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A Trainer's Manual for Community Managed Water Supplies in Kenya

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A Trainer's Manual for Community Managed Water Supplies in Kenya

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List of Abbreviations

A/C	Account
ACF	Action Contre La Faim/Action Against Hunger
ACTED	Agency for Technical Cooperation and Development
AGM	Annual General Meeting
AIDS	Acquired Immunodeficiency Syndrome
AMREF	African Medical and Research Foundation
AOB	Any Other Business
ASAL	Arid and Semi-Arid Lands
Avg	Average
CAAC	Catchment Area Advisory Committee
CBM&E	Community Based Monitoring and Evaluation
CBO	Community-Based Organization
CBWSG	Community Based Water Supply Groups
CDF	Community Development Fund
CDN WQ	Catholic Diocese of Nakuru, Water Quality Program
CEO	Chief Executive Officer
CHAST	Children's Hygiene and Sanitation Training
CHQ	Cheque
CIFA	Community Initiative Facilitation and Assistance
CLTS	Community-Led Total Sanitation
CO-OP	Cooperative Society
COOPI	Cooperazione Internazionale
CORDAID	Catholic Organization for Relief and Development Aid
CPC	Community Project Cycle
CTC	Child to Child
CWP	Community Water Project
DACAAR	Danish Committee for Aid to Afghan Refugees
DCM	Drought Cycle Management
DCO	District Cooperatives Office
DDO	District Development Officer
DSDO	District Social Development Officer
DTU	Development Technology Unit
DWO	District Water Officer
ECHO	European Commission Humanitarian Aid and Civil Protection
EIA	Environmental Impact Assessment
EU	European Union
EWS	Early Warning Systems
FAO	Food and Agriculture Organisation
FBO	Faith Based Organisation
FREQ	Frequency

GAA	German Agro Action
GI	Galvanise Iron
GOK	Government of Kenya
HELB	Higher Education Loans Board
HH	Household
HHW	Household Hazardous Waste
HIV	Human Immunodeficiency Virus
ID	Identification
IRC	International Rescue Committee
JD	Job Description
KAP	Knowledge, Attitudes and Practices
KCO	Kenya Country Office
KCPE	Kenya Certificate of Primary Education
KEWI	Kenya Water Institute
KKWP	Kathita Kiirua Water Project
KPLC	Kenya Power and Lighting Company (now called Kenya Power)
KRA	Kenya Revenue Authority
Ksh	Kenya Shillings
LATF	Local Authority Trust Fund
LPO	Local Purchase Order
M & E	Monitoring and Evaluation
m^3	Cubic metre
MC	Management committee
MENR	Ministry of Environment and Natural Resources
mm.	millimetres
MoWI	Ministry of Water and Irrigation
NEMA	National Environmental Management Authority
NGO	Non-Governmental Organisation
NHIF	National Health Insurance Fund
NRM	Natural Resources Management
NSSF	National Social Security Fund
NWCPC	National Water Conservation and Pipeline Corporation
O & M	Operation and Maintenance
Oxfam GB	Oxfam Great Britain
PAYE	Pay As You Earn
PE	Polyethelene
PHAST	Participatory Hygiene and Sanitation Transformation
PIN	Personal Identification Number
PRA	Participatory Rural Appraisal
PT	Public Toilets
PTA	Parents Teachers Association

PV/R,	Purchase Voucher/Receipt
PVC	Polyvinylchloride
Q&A	Questions and answers
RBA	Rights-Based Approach
RBA Act	Retirement Benefits Authority Act
RDD	Regional Drought Decision
Rev/exp	Revenue/Expenses
RFL	Rural Focus Ltd
RWH	Rain Water Harvesting
SACCO	Savings and Credit Cooperative
SGM	Special General Meeting
SHG	Self Help Group
SKAT	Swiss Resource Centre and Consultancies Development
SMART	Specific, Measurable, Achievable, Relevant and Time-bound
SMS	Short message service
SNV	Stichting Nederlandse Vrijwilligers (Dutch NGO)
SO	Support Organisation
SODIS	Solar Disinfection
SPA	Service Provision Agreement
SWOT	Strengths, Weaknesses, Opportunities, Threats
TNA	Training Needs Assessment
TOT	Training of Trainers
UfW	Unaccounted for Water
UNDP	United Nations Development Programme
UNICEF	United Nations Children's Education Fund
USAID	United States Agency for International Development
UV	Ultraviolet
VLOM	Village Level Operation and Maintenance
Vol.	Volume
VSF	Vétérinaires Sans Frontières
WAB	Water Appeal Board
WASH	Water Sanitation and Hygiene
WASREB	Water Services Regulatory Board
WDC	WRUA Development Cycle
WHO	World Health Organisation
WRMA	Water Resources Management Authority
WRUA	Water Resource Users Association
WSB	Water Service Board
WSP	Water Service Provider
WSTF	Water Services Trust Fund
WUA	Water Users Association

