so as to ensure transparency.

7.3.5 Bid Opening

The PDU must open the bid documents in public at the time and place indicated in the adverts in the presence of bidders or their representatives and the contracts committee representative. At the time of bid opening, the PDU shall read the tender's name, the tender price, the bid security amount and source, alternative tender's (if any), and any discounts offered by the tender. The PDU shall stamp important pages of the tender document of each tender.

7.3.6 Bid Evaluation and Contract Award

The PDU should nominate or appoint an evaluation committee of a minimum of three people, and one of them should be knowledgeable on the subject matter. The evaluation committee is approved by the contracts committee and should sign an ethical code, evaluate bids following an evaluation criteria and recommend to the contracts committee the best evaluated bidder through a report.

Where negotiations are required, a negotiation committee, managed by the PDU, is set up and will also send its recommendations to the contracts committee, who reviews the report and makes the final award decision. The PDU, based on the committee report, should display the list of the best evaluated bidders at the PDU notice board and also send the notice of best evaluated bidders to all bidders. After the best evaluated bidder has been agreed on, and there are no complaints registered after a specific period (10 days) has elapsed, the accounting officer is writes an award letter, receives a letter of bid acceptance, drafts contracts and sends it to solicitor general for clearance before it is signed by the successful bidder and the accounting officer.

7.3.7 Preparation and Signing of Contract Management Plan

The DWO should prepare the contract management plan (see section 8.3 for more detail). This is a useful tool for administering the contract. It shall be an executive summary of the roles and responsibilities of the contracting parties. It shall identify who is responsible for various contract administration activities. It shall be flexible and adapt to changing circumstances and the two parties can sign the contract management plan later.

7.4 Disposal of Public Assets

Disposal of public assets at LG is guided by the PPDA and PPDPA. A public asset can be disposed of using various methods including; public auction, public tendering, sale to public officers, direct negotiations, donations, etc as detailed in the local government regulations 2006 (pages 94 to 109).

Chapter Eight: Contract Management

8. Introduction

Contract management is the process of efficiently managing the contracts made with consultants, contractors and suppliers. Contract management is, therefore, a process involving negotiating the terms and conditions of the contract to maximise financial and operational performance of the project, ensuring compliance with the terms and conditions of the contract between the clients (in this case DLG) and contractors/consultants in order to ensure a successful quality output.

DLG's objective is to ensure that the contractor or consultant meets the terms of contract specified in a timely and effective manner. The contractor or consultant is given the responsibility of achieving the end results and managing how they are achieved. The contract is itemised in the form of Bills of Quantities (BoQ). To earn any payment, the contractor or consultant must successfully perform the specified functions stated in the contract. The overall deliverable e.g. a constructed borehole may be broken down into milestones or stage deliverables like siting, borehole drilling and development, test pumping, casting and installation. Payments may be tagged to two deliverables or milestones. The client (DLG, CSOs, NGOs, etc) is responsible for payment of the services agreed on as per contract and for ensuring that land has been secured for works.

This chapter sets out the stakeholder roles and responsibilities at district level, and the procedures to be followed in contract management. The chapter summarises the overall roles and responsibilities, explains the importance of a contract management plan. The chapter also provides an overview of the procedures to be followed in the siting, design, construction (including pump testing) and supervision of different water supplies. The procedures are set out by technology: i.e., springs and shallow wells; deep boreholes and piped water supply systems. Note that procurement issues have been discussed in Chapter 7.

8.1 Stakeholders in Contract Management

The stakeholders directly involved in contract management of water and sanitation programmes at district level include the DWO, District Engineer (DE), the contractor, the consultant, the CAO, county water officers and Sub-Countyofficials. For piped water supply systems in small towns and RGCs, the WSDFs also play a supportive role as enshrined in the WSDFs operations manual 2009. The key responsibilities of the DWO, contractor and consultant are given in Box 8.1, Box 8.2 and

Box 8.3.The detailed roles and responsibilities should be set out in the Contract Management Plan (CMP), as described in section 8.3.

Box 8. 1: Contract management responsibilities of District Water Officer

The DWO represents the client in the day-to-day management of the construction and consultancy contracts. She/he is responsible for technical supervision and compliance of the consultants/contractor with the provisions of the contract.

Preparation of a CMP, as outlined in section 9.3. The plan should be discussed with the key stakeholders before commencement of work. All other roles and responsibilities should be detailed in the contract management plan and are as follows:

- Oversee, supervise and evaluate work in process. Monitor contractor conduct testing procedures and schedules. Request warranty information (especially electro-mechanical equipment).
- Coordinate construction site meetings with contractor & architect/designer/consultant and any related professionals. Ensure the implementation of the decisions of the meeting.
- Review the Contractor's monthly status reports and Critical Quarterly Analysis. Report to the CAO any schedule delays or progress problems. Provide oversight as required of contractor's compliance with schedule and technical performance.
- Procure all owner related testing and reports including:
    - Geophysical survey reports
    - Geotechnical report (Soils report)
    - Environmental reports
    - Design and other technical reports
    - Training reports
    - Mobilization and other necessary reports
- Review for quality and timeliness, the Contractor's submission of required contract deliverables. Inspect completed work and prepare recommendations to the CAO/DE regarding the acceptability of the product including any inadequacies noted in the specifications and technical requirements.
- Develop District's prompt responses to contractor deliverables and provide recommendations to the CAO.
- Review contractor claims for payment. Make payment recommendations to the CAO/DE.
- Ensure that Government-furnished property is delivered to the Contractor and monitor the Contractor's use of the property.
- Ensure that District meets its compliance obligations.
- Quantify and coordinate removal of all environmental concerns as required by reports.

Box 8. 2: Contract Management Responsibilities of Contractor

The Contractor shall;

- Ensure that measures and procedures described in the specifications are adhered to.
- Provide safe working conditions to the employers in relations to Acts and regulations (Health and safety regulations) by the rightful authority.
- Construct facilities in accordance with design approved but apply professional discretion.
- Notify the client and consultant where the design may not be workable or has inadequacies. If the proposed procedures are not appropriate given the circumstances, the contractor should inform both the client and consultant.
- Ensure the testing of all materials used as may be specified in the contract/or in accordance with the construction practice
- Ensure that purchased equipment and materials/pipes have warranty that will assist the client after the liability period. Handed over warranty to the client at end of the contract.
- Prepare and submit to the consultant the invoices for the works done.
- Attend all the site meetings and/or cause them to be held.

Box 8. 3: Contract Management Responsibilities of Consultant

During the course of the construction, the Consulting Engineering firm may be charged with the following responsibilities:

- Ensure that the contractor adheres to all provisions laid out in the contracts and point out non adherence to the client in writing
- Ensure that the contract protects the client from unnecessary costs especially to do with litigation
- Certify the works done and ensure the quantities are correct
- Prepare certificates for client approval for the works done
- Approve the construction procedure to be employed
- Approve testing procedures, methods, equipment and laboratory to be used in case of laboratory testing
- Determine quantities and value, and giving opinion, consent or decision to the client
- Ensure adherence to all the design details and specifications laid out/ or agreed on.
- Ensure that the contractor complies with construction procedures
- Bring to the attention of the client any omissions, refusal to comply by the contractor
- Supervise all the works on site on behalf of the client

8.2 Contract Management Plan

The availability of accurate information on the contractor's plan of performance and actual progress is fundamental in enabling the client to monitor and supervise the contractor's performance.

Although the contract is the legal and binding document, a CMP assists in the management and administration of the contract and provides a snapshot of the roles and responsibilities of the contracting parties. If the roles and responsibilities are clearly adhered to, the contract can be successfully managed.

The CMP is flexible and can adapt to changing circumstances. It does not include every action that the district must take to make the contract successful. Instead, it summarises the higher-level requirements, deliverables, and tasks necessary and describes the overall process with which the tasks are performed.

This CMP is intended solely to provide guidance to Government employees and should not be construed to create any rights or obligations on the part of any person or entity, including the Contractor and its employees. It describes the various contract management processes and how they fit together. The CMP does not contain all of the step-by-step details of those processes.

8.3 Contract Management for Springs and Shallow Wells

8.3.1 Preliminaries

In order to ensure proper contract management of the construction of springs and shallow wells, the DWO must ensure that the following are undertaken:

i. Environmental impact assessment and source siting. The site must be feasible for spring protection, or provision of shallow wells. Once the site has been approved, the siting report should be passed on to the supervisor.

ii. Pre-construction mobilisation and training phase activities (see Software Steps, Chapter 5 for details) should have been carried out. All the critical requirements for the community must have been fulfilled. This includes land issues which must be resolved with land secured and preferably the land titles obtained. Agreements can be signed with the land-owners to ensure that work is not interrupted.

iii. Contracts are signed between the private sector organisation(s) and DLG. A CMP is agreed upon (section 8.3). The roles and responsibilities of each stakeholder must be clear. The client and the contractor must agree on the key milestones during construction.

iv. The DWO has to ensure that a supervisor has been identified. If supervision is to be undertaken by a private sector consultant, they must be ready for deployment with the contract signed. It is preferred that the consultant who sighted the source undertakes supervision.

v. The contractor must know who will give instructions and approve payments.

vi. The contractor has to submit an implementation schedule that must be discussed and approved of before actual implementation starts. The DWO should ensure that the contractor has been given a commencement letter detailing when he will start the activities.

vii. The WUC must be informed on when the contractor will start construction. The contractor should be introduced to the community in the presence of local leaders and opinion leaders. The construction phase software activities will be undertaken during water source construction (i.e. mobilisation to participate in construction activities, training of caretakers and WUC on O&M). Once the construction has been completed the source will be commissioned.