INTRODUCTION

1. Background

Community managed water supply systems play a significant role in providing water services to the Kenyan public. However many community managed water supplies continue to under-perform and require support in terms of infrastructure improvement, strengthening of management and financial systems, operation and maintenance, and better inclusion into the regulatory framework. It is recognized that many organizations, including the Ministry of Water and Irrigation, have and continue to respond to the need to improve the water services offered by the community managed supplies. This Trainer's Manual aims to support the process of building sustainable community managed water supplies.

2. Development of the Manual

A variety of water supply training manuals already exist, dealing with different topics and providing different levels of detail relevant to community managed water supplies. So why another manual? This Trainer's Manual was commissioned by FAO and UNICEF, on behalf of the Water/NRM Technical Working Group, to respond to a stated need for a comprehensive manual covering financial, organisational, legal and technical aspects of community based water supply management which could be used by any state or non-state organisation to support capacity building activities. In addition, the Manual was intended to incorporate specific issues (e.g. performance monitoring, compliance to regulations and sector guidelines, rights based approaches, etc) that have been emphasised under the water sector reforms in Kenya.

3. Scope of the Manual

There is enormous diversity within the community managed water supplies in Kenya in terms of water source, infrastructure, scale and cultural context. As a result, the content of the Manual covers a diverse range of topics. Consequently there is a responsibility on the trainer to make sure that the content and level of detail is adapted and made appropriate to each particular community training occasion.

The Manual is focused on community managed water supplies. In the past there has been tremendous effort to incorporate sanitation and hygiene elements within community water projects. After consultations with stakeholders it was felt that there is adequate documentation on hygiene and sanitation training and therefore facilitators are referred to recognised materials on CHAST/PHAST/CLTS training to cover these topics.

The Manual is not intended to be used as a reference for the design of water supplies. The Manual focuses on building understanding, knowledge and skills within the community members and their management structures on a range of organisational, legal, financial, and technical issues relevant to operating the water supply infrastructure efficiently and effectively in order to provide an improved and sustainable water supply.

4. Purpose of this Trainer's Manual

This Manual is intended as a resource for trainers or facilitators as they prepare the training materials for individual training activities.

The Manual is not intended as a document that is left with the community, nor does it contain many handouts for the community. The approach adopted has been to provide the facilitator with relevant and appropriate materials. It is expected that during the training and capacity building process the community will establish their own procedures, operation and maintenance schedules, forms and

other management instruments which the community can use. This ensures that outputs from the training sessions are developed with the community, thereby building community ownership.

5. Structure of the Manual

The Manual provides a Facilitator's Guide which discusses many of the issues that a facilitator should consider in the design, preparation and implementation of a training program. The Facilitator's Guide is followed by a sequence of different modules each covering a particular aspect of water supply management. Each module contains a number of different sessions where each session tackles a particular topic.

The sessions are presented in a generic format which is intended to provide the facilitator with useful information, materials, tools and a stepwise approach to covering the topic with the trainees. Each session is presented as a stand-alone session which should be adapted by the trainer to suit the particular conditions within the community where training is being undertaken.

6. How to use the Manual

It is the responsibility of the facilitator to establish the topics to be covered in a particular training program. Individual sessions from this Manual relevant to the identified training topics should be identified, reviewed and adapted to suit individual community conditions.

7. Terminology

Community managed water supply systems in Kenya do not have a uniform legal registration status nor a single common term.

The term Water Users Association (WUA) has been adopted in this manual as the generic term to refer to the membership organisation or group, whether legally registered or not, that is managing the water project. Frequently it is the same group that owns the project and has developed the infrastructure, often with government or external support, although this is not uniformly the case.

We recognise that many water projects are managed by community based organisations (CBO) that may be registered as self-help groups (SHG) under the government department of social services but which lack legal status. The material in this manual is relevant to such groups, although we have used the term WUA rather than CBO or SHG to refer to these groups.

FACILITATOR'S GUIDE

The Facilitator's Guide provides a general discussion on different aspects of designing, developing and undertaking training activities.

1. Introduction to the process of training

Training is the process of imparting knowledge, skills and competence to an individual or group of people (e.g. CBO members) with a view to improving their performance in a particular task or responsibility. In community-based water supply management, key areas requiring attention include:

1. **Governance issues** – Legal registration, preparation of a constitution and bylaws, election of committee members, compliance to the Water Act 2002 and subsidiary legislation, performance monitoring, etc..
2. **Community participation and customer relations** – Community water project customers are often also project members and so have dual responsibilities that can complicate project performance. Enhancing both roles can help to improve the quality of services.
3. **Financial management** – Many community water projects struggle with issues of tariff setting, accounting, revenue collection, billing, record keeping and transparency. Financial sustainability is often an elusive goal for many projects.
4. **Operation and Maintenance** –Water supply infrastructure is used on a daily basis and requires maintenance to prevent unexpected interruptions to supply, high repair costs and poor quality services, and increase its lifespan.
5. **Cross-cutting issues** – These are issues related to community-based water supply management which ought to be addressed in order to provide better services e.g. gender considerations in governance and water provision; poverty-related issues and accessibility of water by poor and vulnerable households in the community; environmental, sanitation and hygiene issues, etc.

Proper training should lead to improved performance if carefully designed and implemented. Training materials, approaches to training and methodologies used become important issues to consider when planning specific training programs. This guide will provide some suggestions on how training materials can be developed and how training approaches and methods can be tailored to meet the needs of the participants. Remember that the key point in training is to impart new knowledge, assist participants to develop their skills and encourage them to change their attitude towards specific aspects of community-based water supply management.

2. What is a training program?

A training program is a set of activities and tasks that are carefully put together in a manner that aims to impart knowledge and/or instruction to improve the recipient's performance or to help them attain a required level of knowledge or skill.

A good training program is one that:

- Is tailored to the needs of the participants in order to ensure that the training is beneficial to them;
- Is scheduled to suit participants' own plans and schedules;
- Allows the participants to practice the new technology or skill as much as possible;
- Adopts methods and approaches to suit the learning style of the participants.

3. Characteristics of a good trainer

To be a good trainer you should have the following qualities and attributes:

- **Be well organized:** Read the trainers guide before training so that you are well prepared and know how to handle your sessions.
- **Practice beforehand:** Know how to conduct the sessions in the local language. You will have to get used to translating phrases.
- **Be friendly:** Make everyone feel comfortable and part of the group.
- **Be observant:** As well as listening closely, pick up information about the situation from non-verbal cues.
- **Use open questions:** these are questions that encourage people to give their own opinions, rather than a "yes/no" or single response. Example "what problems do you have with your water sources?" or "How can you raise money for the new facility?" These questions facilitate open discussion. They allow people to express their own ideas and find their own solutions without fear of giving a wrong answer.
- **Wait for responses:** Give people time to think and come up with an answer. Do not bombard them with more questions.
- **Do not rush:** Find the pace that people feel comfortable with.
- **Do not do all the talking:** Remember your job is to ask questions and get participants to do the talking.
- **Encourage everyone to contribute:** Make eye contact, use hands, walk close to shy people and use names. Try to draw out the silent and control the talkative.
- **Use minimal encouragers**: – "yes ….. I see …. And then? ….. tell me more" They help to keep the person talking.
- **Listen actively:** Use eye contact and body language. Praise and encourage but do not over praise.
- **Re-phrase:** briefly restate what people say in your own words, to make sure you have heard and understood. When you rephrase make sure to do two things – 1) verify with the speaker if you have understood correctly, and 2) see if others want to add something.
- **Be gender aware:** Encourage women to be active in the discussions.
- **Probe:** Do not be satisfied with one answer. Ask follow up questions to explore issues and make it clearer – "Why? What else? … Tell me more. Can you explain further?"
- **Redirecting** is a way of building on one person's answer in order to get others involved in the discussion. Example: "She said …….. what do others think?"
- **Watch level of participation:** Look around and see who is participating and who is left out. Are people still interested?
- **Summarize:** Restate what people have said in a simple, brief form. This will make it easier for people to contribute.
- **Watch the energy level:** Look for signs of tiredness or boredom. When people get tired, change the activity, introduce a song, or take a break.
- **Be a good time manager:** Estimate how much time each activity takes, watch the time and set an appropriate pace for the group;
- **Be flexible in planning:** Create an atmosphere of flexibility, creativity and experimentation and develop insight into the learning process of the participants while using time efficiently to organize learning situations in a good sequence;
- **Be open and self-reflective***:* Be open to feedback from the participants about the way you work and take time to examine your own attitudes, values and ideas.