8.3.2 Supervision of Construction

The Supervisor is assigned to a particular Contract on behalf of the client (DLG, CSO, NGO, etc) to ensure that the Contractor upholds the standards and guidelines. The supervisor should be familiar with procedures set out in the Springs Construction Manual and Shallow Wells Manual. Box 8.4 sets out the procedures that need to be followed in the supervision of shallow well construction.

Box 8. 4: Procedures for supervising shallow well construction

Before going to site, the supervisor should:

- Confirm locations, check against Contractor's Work Programme and inform community of future drilling activities.
- Review geophysical survey results and produce photocopies for the Contractor. In case there are issues (e.g land disagreements, site location, etc) with some of the selected drilling sites
- Obtain and review a copy of the Contract and become familiar with all aspects of the Contract, most importantly the Technical Guidelines/specifications.

The supervisor should take the following to the site:

- Work Programme.
- Geophysical Surveying Results (2 copies),
- Copy of the Contract,
- Blank driller's log, daily record, daily instruction and equipment checklist.

On-site, preliminary activities for the supervisor comprise of:

- Establishing who is in charge on Contractor's side.
- Give a copy of the geophysical surveying and penetration results to the Contractor.
- Confirm Work Programme and proposed drilling method with the Contractor.
- Check equipment and materials on site. Provide written instructions to the Contractor specifying the exact location where the well is to be drilled and its intended depth. Instructions must be signed by both parties prior to drilling
- Record details of the above on the Daily Record sheets.

For Daily Record Forms, the supervisor should record the following (refer to Technical Specifications for more details):

  - drilling progress on a minute-by-minute detail, including formation, diameters and depths per meter or drilling rod,
  - first and main water strikes,
  - diameter changes,
  - yield measurements,
  - electrical conductivity and
  - Reasons for delays.

For well design, refer to the standard design in Technical Specifications of Contract or Tender Documents. The Contractor must submit a final design drawing to the Supervisor prior to well construction. Specifications for shallow wells are spelt out in section 6.2.4 of this manual. Specifications as well as yield test, well development, grouting, and after construction procedures, as well as guidelines for test pumping, are set out in the shallow wells manual.

8.4 Contract Management for Deep Boreholes

8.4.1 Preliminaries

To ensure proper contract management of the construction of deep boreholes, the DWO must ensure that the following are undertaken:

i. Environmental impact assessment and source siting. The site must be feasible for borehole drilling. Once the site has been approved, the siting report should be passed on to the supervisor.

ii. Pre-construction mobilisation and training phase activities (see Software Steps, section 5.2.3 for details) should have been carried out. All the critical requirements for the community must have been fulfilled. This includes land issues, which must be resolved with land secured and preferably the land titles obtained. Agreements can be signed with the landowners to ensure that work is not interrupted.

iii. Contracts are signed between the private sector organisation(s) and clients. A CMP is agreed upon (section 8.3). The roles and responsibilities of each stakeholder must be clear. The Client and the Contractor must agree on the key milestones during construction.

iv. The DWO has to ensure that a supervisor has been identified. In the case of deep borehole drilling, supervision is undertaken by a private sector consultant. They must be ready for deployment with the contract signed. It is preferred that the consultant who sighted the source undertakes supervision.

v. The contractor must know who will give instructions and approve payments.

vi. The contractor has to submit an implementation schedule that must be discussed and approved before actual implementation starts. The DWO should ensure that the contractor has been given a commencement letter detailing when he will start the activities.

vii. The WUC must be informed on when the contractor will start construction. The contractor should be introduced to the community in the presence of local leaders and opinion leaders and shown the exact location of the drilling site. The construction phase software activities will be undertaken during water source construction (i.e. mobilisation to participate in construction activities, training of caretakers and WUC on O&M). Once the construction has been completed the source will be commissioned.

8.4.2 Borehole Drilling and Construction Supervision

Private sector consultants undertake supervision of deep borehole drilling. The district staff will manage the supervision contract. The (private sector) drilling supervisor is responsible for the decision on the final drilling depth and screen positions for borehole construction.

The key outputs of the drilling supervision are:

i. Boreholes drilled and installed according to the recommended designs given in Figure 6.2, and 6.3.

ii. The contractor and supervisor must be familiar with and agree on the borehole design. This

is based on the sighting report and encountered geology in the course of drilling. As much as possible, the design is adopted on site based on the well log, but in consultation with the supervisor and driller and must follow any of the two standard designs (figure 6.2 & 3).

iii. Supervisor's logbook with minute-by-minute well log details; geology, drilling diameters, depths, design proposed, etc as they happen.

iv. All instructions and suggestions to the contractor or from the contractor not agreed on or adopted should also be recorded and signed for by each party.

v. Minutes of site meetings between contractor, consultant and district Staff.

vi. Written site supervision instructions to the contractor, including decision regarding final drilling depth and installation of casing and screen.

vii. Certification of contractor's borehole record.

viii. Certification of contractor's monthly statements and preparation of payment certificates.

ix. End of drilling report.

x. Report covering number of boreholes for a particular contract schedule.

xi. Certification of completion of works.

xii. The following forms must be completed for each borehole:

- Daily log for drilling supervision
- Borehole Pump Test Supervision
- Check list for various materials and equipment to be provided by the Contractor during drilling, installation of casing and screen, development and test pumping
- Feedback form which compares drilling log with geophysical survey
- Performance Evaluation form (after drilling work is completed)

Full details regarding borehole supervision are given in the *"Supervisors Manual for Drilling and Test Pumping(MWE/DWD, 2007)*[13]. It should be used by the consultant (supervisor) and client's representative. The manual clearly sets down the following:

a) Hydrogeological cycle;
b) Drilling methods;
c) Responsibilities of the supervisor;
d) Contract pre-commencement checks (accessibility, site inspection, equipment and materials inspection, staff inspection and familiarisation);
e) Drilling supervision (instructions for: beginning of a hole, drilling, end of drilling);
f) Test pumping supervision (procedures, pre-testing checks, instructions: beginning, during, end).

[13] This is an updated version of a manual of the same name that was produced under the RUWASA programme in 2000.

8.5 Piped Water Supply Systems

8.5.1 Summary of Procedures

The development of piped water supply systems, (gravity flow schemes or motor pumped), follows a number of stages as listed below:

i. Pre-feasibility study and preparation of ToR.
ii. Study, design and documentation i.e. feasibility studies, water resources assessment, engineering design, tender document preparation, review and approval by MWE (also see chapter 7 and design manual for details).
iii. Procurement and award of contract (see Chapter 7 for details).
iv. Construction supervision.

8.5.2 Study, Design and Documentation

The study and design of piped water supply systems is mainly out-sourced to private consultants procured by the client. Chapter Seven sets out information on procurement).

The DWO is the main technical officer representing the Client. Having participated in the upstream water supply implementation activities, the DWO is expected to have a deep understanding of the project and is therefore expected to play a leading role during the study and design phase. For piped water supply systems to serve small towns and RGCs, MWE/DWD has set up WSDFs at regional level to work with district local governments to supervise the design and implementation of such systems. The Operations Manual for WSDFs, 2009, sets out modalities and cooperation arrangements between districts and WSDFs. The manual sets out roles and responsibilities of all stakeholders in these projects. Notwithstanding roles stipulated in the contract documents, the DWO is responsible for the following:

i. To introduce the study and design consultant to the local authorities (District/Sub-County) and the beneficiary community.
ii. Moderate community meetings (assisted by the mobilisation officers), to ensure access to the consultant to conduct socioeconomic, hydro geological (sighting for production wells if applicable) and topographic surveys.
iii. Supervise the consultant to ensure compliance with Terms of Reference which clearly defines the activities, output and schedule of deliverables for the assignment.
iv. Certify and process the consultants' payment requests according to modalities stipulated in the consultancy contract.
v. Convene meetings with the consultant as and when required to review the study and design progress and outputs.
vi. Assist the consultant in accessing key data and local contacts to facilitate the study and design.

Figure 8. 1: A Well constructed and maintained tap stand in Kabarole

In case of groundwater sources, it is important to determine the ability of a single source to supply the demand. This can only be measured by the pumping tests of the boreholes drilled during the test drilling or drilling phase. Experience has shown that non-confirmation of the availability of water for the scheme is a major deterrent to the development of feasible options. It is, thus, essential to ascertain the safe yield of the source at the study and design stage. Groundwater investigations are usually not conclusive with regard to the water resource potential of the area. Only the drilling of the production wells can determine this.

8.5.2.1 Feasibility Study

This is carried out to determine the viability of a project through the assessment of the existing situation and available options. It enables the most suitable alternative to be selected. The feasibility study should contain enough information to permit a decision regarding whether or not the project should be implemented. This means that the feasibility study is a detailed technical study by a multi-disciplinary team, i.e. more than a reconnaissance report at the pre-feasibility stage. The contents of the feasibility report are given in Box 8.5.

Box 8. 5: Content of feasibility report for piped water supplies

- An evaluation of the present water supply and sanitation situation.
- An assessment of water demand for a horizon of 10 years / 20 yrs for GFS.
- The socio-economic status of the beneficiaries.
- Demographics.
- Knowledge, attitudes, beliefs and roles.
- Willingness to pay and affordability.
- Sanitation and hygiene situation of the area.
- Design standards (reservoir storage in hours, peak supply and minimum pressures).
- Capital and recurrent costs for the different feasible options.
- Preliminary design.
- Preliminary cost estimates.
- Economic analyses of the project.
- Institutional arrangements and legal requirements.
- Indicative tariff structure and financial viability. Financial analyses projecting the year-by-year costs, revenues, and subsidies for the project.
- Environmental screening report clearly indicating the likely impacts of the intervention on the communities and the environment at large.

8.5.2.2 Water Resources Assessment

This should be carried out along with the feasibility study. The information therein should be used during the preparation of the feasibility reports as a basis of evaluating alternatives. In the case of groundwater the hydrogeologist should provide the following:

- Production of siting reports.
- Data on existing water sources i.e. boreholes, springs and shallow wells in the area inclusive of their yields in the sub county.
- Hydrogeological background information and analysis of hydro-geological data.
- Geophysical survey.
- Siting results and analysis.
- Production of well drilling supervision and completion reports.
- Drilling logs.
- Test pump results showing step and long duration tests inclusive of their analysis..
- Recommended installation depths and safe yields.

The design consultant shall prepare a water resources report, which shall include an assessment, evaluation, and recommendation of the alternative feasible water supply and sanitation systems options for consideration by the client. At this stage, the decision should be made on the water supply option. In case of groundwater source, further drilling should be recommended if boreholes drilled in the test drilling phase are not good enough for consideration.

8.5.2.3 The Engineering Design Report

This is a final document detailing the water supply and sanitation plan layout and budget with the following sub-products;

i. Clearly defined water source;
ii. Levels of service;
iii. The final water supply infrastructure layout;
iv. Sanitation facilities to be provided;
v. Institutional arrangements to be put in place (water authority, water board, operator arrangements);
vi. Construction Cost Estimates (Engineer's estimate);
vii. Future Operation and Maintenance (O&M) budget and revenue budget.

The Consultant (for study, design and documentation) prepares tender documents for each of the phases as agreed with the client, fitting within the resource envelope (available resources). The tender documents comprise of different volumes from the major items listed below:

i. General Specifications;
ii. Special Specifications;
iii. Bills of Quantities;
iv. Drawings.

It is proposed that the FIDIC General Conditions of Contract and Conditions of Particular Application are the basis of the tender packages. Tender Dossiers with specifications for Invitation of Bidders for Construction, should include items listed in Table 8.1.

Table 8. 1: Items to be included for Specifications for Invitation to Bidders for Construction

Item No.	Volume	Contents
1	Volume 1	Instruction to Bidders Bidding Data General Condition of Contract Contract Data Specifications
2	Volume 2	Forms Security Forms Bills of Quantities
3	Volume 3	Engineering Drawings

The review and approval of the tender dossiers is preceded by formal quality assurance by technically qualified persons familiar with Water Supply Design Guidelines. The quality assurance process ensures that:

- The proposed water supply and sanitation plan realistically matches the socio economic and water resource conditions and the needs of the community.
- The design standards do not materially deviate from the national standards stipulated in the DWD design manual.
- The bidding documents satisfy the minimum requirements stipulated in the procurement guidelines.

The DWO receives and circulates the product documents and liaises with the CAO and DWD for technical support. The DWO also must liaise with line departments to initiate the product review and approval processes. The review and approval process should be conducted in a meeting/ workshop setting. Table 8.2 sets out the schedule for the review of the study, design and documentation.

Table 8. 2: Schedule of reviews for the study, design and documentation stage

No.	Product to be re-viewed & approved	Preferred Period	Stakeholders Involved
1	Project Inception Report	Not later than 1 week from date of submission by the Consultant	DWO DWO Mobilization CDO
2	Feasibility Study Report	Not later than 2 weeks from date of submission by the Consultant	DWO County Water Officer DWO Mobilization CAO/ACAO WES Community representatives (e.g. LCs and opinion leaders).
3	Water Resources Report	Not later than 1week from date of submission by the Consultant	DWO DWD Hydrogeologist DWO water supply
4	Engineering Design Report and Bid documents	Not later than 2 weeks from date of submission by the Consultant	DWO DWD Hydrogeologist DWO water supply

The final report should be submitted to the Design Review Committee of MWE/DWD for quality assurance, preferably before final payment. The Procurement and Contract award processes are covered under Chapter Seven.

8.5.3 Supervision of piped water supplies construction

DLGs undertake the supervision of spring protection and GFS through consultants, as outlined in section 8.4. If the water source is a borehole, the supervision of drilling should also be contracted out to a consultant as outlined in section 8.5. In general, the DWO undertakes supervision of GFS construction (i.e. the reservoir tanks and pipe distribution network). However, there are cases where supervision of construction is contracted out to a private sector consultant. In either case, the following activities are required by the supervisor:

i. Review the preliminaries (i.e. construction method, construction equipment, materials

sources and key technical personnel who will be on site).

ii. Visit the site and introduce the contractor to the beneficiaries, discuss and agree on land issues and accessibility issues, confirm the sites and salient points as indicated in the designs report and any other issues that may arise from site visits.

iii. Discuss the mobilisation arrangements of the contractor and issues of security.

iv. Discuss any possible phasing arrangement, if any with the contractor.

v. Ensure the following is undertaken:

vi.

1. Source area is cleared, spring eyes identified and area around the spring protected. Caution must be taken not to interfere with spring eyes.
2. Area near the spring is protected and yield measured. If the yield is significantly different from the design yield, then a decision must be taken. A significant difference may warrant change in design.
3. Trench has to be dug according to specifications. Cross check that areas with rock/stones galvanised iron (GI) pipes are used instead of PVC or HDPE pipes.
4. Pipes are laid up to the next structure (break pressure tank or reservoir). Ensure availability of water before construction of the structure.
5. Water tank or reservoir is constructed and thereafter construct the rest of the pipeline.
6. Tap stands should be constructed where the water has reached. This is to guard against losses in case of error in topography survey or hydraulic design.
7. Inspect the quality of works against the specifications as stated in the contract.
8. Verify the certificates submitted by the contractor against the actual works done.

8.5.4 Management of Consultants

In the case of pumped water supplies and for some GFS the supervision is contracted out to a private consultant. The DWO has to manage this supervision contract. The first basic requirement for good contract management is through proper contract wording. The next step is to prepare a contract management plan (section 8.3). The following should be agreed upon:

a) Areas of assistance by the client. The client and consultant should agree on the areas in which the consultant will need assistance from the client. Both the timing and quality of the assistance affects the output of the consultancy. Areas of assistance include field visits, access to certain documents and data, discussion with local politicians, standards and regulations set by MWE/DWD and facilitation of presentations.

b) Milestones. For successful management of the contract, the consultant and contractor must agree on major milestones for which the client has to give approval. This will help the DWO track the progress and control the quality of the outputs. The milestones can include results of the baseline survey and preliminary assessment of water resources, scheduled progress reports per phase completed. It is necessary to tag these reports to payments.

(c) Informal Progress Review. The consultant and client should agree on informal review and information flow and control points. Such informal briefs serve two main purposes: (i) quality control and (ii) updating the client. The client can then easily know the difficulties the consultant is facing.

(d) Correspondences. The client should open a separate file for the correspondences from the consultant and his/her correspondences to the consultant. Importantly, they should agree on who should communicate on issues that can change the course of the consultancy. The communication lines must be agreed upon.

(e) Procedure of Verification of Reports. The client and consultant have to agree on the verification procedure of the reports. Internally the DWO should set up a team that will manage the consultancy and verify the reports.

(f) Site Visits. The DWO has to visit the area with the consultant and introduce him to key political and/or administrative officials who can assist him/her whenever help is needed. The local residents and politicians can assist the consultant when carrying out surveys and other necessary activities.

(g) Feedback to the Consultant. There should be agreement on the period within which the client will give feedback to the consultant. Delayed feedback usually delays the contract, attracts penalties, and affects quality of work. The consultant tends to abandon the assignment for other work when the feedback on interim comments/correspondences delays.

(h) Approval of the Reports: It is usually better to form a team that can approve the report after thoroughly looking at the areas in the report. Usually, a community mobiliser and hygiene specialist should be encouraged to attend. If the report has a specialised area, seek technical assistance from DWD/MWE or any other relevant technical institution. Ensure that the consultant's reports are approved in writing and that he /she goes ahead with the remaining phases of the project.

(i) Meetings and Site Handover: These are important meetings to be held during the Consultancy:

- **Monthly site meetings.** For purposes of tracking progress, it's advisable to hold regular site meetings. The Consultant chairs the meetings and is the secretary during the meeting with the Client's Representative sitting in. The meeting discusses the progress of the works.