4. Different ways of encouraging participation

There are various different techniques to get information from a group and encourage participation. Whilst some are better for certain situations and according to group size and sensitivity of issues being discussed it is probably best to try to vary techniques to keep the sessions as exiting and interesting as possible.

- **Use warm-ups and energizers**: Warm-ups and energizers are not training techniques but they form an essential part of training. They are used to change the tempo of a session and encourage participants to move about and relax after spending time sitting in a discussion. Energizers should be active and humorous. Always be aware of the mood of the participants.
- **Use of questions during training:** The effective use of questions is one of the most important skills needed by trainers. By asking questions, you help the participants to think for themselves and it stimulates a process of discovery. If participants think about a problem and come up with an answer themselves, they are much more likely to remember the information than if you just told them that information as the trainer.
- **Use practical instruction**: Practical instruction is used to teach participants a skill, such as how to service a diesel engine or how to repair a hand pump. Practical instruction is based on the principle that people learn by doing. Practice time for every participant forms a major part of the training session.
- **Use discussions, hum groups and buzz groups**: There are various types of discussion techniques used in participative training courses. The most common are the paired discussion (sometimes called a hum) and the group discussion (sometimes called a buzz group). A paired discussion involves dividing participants into pairs and asking them to discuss a problem or task such as: "*List the factors that limit the availability of borehole spare parts in your area of operation*". During the plenary discussion for both hum and buzz groups you as the facilitator should ask probing questions to stimulate debate, share experiences and encourage participants to come to a consensus on issues, or agree to differ.
- **Encourage brainstorming**: One type of discussion method is brainstorming. This is a lively method used for gaining a rapid overview of participants' knowledge or ideas on a particular issue. A brainstorm should be run in 10-15 minutes. It is used to switch to a new subject; examine a subject very broadly; obtain 30-40 ideas quickly and to create a lively atmosphere and wake people up.
- **Use the debate**: The debate is useful for encouraging participants to think for themselves and identify key points for and against a particular issue. The participants also have to work as a team, decide which points to present during the debate and select a speaker to forward their views. An example of a debate can be technology choice between a solar powered or diesel powered water pump.
- **Come up with plays and drama for participants**: Plays and drama are extremely useful training techniques because they can be used to focus on real-life problems in an active way, especially where participants are encouraged to act out issues themselves. For example problem plays are used specifically to pose a problem or issue. A short play depicting a problem and lasting only two to three minutes is enacted at the beginning of the session. Participants are then asked to draw out and analyze the causes of the problems, discus how it related to their life situation and then to suggest solutions or strategies for tackling that problem.
- **Use pictures**: Pictures can be used to analyze issues that are difficult to depict in a play, such as overgrazing around a borehole. The picture used should show only one problem and should not show

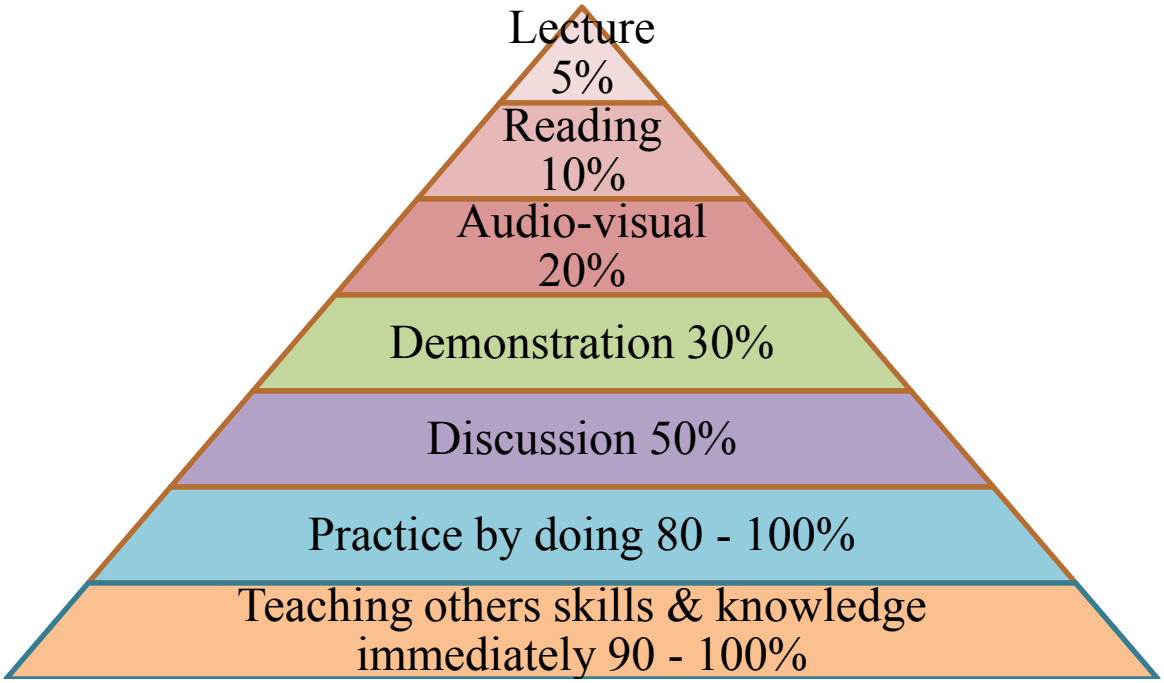
possible solutions. It should be a simple line drawing, avoiding too much shading and color, and with no abstract symbols that might confuse the picture.

- **Give participants exercises**: Exercises are used to give participants practice in certain skills and knowledge they have learnt. Examples include calculations of revenue to be expected at the end of the month based on volume of water consumed and number of consumers, etc. You as a facilitator can prepare hypothetical problems and tasks and then ask participants to work through them. These exercises can be used to test the skills and knowledge of individual participants and so you can ask each person to work alone. When everyone has finished the exercise, these can be discussed in plenary.
- **Use training visits**: During training visits, participants are taken to a specific site outside the training venue e.g. a public water point for livestock. Training visits are very useful for putting theory into practice in a real situation. It is important that the visit is well-structured with specific learning objectives.
- **Stories, songs, fables and poetry**: Many rural or pastoral communities belong to societies that have a strong oral tradition in which stories, songs, fables and poetry form an important part of cultural life. Stories can be told by the facilitator or the participants, and can be an effective way of raising important issues during training.
- **Use games**: Games can be used to raise issues about behavior and attitudes, such as how people behave in groups, conflict resolution, cooperation and team work. Games can also raise participants' awareness about how their behavior as individuals and as a group affects others in both a positive and negative way. The session should be structured with clear objectives and key learning points drawn out.
- **Use of training aids**: Training aids are used to help illustrate and reinforce key learning points during training. A wide variety of training aids are available such as flip-charts and colored markers, chalkboard and chalk, photographs, pictures, models, computer presentation systems e.g. video, slides and overhead projectors. The choice of training aids depends on many factors such as cost, electricity supply, literacy of the participants, the subject being covered in the training, etc.