- Meeting organised by the Client (District), preferably on the first site with the Contractor and Consultant. Authority and responsibilities of the Consultant and the Contractor are out lined and any outstanding issues are discussed.

(J) Community Mobilisation: This should be done during construction to ensure sustainability. Views by the community should be passed on to the trainers and the leaders. The DWO should ensure that he/she attends at least one of the community mobilisation sessions during the initial stages of the project.

(k) Supervision/Monitoring: As mentioned above, Supervision of the Contract is to be handled by the Consultants however the District Water Office will have to play a monitoring role.

(l) Reports: The Consultant is required to submit several reports including: (i) weekly reports, (ii) monthly reports, (iii) inception reports and, final report. The client should prepare a project completion report. If all the payments have been done, prepare a project completion report and include the experiences and lessons learnt, for future reference. Details to report on are specified in the Contract document.

(m) Payment Certificates: For effective contract management, there has to be a finance control system. The Client's Representative has to be able to track all quantities submitted in invoices and the cumulative payments, track cumulative retention money, withholding tax, and VAT. Thus Payment Certificates with clear serial numbering system have to be developed.

8.6 Financial Management

8.6.1 Financial Management Procedures

DLGs are subject to a financial internal audit and an external audit to cover the GOU financial year (July to June). A semi-annual audit report is undertaken at the end of December and the annual audit report is undertaken at the end of June as shown in Figure 8.2.

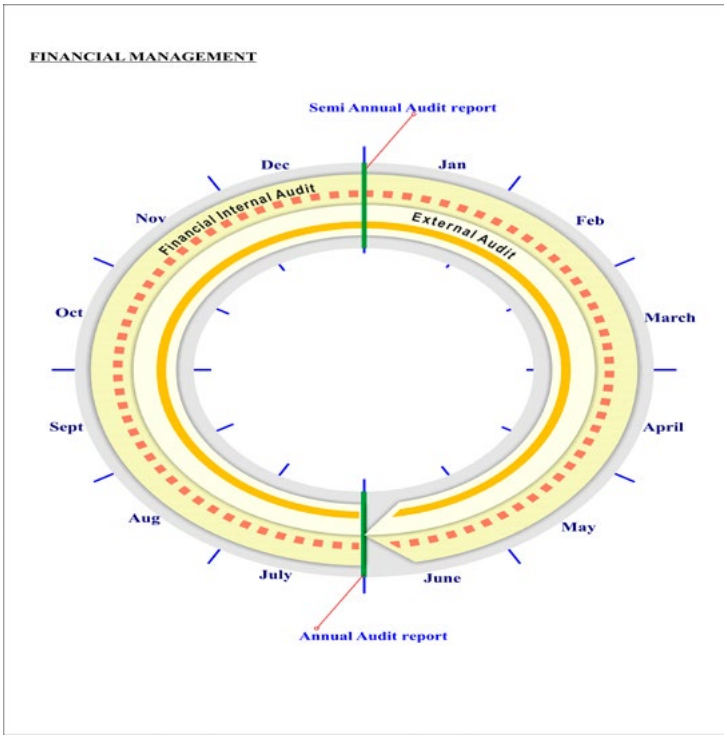


Figure 8. 2: Calendar of financial management procedures

8.6.2 Payment Processing Procedures

The process of payments varies from district to district, depending on the structure and the mode of operations. The starting point is the approval of the annual work plan and budget by the district council. These should ensure that LG resources are efficiently allocated towards activities and outputs to achieve its objectives. The budget process will only add value if there are adequate systems in place to ensure that the work plan and budget are actually implemented during the financial year. The district council therefore needs to develop cash management plans

The Financial Transactions of a LG are managed by: the CFO, the Accountant or Accounts Assistant, subject to the provisions of the LGs Financial and Accounting Regulations 2007.

8.6.3 Stores

It is the duty of the DWO to ensure that the accounting and control procedures for stores and other assets laid down in the Local Governments Financial and Accounting Regulations, 1998 are followed at all times.The stores shall be under the control of the Chief Finance Officer. The DWO shall consult with the CFO on the ordering, storage and accounting arrangements for stores and other assets. (see Local Governments Financial and Accounting Regulations, 2007).

8.6.4 Payments

The District Water Officer shall ensure that the following documents form part of submissions for payment:

i. Copies of Contracts.
ii. Local Purchase order
iii. Suppliers invoice.
iv. Admeasurements sheet.
v. Certificate prepared by DWO and approved by the DE & CAO.
vi. Forwarding letter to the CAO and CFO to process payments.

These are necessary documents for the processing of funds for service providers and Goods suppliers.

8.7 Post Contract Management

Once a project is completed, the service provider makes a completion report and other deliverables, such as built drawings, O&M plan/manual (where applicable), etc and submits it to the user department (DWO) for verification. The DWO must verify with his supervision team (consultant or departmental staff) to ascertain that facilities constructed/provided are according to specifications agreed on in the contract. Once the DWO has certified him/her self of the quality of the facilities, he/she may invite a joint monitoring team with other technical personnel from other departments depending on the size and complexity of the project. Other stakeholders, e.g. TSUs, and WSDFs may also make verification visits especially where they directly have a joint supervisory role (e.g. Small towns and RGCs for in the case of WSDFs). Payment reconciliations should be made, performance guarantee (where applicable) released, partial and final completion certificates given where necessary.

The DWO should monitor defects on the completed facilities in due course of the defects liability period. Once defects are noticed, the DWO should immediately notify the contractor/consultant of the defect that requires rectification before the retention payments are processed. The CAO, as the accounting officer, may also verify the facilities constructed or supplied (under multi-sectoral monitoring) before the commissioning or final hand over of the project to the beneficiaries.

Chapter 9: Environment

9. Introduction

This chapter summarises the key environmental issues to be considered during the planning and implementation of water and sanitation services, especially the potential environmental impacts to be aware of and to be mitigated. The chapter also provides guidance in form of the Environmental Template, and gives an exhaustive listing of possible mitigation measures.

9.1 Key Environmental Issues to Consider

The DWO has to ensure that key environmental issues are addressed during the planning of a water point, during the construction works and after completion of the construction works[14].

9.1.1 Planning the Construction of a Water Point

When planning the construction of a water point, the location should be at least 50m from pit latrines, existing graveyards, homes and kraals. For uphill pit latrines, the distance should be at least 80m.

9.1.2 During Construction of a Water Point

The DWO has to ensure that the drilling/construction contract includes a clause regarding environmental protection of the site and has to monitor adherence. The clause may read as follows:

"Care must be taken in the handling and storage of all drilling fluids, oils, greases and fuel on site, to avoid any environmental degradation. The contractor shall dispose of any toxic materials, drilling fluid and other additives, cuttings and discharged water in a manner approved by the supervisor so as to avoid damage to public and private property. All appropriate measures will be undertaken by the contractor to ensure that the proposed activities do not negatively affect the private and public property as well as the environment surrounding the borehole sites. The site will be cleared of debris, garbage, and any evidence of construction activities upon completion of the borehole/ water point".

The community should fence the water point to protect it from interference and contamination by animals and human activities:

i. For a spring, it is necessary to fence off the area in the vicinity of the catchment and extending 54 to 180 steps (30 to 100m) above it. In addition, the communities should plant grass in the catchment area, and organise the digging of the runoff channel.
ii. For hand pump equipped water sources (shallow wells, boreholes), a fence should be constructed with a minimum distance of five steps (3m) around the apron and one step (60cm) along the drainage channel. The area of the fence in line with the pump handle should have vertical poles restricting movement of the handle within one vertical plane. The pump handle should have cross bars restricting the up and down movement of the handle.
iii. For gravity flow schemes, a fence should be constructed around the intake extending a minimum of 54 to 180 steps (30 to 100m). A fence should also be constructed along the tap-stand with a minimum distance of one step (60cm) around the apron and the drainage channel.

[14] Information in this Section is provided in the Environmental Monitoring Template for Water and Sanitation, and standard drilling contract formats in use by MWE.

9.1.3 After Completion of Works

Once construction has been completed, the **WUC** should:

i. hold regular meetings,
ii. mobilise the community for sanitation and hygiene improvement,
iii. maintain an up-to-date record of water users,
iv. mobilise users to pay for operational and maintenance cost and properly look after water point funds, and
v. ensure preventive maintenance, i.e. carry out minor service and/or major service, repair cracks, etc.
vi. establish bye-laws regarding O & M of the source.

The **caretaker** should;

i. show the users how to use the water source properly,
ii. maintain the fence around the pump,
iii. keep the area around the water point clean,
iv. undertake environmental protection measures, such as planting high water absorbing plants at the end of the drainage channel, protection of the water catchment and ensuring that users do not pollute the water point,
v. promote hygienic handling of water by using clean containers among users,
vi. Monitor the groundwater level in the wells, and the yield of the springs and
vii. Enforce bye-laws with the help of Local Council officials.

9.2 Environmental Monitoring Template Form

The Environmental Monitoring Template for Water and Sanitation includes a recommended monitoring form, to assist district extension staff to collect and record information mainly for post construction monitoring of the water users, water facilities and the environment. District local Governments can use the information collected in the templates to identify where to provide follow-up support, as well as data sources for the quarterly and annual reports.

The data collection shall be undertaken with the Community Mobilisation Officer. However, either the water facility caretaker or a member of the community shall answer the questionnaire. After the results of the questionnaire have been analysed, recommendations will be provided to the community. One copy of the completed template should be left with the community and one delivered to the District Water Officer for possible action.

9.3 Potential Environmental Impacts of Water Supply and Sanitation Projects and their Causes

This Section gives detailed background information about the adverse environmental impacts of water supply projects as summarised in Table 9.1. Adverse environmental impacts of sanitation projects and their causes are summarized in Table 9.2.

Table 9. 1: Potential Environmental Impacts of Water Supply Projects and their Causes

Table 1: Potential Environmental Impacts of Water Supply projects and their Causes		
Problems	**Possible Impacts**	**Possible Causes**
1. Depletion of fresh water sources (Sources and ground water)	Destruction of the natural resource	Overestimation of water supplies
	Destruction of aquatic life	Underestimation of water demand
	Loss of economic productivity	Over-pumping of water resources
	Loss of recreation areas	Lack of information on resource yields
	Land subsidence	Water and leakage of potable water
	Increased cost of water supplies in the future or in down-gradient locations	Poor water pricing policies and practices, leading to excessive use, waster and leakage.
2. Chemical degradation of the quality of potable water sources (surface and groundwater)	Concentration of pollution in surface water sources	Depletion of surface and groundwater resources (see above)
		Reduced stream flows
	Poorer quality water, with associated health problems	Runoff/drainage from improper solid and liquid waste or excreta disposal
	Increased water treatment costs in the future or in down-gradient locations	
3. Creation of stagnant (standing) water	Increase in vector-borne diseases	Drainage systems lacking or poorly designed
	Contamination of standing water with fecal matter, solid waste, etc, leading to health problem	Leakage from pipes/wastage from taps
	Soil erosion/sedimentation	Lack of user/operator concern for stagnant water
4. Degradation of terrestrial and aquatic habitats	Alteration of ecosystem structure & function and loss of biodiversity	Improper siting of facilities within wetlands or other sensitive habitats, etc)
	Loss of economic productivity	Poor construction practice
	Loss of natural beauty	Leakage/wastage from pipes and taps
	Loss of recreational values	Increased population density/agricultural activity because of new water systems
	Soil erosion/sedimentation	
5. Increased human health risks	Arsenic poisoning	Failure to test water quality before developing the water resource
	Mercury poisoning	Lack of ongoing water quality monitoring
	Water-related infectious diseases	Inadequate protection of wells and water supply points

Table 9. 2: Potential Environmental Impacts of Sanitation Projects and their causes

Problems	Possible Impacts	Possible Causes
1. Increased human health risks from contamination of surface water, groundwater, soil, and food by excreta, chemicals and pathogens	Increased disease transmission associated with excreta	Failure to use sanitation facilities
	Malnutrition caused by above diseases	Disposal of excreta or wastewater directly on land or into surface water without adequate treatment
	High infant mortality	Improper siting of sanitation facilities near water supplies
	Reduced economic productivity	Inadequate protection of groundwater
	Poor quality surface and groundwater	Improper operation of sanitation facilities
	Health problems from use of chemically contaminated water	Failure of sanitation facilities due to lack of maintenance
	Increased cost of down-gradient water treatment for domestic and industrial uses	Improper use of wastewater in food production
2. Ecological harm from degradation of stream, lake and estuarine water quality and degradation of land habitats	Health problems from contact with contaminated water	Failure to use sanitation facilities
	Fish contamination	Disposal of excreta or wastewater directly on land or into surface water without adequate treatment
	Nutrient contamination (eutrophication)	Improper operation of sanitation facilities
	Alteration of ecosystem structure and function; loss of biodiversity	Failure of sanitation facilities due to lack of maintenance
	Reduced economic productivity	Improper sighting of facilities (within wetlands or other sensitive habitats, etc)
	Soil erosion and sedimentation	Poor construction practice

After: Alan Wyatt, William Hogrewe and Eugene Brantly (1992). Environmental Guidelines for PVOs and NGOs: Potable Water and Sanitation Projects. Water and Sanitation for health project, USAID

9.4 Environmental Mitigation and Monitoring Issues

Table 9.3 describes what can be done to address adverse environmental impacts related to water and sanitation developments[15]. District staff will be responsible to ensure that these activities are implemented as part of the tasks of the various stakeholders involved.

Table 9. 3: Environmental impact and mitigation measures

Activity/ Technology	Impact The activity or technology may. . .	Mitigation Note: Mitigations apply to specified project phase: planning and design (P&D), construction (C), or operation and maintenance (O&M).
General		
Site selection (P&D)	Damage sensitive ecosystems or endangered species (P&D)	Survey for, and avoid, wetlands, estuaries or other ecologically sensitive sites in the project area. Identify nearby areas that contain endangered species and get professional assessment of species' sensitivity to construction at site (P&D)
Construction of buildings and structures (C)	Damage sensitive ecosystems or endangered species (C); Cause erosion and sedimentation (C)	Train and monitor workers (P&D) (C) Gather data on soil type, slope and topography to determine the potential for significant erosion (P&D) Use silt screens, straw bales or similar erosion control measures (C) Avoid damaging vegetation (C) Re-vegetate areas damaged during construction. Do not remove erosion control measures until re-vegetation is complete (C) Use proper bedding materials for pipes (P&D) (C)
Soak ways and drains	Cause erosion (O&M); Alter the natural flow of rainwater runoff (O&M); Create pools of stagnant water (O&M)	Use riprap (cobbled stone), gravel or concrete as needed to prevent erosion of drainage structures (P&D) (C); Monitor and keep drains and soak ways clear (O&M)
Water Supply Improvements		
Hand-dug wells, seasonal ponds, improved springs, ground-level catchment and similar structures	Contaminate water with human pathogens (O&M)	Include focus on proper use and maintenance of the improvement as part of behavior change and education program (P&D); Construct spigot or similar system that prevents people from touching impounded water with their hands or mouths (P&D) (C);
	Contaminate water with animal manure (O&M)	Use fencing or equivalent that will keep live stock from grazing uphill or up gradient of the water supply improvement (P&D) (C)

[15]USAID (2003) - Environmental Guidelines for Small-Scale Activities in Africa

Activity/ Technology	Impact The activity or technology may. . .	Mitigation Note: Mitigations apply to specified project phase: planning and design (P&D), construction (C), or operation and maintenance (O&M).
	Create pools of stagnant water (O&M)	Do not allow animals to drink directly from the water source (O&M); Monitor drains and soak ways and keep them clear of debris (see entry on soak ways and drains above for more detail) (O&M);
	Exhaust water supply (not applicable to improved springs or hand-dug wells) (O&M)	Monitor and repair leaks from cracked containment structures, broken pipes, faulty valves and similar structures (O&M); Put in place a system for regulating use, such as a local warden or appropriate pricing (P&D); Give the community training in operating the improvement (P&D) (O&M) Monitor water levels in wells or impoundment structures to detect overdrawing (O&M)
Wells	Contaminate water with nutrients and bacteria from animal waste (O&M)	Don't let animals graze or be watered up-gradient from wellhead (P&D) (O&M)
	Create pools of stagnant water (O&M)	Monitor and repair leaks from cracked containment structures, broken pipes, faulty valves and similar structures (O&M)
	Change groundwater flow (O&M)	On islands, keep withdrawals within safe yield limits to avoid overdrawing and contamination of the well (P&D)
	Deplete aquifer (groundwater) (O&M)	Put in place a system for regulating use, such as a local warden or appropriate pricing (P&D); Include a focus on proper use and maintenance of the improvement as part of the behavior change and education program (O&M); Monitor water levels (O&M)
	Cause land subsidence (impact from many wells)	
Standpipes	Create pools of stagnant water (O&M) (This problem can be more severe when water table is high, clay soils are present, or population/tap density is high)	Ensure that spilled water and rainwater drain to a soak way or equivalent structure and do not accumulate and create stagnant standing water (C); Monitor and repair leaks from cracked containment structures, broken pipes, faulty valves and similar structures

Activity/ Technology	Impact The activity or technology may. . .	Mitigation Note: Mitigations apply to specified project phase: planning and design (P&D), construction (C), or operation and maintenance (O&M).