5. Understanding Adult Learning Techniques

As the facilitator you need to be conscious of the best approach for conveying messages to adults. The method chosen for training adults influences the rate of learning and retention of new knowledge and skills. A combination of approaches is strongly recommended.

The Pyramid of Learning provides an indication of the relationship between the training approach and the level of information that is retained.



Pyramid of Learning indicates the retention level of information given to adults based on the method in which the information is given to the adults.

Example from the field:

Five borehole attendants being trained to service diesel engines in Samburu District in Kenya were far more confident and competent in simple servicing diesel engines and in identifying which parts were to be replaced because the trainer had demonstrated the process while they were all watching. After the demonstration, the most confident one was encouraged to demonstrate to others how to service the engine and explain the process clearly. Each one of them got the opportunity to demonstrate and explain to others the process. The trainer assisted the trainees with any problems, and checked that each individual had acquired the relevant skills by the end of the training session. When trainees understood the role of each spare part and which tools to use in the process, they were more eager to service the engines properly. Their increased confidence also showed itself in reduced engine breakdowns.

Lesson: Adults learn best when they do things practically and are able to teach others and use the skills and knowledge they have acquired immediately.

The following are various points related to adult learning:

a. Adults are often concerned that participating in a group will make them look weak, either professionally or personally

- Design training sessions that help people feel **safe** enough to ask questions and **confident** that they will be respected.
- Do not ask people to take **risks** too early in a workshop or course (for example, engaging in a role play exercise) unless they already know each other well.
- Provide opportunities and allow time for people to establish themselves in the group.

b. Adults bring a great deal of experience and knowledge to any learning situation

- Show **respect** for participants' experience by asking them to share ideas, opinions, and knowledge. Verbally **recognize** that they may be a good resource for reaching your teaching goals.
- Carry out a needs assessment before the training. This can tell you more about the individuals in the group. Or, if you already know the participants, you may realize that particular individuals can provide helpful input before, during, or after your session(s). See number 6 below.

c. Adults are decision-makers and self-directed learners

- Do not seek to make people obey you. Adults will do what they need to do.
- Be the **"guide on the side"** rather than the "sage on the stage".
- Listen to what they want and need and **be flexible** in your planning. **Seek feedback** from the group. Change your approach if your agenda or methods are not working

d. Adults are motivated by information or tasks that they find meaningful

- Conduct some type of training **needs assessment** so that you are aware of what people want (and need) to learn, how much they already know, and the kinds of "generative themes" that might affect their attention span.

e. Adults have many responsibilities and can be impatient when their time is wasted

- Be **thoughtful** and **kind**.
- Begin and end your session on time.
- Understand who is in the audience and why they are participating.
- Learn what questions they have about the subject.
- Don't cover material they already know unless there is a good reason for it.
- Recognize that your subject is only one of many that participants may be interested in learning more about.

6. Design of a training program

The design of training program requires certain steps to be considered. These are discussed briefly below.

A. <u>Training Needs Assessment</u>

a. *What is a training needs assessment?*

A training needs assessment is a structured participatory process that is used to identify the training that people need. The objectives of a training needs assessment are:

- To help establish the existing skills, competencies and gaps within the group;
- Understand the skills and competencies that are required to manage and operate the water project;
- Make an informed decision regarding the training required to bring the skills and competences to the required level.

b. ***How to carry out a training needs assessment***

You as the facilitator can use the Strengths, Weaknesses, Opportunities and Threats (SWOT) analysis tool to undertake the training needs assessment. For example, if you are training borehole operators or pump attendants, a SWOT analysis of the O & M operations will bring out the strengths, weaknesses, opportunities and threats of the O& M system of that particular water supply system.

The facilitator can also use individual interviews to obtain additional details on skills gaps within the WUA.

Individual Interviews for Skill Gap Analysis

The facilitator may also need to refer to other documents that provide information on the community. This information may include a Participatory Rural Appraisal (PRA) Report, Knowledge, Attitudes and Practices (KAP) report or other baseline studies regarding the situation in the target community.