Treatment systems		
Pit latrine	Increase transmission of vector-borne diseases (0)	Devote adequate attention to identifying and addressing social barriers to using latrine (P&D); Use the ventilated improved pit latrine design that traps insect vectors (P&D)
	Contaminate groundwater supply with pathogens (0);	Evaluate depth to water table, including seasonal fluctuations and groundwater hydrology. The size and composition of the unsaturated zone determine the residence time of effluent from the latrine, which is the key factor in removal and elimination of pathogens. Pit latrines should not be installed where the water table is shallow or where the composition of the overlying deposits make groundwater or an aquifer vulnerable to contamination (P&D)
	Contaminate water supplies, damage water quality and/or transmit disease at other locations if waste is not properly handled and treated during or after servicing (0)	Ensure that a reliable system for safely emptying latrines and transporting the collected material off-site for treatment is used. This should include use of a small pit-emptying machine such as the vacuum that relies on an engine-driven vacuum pump. The Vacutug was tested for UNCHS in low -income areas of Nairobi, Kenya, and was found to give workers much greater protection from disease than conventional methods. See Wegelin-Schuringa, Small Pit-Emptying Machine: An Appropriate Solution in Nairobi Slum, for more details) (O&M)
	Cause injury to people or animals	Ensure that collected material is adequately treated and not directly applied to fields or otherwise disposed of improperly (O&M); Properly decommission pit latrines. Do not leave pits open. Fill in unused capacity with rock or soil.
Composting toilets	Increase transmission of vector-borne diseases (0)	Maintain humidity of composting material above 60% and supplement excreta with generous quantities of carboniferous material (dry leaves, straw, etc). The pile should then remain aerobic, odor-free and insect-free (O&M).
	Contaminate groundwater supply with pathogens (0);	Construct sealed vaults to hold composing material if using fixed-batch systems. If using movable-batch systems check removable containers for leaks before installing (O&M)
	Cause disease transmission to field workers and consumers of agricultural products (0)	Test samples from active chamber and mature after fallow period for Ascaris eggs and fecal coliforms (O&M)
Activity/ Technology	Impact The activity or technology may. . .	Mitigation Note: Mitigations apply to specified project phase: planning and design (P&D), construction (C), or operation and maintenance (O&M).

Treatment systems (continued)		
		Allow sufficient residence time in mature chamber. This may vary from 6 months in warm climates to 18 months in cooler climates (O&M)
		Ensure that the systems will be properly operated and maintained so that the soil amendment taken out after the treatment period is truly sanitized (O&M)
Dry Toilets	Increase transmission of vector-borne diseases (O)	Maintain humidity of composting material above 20% and supplement excreta with alkaline material (ashes or lime). The pile should then remain both odor free and insect free (O&M). Generous applications of ashes will help ensure that pathogens are destroyed. pH is the most important factor for sterilization (O&M)
	Cause disease transmission to field workers and consumers of agricultural products (O)	Construct sealed vaults to hold dehydrating and curing material ©
		Ensure that the systems will be properly operated and maintained so that the soil amendment taken out after the treatment period is truly sanitized (O&M)
		Test samples from active chamber and mature after fallow period for Ascaris eggs and fecal coliforms to assess level of sterilization (O&M)
		Allow sufficient residence time in mature chamber. This may vary from 6 months in warm climates to 18 months in cooler climates (O&M)

Activity/ Technology	Impact The activity or technology may. . .	Mitigation Note: Mitigations apply to specified project phase: planning and design (P&D), construction (C), or operation and maintenance (O&M).
Treatment systems (continued)		
Septic Tanks	Contaminate groundwater supply with pathogens (O);	Evaluate depth to the water table, including seasonal fluctuations and groundwater hydrology. If water table is too high, line the tank with clay, plastic sheeting or some other impermeable material to prevent leakage (P&D) (C)
	Contaminate surface water supplies with nutrients, biological oxygen demand (BOD), suspended solids (SS) and pathogens. (Septic tank effluent generally contains relatively high concentrations of pathogens, BOD, and SS) (O&M)	Avoid discharge of effluent to waterways if possible. Direct discharge to waterways with sufficient volume and flow to assimilate the waste maybe acceptable. It is better to add a secondary treatment, such as passing effluent through an anaerobic filter, followed by discharge to an absorption field, or better yet, a constructed wetland (P&D)

	Contaminate water supplies, damage water quality and/or transmit disease at other locations if waste is not properly handled and treated during or after servicing (O&M)	Ensure that a reliable system for safely removing sludge and transporting the collected material offsite for treatment is available. This should include use of collected material off-site for treatment is available. This should include use of a mechanized (probably vacuum-based) removal system (P&D) (O&M)
		Ensure that collected sludge is adequately treated and not directly applied to fields or otherwise improperly disposed off (see Sludge management below) (O&M)
Settled and simplified sewers	Damage ecosystems and degrade surface water quality (O&M)	Ensure that collected sewage will be treated, e.g., in a wastewater stabilization pond, and not simply discharged to a river or stream or used directly in agriculture or aquaculture. This is especially important in simplified sewerage, since there is no interceptor tank (P&D) (O&M)
	Transmit diseases to field workers and consumers of agricultural products	
Wastewater Stabilization ponds (anaerobic, facultative, aerobic	Damage ecosystems and degrade surface water quality (O&M)	Avoid discharging single (facultative) pond systems directly into receiving waters. If this is unavoidable, construct hydrography-controlled release lagoons that discharge effluent only when stream conditions are adequate. Install secondary treatment such as a constructed wetland, if possible (P&D) (C) (O&M)
	Transmit diseases to field workers and consumers of agricultural products (O&M)	Use two, three-five pond systems if possible (anaerobic, facultative, (maturation)) (P&D)
Activity/ Technology	**Impact** *The activity or technology may. . .*	**Mitigation** *Note: Mitigations apply to specified project phase: planning and design **(P&D)**, construction **(C)**, or operation and maintenance **(O&M)**.*
Treatment systems (continued)		
		Allow only restricted uses for agriculture and aquaculture of effluent from all but five-pond systems (O&M)
Reed bed filter	contaminate groundwater or surface water (O&M)	Evaluate depth to the water table, including seasonal fluctuations and groundwater hydrology. If water table is too high, line the tank with clay, plastic sheeting or some other impermeable material to prevent leakage (P&D) (C)
Subsurface wetland	**(See reed bed filter above)**	

Free water surface wetland Floating aquatic macropytes	provide breeding ground for disease vectors (O&M)	Use plant and animal species that are native to the region. Avoid introducing water hyacinth, water milfoil, or salvinia, which have proven extremely invasive outside of their natural range (P&D)
	Introduce invasive non-native species (O&M)	If using water hyacinth, maintain dissolved oxygen at 1.0mg/L, frequently harvest and thin plants and /or add mosquito fish (Gambusia affinis) to the wetland or use other plant species such as duckweed, water lettuce (Pistia stratiotes), water milfoil, or salvinia (Salvinia spp) (O&M)
Slow-rate overland flow	contaminate groundwater or surface water (O&M)	Use where growing season is year round. Requires vegetation (P&D) (O&M)
		Use only where soil textures are sandy loam to clay loam (P&D) (O&M)
		Use where groundwater is >3ft below surface (P&D) (O&M)
Slow-rate subsurface flow	contaminate groundwater or surface water (O&M)	Use only where soil textures are sandy loam to clay loam (P&D) (O&M)
		Use only where groundwater is >3ft below surface (P&D)
Rapid Infiltration	contaminate groundwater or surface water (O&M)	Use only where soil textures are sandy to loam (P&D)
		Use only where groundwater is >3ft below surface (P&D)
Sludge Management	Damage ecosystems and degrade surface water quality (O&M)	If possible, choose treatment technologies that do not generate sludge, such as wastewater stabilization ponds (P&D)
		Compost sludge, then use as soil amendment for agriculture (O&M)
	Cause disease in handlers and processors (O&M)	Provide workers with appropriate protective clothing, including rubber gloves, boots, long sleeved shirts and pants. Train workers to wash hands and faces frequently with soap and warm water and make both available.
Activity/ Technology	**Impact** *The activity or technology may. . .*	**Mitigation** *Note: Mitigations apply to specified project phase: planning and design **(P&D)**, construction **(C)**, or operation and maintenance **(O&M)**.*
Treatment systems (continued)		

Wastewater use in agriculture and aquaculture	Cause disease in field workers and consumers of agricultural products (O&M)	WHO guidelines recommend (1) treat to reduce pathogen concentrations, (2) restrict use to crops that will be cooked, (3) use application methods that reduce contact with edible crops, and (4) minimize the exposure of workers, crop handlers, field workers and consumers to waste (P&D) (O&M)
		Wastewater used in aquaculture should have $<10^3$ fecal coliforms per 10 ml to minimize risk to public health. (see Guidelines for the safe use of wastewater and excreta in agriculture and aquaculture: Measures for Public Health Protection, 1989, WHO, Geneva (P&D) (O&M)
		http://www.who.int/environmental information/information resources/documents/wastreus.pdf

Chapter 10: Water Resources Management

10. Introduction

The Water Resources Management (WRM) sub-sector is responsible for:

i. Monitoring and assessment of the quantity and quality of water resources;
ii. Acquiring, storing, processing and disseminating water resources data and information to users;
iii. Providing advice on management of trans-boundary water resources;
iv. Regulating water use and discharge of wastewater into water bodies through issuing of water permits, and
v. Providing services for water quality analysis.

This chapter provides an overview of the key issues in WRM, water quality, as well as guidance in implementing integrated water resources management.

The government of Uganda has adopted Integrated Water Resources Management (IWRM) as the most appropriate approach to manage water resources. See Box 10.1.

Box 10. 1: The IWRM Concept

IWRM is a systematic process for the sustainable development, allocation and monitoring of water resource use to reach social, economic, and environmental objectives. Integrated water resources management means that all the different uses of water resources are considered together.

The basic IWRM concept has been extended in Uganda to incorporate participatory decision-making. Different user groups (e.g., farmers, communities, environmentalists) can influence strategies for water resource development and management. This brings additional benefits, as informed users apply local self-regulation on issues such as water conservation and catchment protection far more effectively than central regulation and surveillance.
The importance of IWRM becomes even more crucial in light of Uganda's impending water crisis:

- Water resources are increasingly under pressure from population growth, environmental degradation, economic activity and intensifying competition for the water
- Pollution is further enhancing water scarcity by reducing water usability;
- Water withdrawals and pollution have increased and Uganda is projected to be water scarce country by 2020.
- Shortcomings in the management of water, a focus on developing new sources rather than managing existing sources better and top-down sector approaches to water management result in uncoordinated development and management of water resources.
- Increasing development means greater impacts on the environment.
- Current concerns about climate variability and change demand improved management of water resources to cope with more intense floods and droughts (see also Section 10.4).

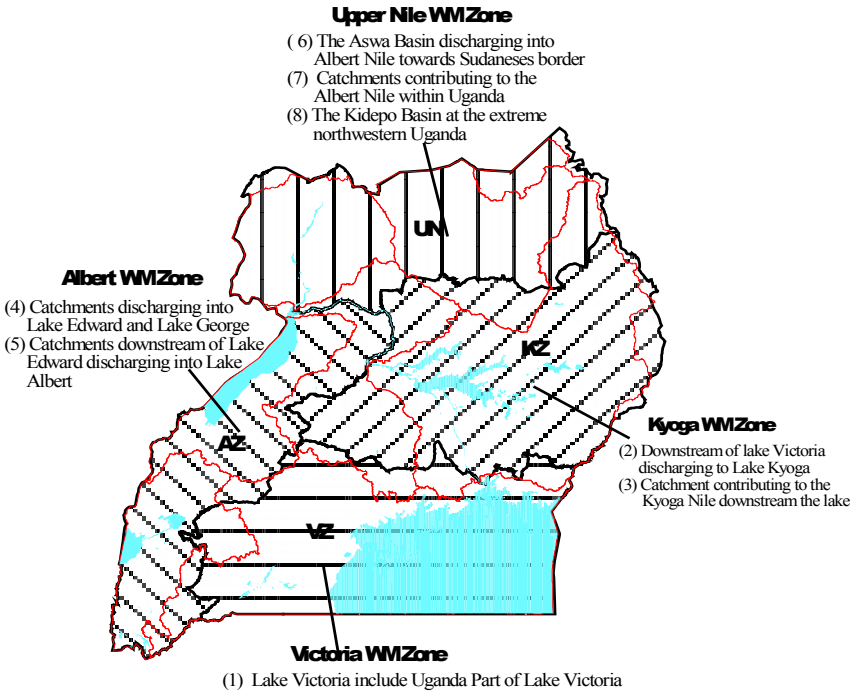
10.1 Institutional Set-up

Key to successful and sustainable IWRM is that it is based on a participatory process being both bottom-up (i.e. stakeholder/beneficiary-driven) and top-down (facilitated and supported by central, regional and district local governments).

The Directorate of Water Resources Management (DWRM) has therefore de-concentrated its regional functions to Water Management Zones (WMZ) as a way of moving closer to the stakeholders at community level. The country has been divided into four WMZs (Victoria, Albert, Kyoga and Upper Nile) based on hydrological (water) basins and this is a regional level framework through which water resources will be managed and developed (see Figure 10.1).

The local level institutions include Catchment Management Organisations (CMOs), which are based on water sub-basins or catchments. They form parts of WMZs. CMOs will be the local level bottom-up frameworks through which stakeholders will participate in water resources management. Districts are the other institutions where implementation of catchment based water resources management plans will be implemented.

Figure 10.1: Map of Uganda showing the Water Management Zones and sub-basins ***Source: Water and Environment Sector Performance Report 2011***



10.2 Local Government and Communities' Role in Water Resources Management

10.2.1 Roles and Responsibilities in WRM

The WMZ will establish and support the Catchment Management Organization (CMO). This institutional framework consists of two connected and complimentary committees: the **Catchment Management Committee** (CMC), and the **Catchment Technical Committee(**CTC), being the technical arm of the CMO. To extend the reach of the WMZ planning team and ensure the broadest possible and practicable participation, the WMZ planning team will establish an informal and ad hoc stakeholder forum and possibly general public forums.

The **Inter-district Steering Forum** brings together the chairpersons of district and urban councils, the district water and sanitation committees and the district environment committees. The forum also brings together the respective chief administrative officers, important leaders of business and private sector groups including farmer organizations, fisherman and livestock associations, etc. This is an important group since it is essential for the WMZ planning team to ensure that key issues within and across districts is addressed. Local government is likely to play a major role in implementing the catchment plan including and beyond the provision of water and sanitation services. Hence, the Inter-district Steering Forum has both an important political and substantive role in the preparation and implementation of the catchment plan. In general its role might include:

- Enacting and enforcing, local government laws and regulations, policies, ordinances and bye-laws related to IWRM and wise use and sustainable management of water and environmental resources;
- Participating actively in the development and implementation of catchment management plans for the river/lake basins;
- Promoting integrated planning in management of land, water and environmental resources; promoting and facilitating the mainstreaming of IWRM into district and town development plans, district environmental action plans, poverty eradication action plans, district water development plans and other relevant plans;
- Carrying out monitoring and evaluation of IWRM activities in their respective areas;
- Raising public awareness within their jurisdictions on water and environmental issues;
- Encouraging and increasing stakeholder participation in the integrated management of water resources; and
- In collaboration with the WMZ team and DWRM, resolving conflicts related to use of the water resources.

More information on Catchment Management Organisations can be found in DWRM's Guidelines for Catchment Based WR Planning - Working Draft v7, and the Operational Manual for Catchment-based Water Resources Management, July 2012.

The DWOs ensure that relevant data collected by Water Authorities and private drillers on water levels and quality will feed into the DWRM data bank for planning and monitoring purposes. The DEnOs ensure that wetlands, which are important in the water resources management chain, are not abused; and that planned and on-going water and sanitation activities meet the requirements of the relevant environmental laws and regulations.

In the implementation of IWRM, NGOs and CBOs are expected to implement activities related to protection of water supplies, e.g.maintaining tree or grass cover in the catchment area of water sources, reducing stream pollution and abstractions and resolving conflicts arising from sharing of water, etc.

Unlike other sub-sectors where functions and responsibilities can be linked to physical inputs and outputs, the case of IWRM is different. At community level, few people can grasp the impact of IWRM easily. So far, the participation of the community has been experimented through the Catchment Management Committee whose functions include:

i. Lobbying district councils for issuance of bye-laws related to appropriate management and conservation of water and environmental resources in the catchment;
ii. Promoting integrated planning within the catchment in management of land, water and environmental resources; promoting and facilitating the mainstreaming of IWRM into district and town development plans, district environmental action plans, poverty eradication action plans, investment plans and other relevant plans;
iii. Approving catchment management plans prepared through a participatory process;
iv. In collaboration with DWRM, mobilising resources for implementation of catchment management plans;
v. Overseeing implementation of catchment management plans including enforcement of existing bye-laws related to water and environmental resources management;
vi. Raising public awareness within the catchment area on water and environmental issues;
vii. Encouraging and increasing stakeholder participation in the IWRM process; and in collaboration with DWRM, resolving conflicts related to use of the water resources of a basin.

Otherwise, the participation of communities in water resources management is through the community based maintenance of their individual water sources.

10.2.2 Roles and Responsibilities in the Production of Water Source Protection Plans

Protection of small point sources (such as hand pump boreholes and spring catchments) is important for protecting the health and livelihoods the population particularly in rural areas. Water Source Protection Guidelines help the users to identify the risk to their water source and to engage the people and organisations responsible for the problem in a positive way that leads to a mutually beneficial outcome. People in charge of the water source are responsible for producing a Water Source Protection Plan for their source based on the mentioned Guidelines. While each Water Source Protection Plan will set its own specific aims, they should work towards the general aims and objectives set out in Table 10.1:Table

10.1: Over-arching objectives for Water Source Protection

Aim	Objectives
1. Improved Water Quality	1.1. Health: Minimise the risk to human and livestock health 1.2 Equipment: Minimise risk of damage to pumps and water services equipment (e.g. through corrosion)
2. Reliable Water Quantity	2.1 Yield: Ensure adequate yield to meet water supply demand 2.2. Reliability: Minimise seasonal disruption or halt long term declines in water flows/levels
3. Better Livelihood Opportunities	3.1 Sustainable Land Management: Increase level and reliability of household income from better farming and forestry practices. 3.2 Poverty Reduction: Develop new sources of income and socio-economic security through better catchment management.

The role of the DWO is to monitor, assist and regulate the production of the Plan. At the time of writing this District Implementation Manual, only the draft guidelines were available. A final set of the guidelines will be placed on the Ministry's website (www.mwe.go,ug) as soon as they are operational.

10.2.3 Roles and Responsibilities in Water Quality Testing

Water quality testing is intended to ensure that water from improved water sources is suitable for human consumption before the facility is commissioned. Water is tested for specific physical, chemical and bacteriological parameters. In the case of boreholes and shallow wells, water should be tested prior to pump installation. For piped water supplies (GFS or motor pumped), the sources must be tested at the design stage and relevant treatment methods specified before implementation of the project begins.

The Uganda Water Quality Standards and Guidelines are available. The National Water Quality Management Strategy gives recommendations for environmental protection of a water source (i.e. environmental protection plan and protection zones). The National Water Quality Management Strategy is also availabe, summarised in chapter 3.
The District Water Office's role with respect to water quality management (as defined in the National Water Quality Strategy is to:

i. Design and implement Water Quality Monitoring Programmes in collaboration with DDHS and CDO.
ii. Monitor water sources and take appropriate measures. Carry out routine water quality analysis (bacteriological and physical) and sanitary surveys.
iii. Monitor activities that have an impact on water quality.
iv. Set local priorities and bye laws
v. Train stakeholders in carrying out sanitary surveys and remedial action on contaminated sources.
vi. Provide feedback to WUCs and communities.
vii. Ensure compliance to the National Interim Water Quality Guidelines and ensure implementation of preventative action for non-complying cases.
viii. Collect physical and chemical water quality results from water source developers in the District.
ix. Establish and maintain a water quality database.
x. Report on the water quality situation to DWD (in quarterly reports) and the DWSCC.
xi. Use results of the above in planning and decision-making.

Testing of the water is usually included in the contract with the company constructing the water point. When feasible, independent water sampling may be carried out by the DWO. Water quality issues usually result from the natural environment but may also be the result of a technical failure of the contractor. For that reason, it is important to have a competent drilling supervisor on site.

The contractor cannot be held accountable for naturally occurring water quality issues. In case a contractor drills a well that has water of unacceptable quality due to natural causes, the borehole will not be installed with a handpump, but the contractor will be paid for a successful borehole drilled. However, in case of unacceptable water quality as a result of a technical failure, the borehole will not be installed and the contractor will not be paid for the works.

Water should be sampled from each new borehole at the end of the test-pumping exercise. Only boreholes where the water quality test indicates that the water is fit for drinking should be installed with a hand pump. The National Drinking Water Standards are given in Table 10.2. The minimum parameters that should be tested prior to commissioning of a water source include appearance, temperature, pH, conductivity, colour (apparent), turbidity, carbon dioxide (dissolved), alkalinity (total), hardness (total), iron (total), and coliforms (faecal presumptive).

These parameters should also be monitored subsequently. It should be noted that although fluorides and chlorides are not on the list, these should be tested in areas where this is known, or observed to be a problem. The National Water Quality Management Strategy (2006) recommends that water sources are monitored monthly. However, given the financial constraints, the Rural Water Supply and Sanitation Department of MWE/DWD recommends that twice a year would be adequate. Boreholes, if well constructed, are not easily contaminated. Water quality data should be submitted as part of the DWSCG annual reports.

During emergency situations, for example flooding, water sources may become contaminated. The sector guidelines for the Conditional Grant provide for a percentage of the grant that may be used for emergency issues; these funds can be used for water quality testing.

A **Water Safety Plan** (WSP) is a comprehensive risk assessment and risk management approach that encompasses all aspects of the water supply chain from 'Catchment to Consumer', including:

- preventing contamination of the water resources,
- treating the water to reduce or remove contamination that could be present to the extent necessary to meet the water quality targets, and
- preventing re-contamination during storage, distribution, and handling of drinking water.

This tool was developed and promoted by World Health Organization. The National Water Quality Management Strategy (2006) adopted this tool for assessment of rural/small community water supplies. In 2008, it was incorporated as part of the national drinking water and bottling water standards. The WSP tool is partly implemented in the large towns under National Water & Sewerage Corporation, and not yet at the rural level. As an example, a possible template for a rural water safety plan can be accessed from: Water Safety Plan Template.

Table 10.2: National water quality guidelines for untreated drinking water (2006)

Parameter	Guideline Values / Acceptable Values	Maximum Acceptable Concentration (MAC)
Hardness (CaCo3)	600 mg/l	800 mg/l
Iron total (Fe)	1 mg/l	2 mg/l
Manganese (Mn)	1 mg/l	2 mg/l
Chloride (Cl)	250 mg/l	500 mg/l
Fluoride (Fe)	2 mg/l	4 mg/l
Sulphate	250 mg/l	500 mg/l
Nitrate (NO3)	20 mg/l	50 mg/l
Nitrite (NO2)	0 mg/l	3 mg/l
TDS	1000 mg/l	1500 mg/l
Turbidity	10 NTU	30 NTU
PH	5.5 – 8.5	5.0 – 9.5
E. Coli	0 / 100 ml	50 / 100 ml

10.3 Climate Variability and Change

In the last century, Africa warmed by 0.7°C. Precipitation in East Africa also increased. In this 21st century; projected warming for Africa will range from 0.20C per decade (low scenario) to > 0.50C per decade (high scenario). Increase in precipitation from December-February (wet months) is estimated at 5-20%, and decrease in precipitation from June-August (dry months) at 5-10%. For Uganda, the fastest warming regions are in the Southwest of the country where the rate is of the order of 0.30C per decade. Pressures and threats on water resources due to climate change and variability, poor land use practices and catchment degradation have led to declining water levels, drying up of water sources and pollution of water resources. This situation poses serious problems with far reaching social, political, economic and environmental consequences. The situation also threatens to undo many decades of development efforts and to frustrate poverty eradication programmes, as well as the MDGs through destruction of infrastructure and diversion of development funds to relief operations.

Climate change has manifested itself in Uganda through increased frequency of high temperatures, droughts (leading to food insecurity), scarcity of water resources, and wild fires. It is predicted that the frequency and intensity of extreme weather events will continue to increase with increasing climate change. Uganda experienced seven drought episodes in one decade (1991-2000). Droughts significantly affected water resources, hydro power production and agriculture and many others. The past experience in Uganda shows that El Nino and Lanina episodes are the principal causes of the most severe climate change related disasters in Uganda.

The climate change problem can be turned into an opportunity by implementing appropriate mitigation measures and adaptation measures, for example:

i. **Promoting Sustainable Water Storage:** Because sub-Saharan Africa is subject to more extreme climate variability than other regions, it needs improved water storage capacity. Some experts say that large dam projects would create a more sustainable reserve of water resources to combat the burden of climate fluctuations, but others disagree, stating the harmful environmental impact of large dams.

ii. P**romoting Trans-Boundary Water Treaties and Dialogue:** Many experts say more water treaties are needed. More dialogue on water shed management, understanding the issues, options and strategies at a regional, national and river basin level will facilitate emergency of appropriate policy and actions for peaceful co-existence. Partnerships and coordination platforms for water, weather and climate are encouraged.

iii. **Promoting Green Water Technology and Small-Scale Agricultural Improvements:** The key concept is the use of green water as opposed to blue water. Blue water is the water we see in streams. Green water is the water we don't see in the soil, whereas green water accounts for two-thirds of the water supply. Farmers can access green water through drip irrigation (systems that slowly and consistently deliver water to plants' root system), supplemental irrigation (supplementary to natural rainfall rather than the primary source of moisture during periods of drought) and rainwater harvesting (the collection of rainwater for crops, which reduces reliance on irrigation). Crops can grow poorly even during rainy seasons, and most farms in Africa suffer from nitrogen and phosphorus depletion in soil. One way to assuage water stress in terms of food scarcity is to increase water-holding capacity with organic fertilizers that would increase availability and efficacy of green water.

iv. **Promoting Energy Efficiency.** Energy efficiency can be achieved through use of water saving technologies, instilling sense of responsibility to end users, encouraging use of water efficient electronic accessories and policies.

v. **Tree Planting:** 50% of precipitation in sub-Saharan Africa is the result of the presence of trees and forests. Since trees remove carbon dioxide, they mitigate climate change.

vi. **Tapping and Storing Water during Floods:** this is very important especially in regions that are semi arid such as northern Uganda. Building dams that tap water, reduce flooding in regions like in the northern Uganda can help solve the problem of lack of water in these areas during the dry season.

vii. **Climate Change Proof Infrastructure[16]:** water infrastructure should be built and constructed with the design element to resist and withstand extreme climate events. During the design of shallow wells and protected springs, care has to be taken so that flooding of water points is avoided during extreme rainy seasons.

Implementing appropriate mitigation and adaptation measures can be most appropriately done in an IWRM context. For more information, refer to the Draft National Strategy Framework for adaptation to climate change from water resources perspective (MWE, 2008)

To guide Uganda's immediate climate change adaptation actions, a National Adaptation Programme of Action (NAPA) was developed in 2007. The Climate Change Unity (CCU) under MWE coordinates all climate change mitigation and adaptation actions in Uganda. In FY 2011/12, draft Climate Change mainstreaming guidelines were produced by the Climate Change Unit to support all sectors and district local governments, to integrate climate change into their investment and development plans and budgets; once these are final and published, they can be downloaded from MWE's website.

[16]Adaptation to climate change in the engineering context implies accounting for climate change factor in the design of water supply technologies. For example, while designing and abstraction system which is based on river water the low flow frequency duration curve is constructed in such a way that it accounts for climate change.