B. Setting Training Objectives

The training objectives represent what we want the participants to have achieved by the end of the training. As observed from the TNA above, the training objectives are based on the learning needs identified and they also provide a basis for the design of the training program. In keeping with the principles of using a *learning* approach as opposed to a *teaching* approach, training objectives are written from the point of view of the participants and not the trainer.

Training objectives include skills, knowledge and attitudes. For example, "*By the end of the training, the participants will each on their own be able to service a water pump*".

Step 1:
Identify what the greatest capacity gap among participants is i.e. the core capacity need, which if addressed would contribute to other learning needs being addressed more easily. This gap, if turned into an opportunity, becomes the overall objective of the training program.

Step 2:
Cluster the other gaps into 3 or 4 groups depending on how closely linked they are to each other. These, if turned into capacity building opportunities, become the specific objectives of the training. Each of them contributes to the overall objective of the training.

Step 3:
Develop the training course content and approach once the training objectives are known.

C. Developing the Training Course Content and Approach

a. List the topics that will be covered in order to meet each of the specific course objectives;

b. Decide how many topics are required to cover each objective;

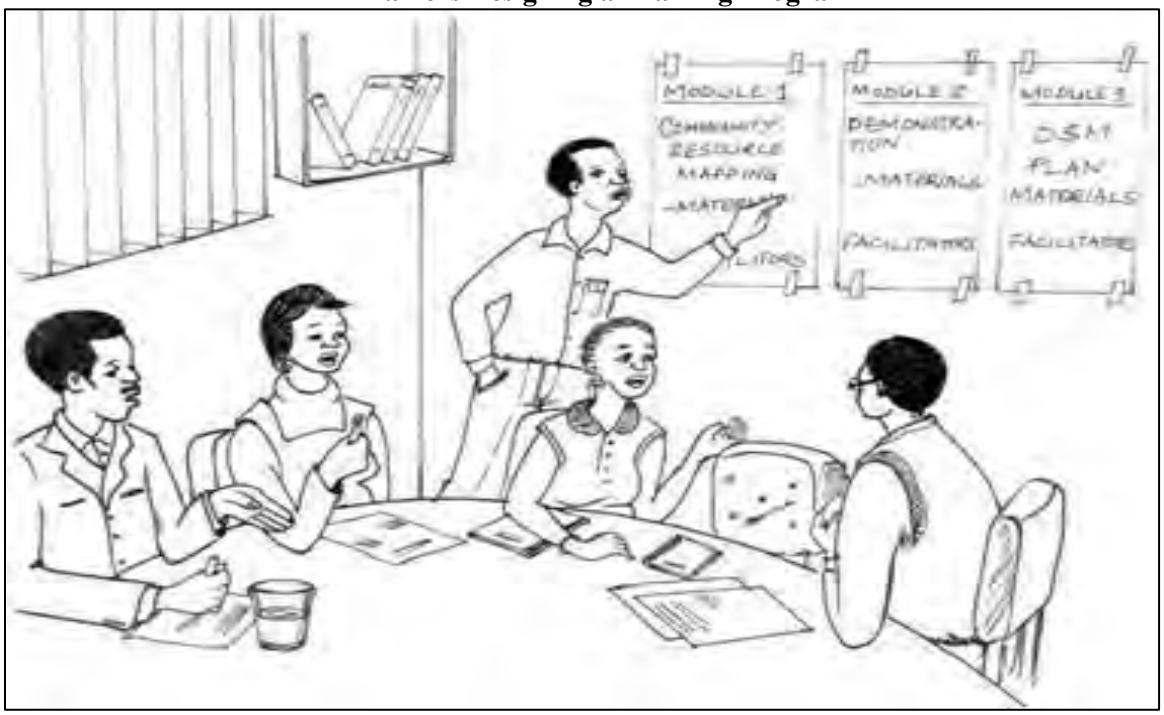
c. Break each topic down into sessions. A session usually lasts one to two hours. **Note**: a single topic may require several sessions;

d. Prioritize the topics to be covered;

e. Develop a timetable for the training course outlining how each session and the time required;

f. Decide on the most appropriate training approach to take. If most of the participants are illiterate, then training methods that do not rely on reading and writing are required. This will also affect the way training materials are prepared.

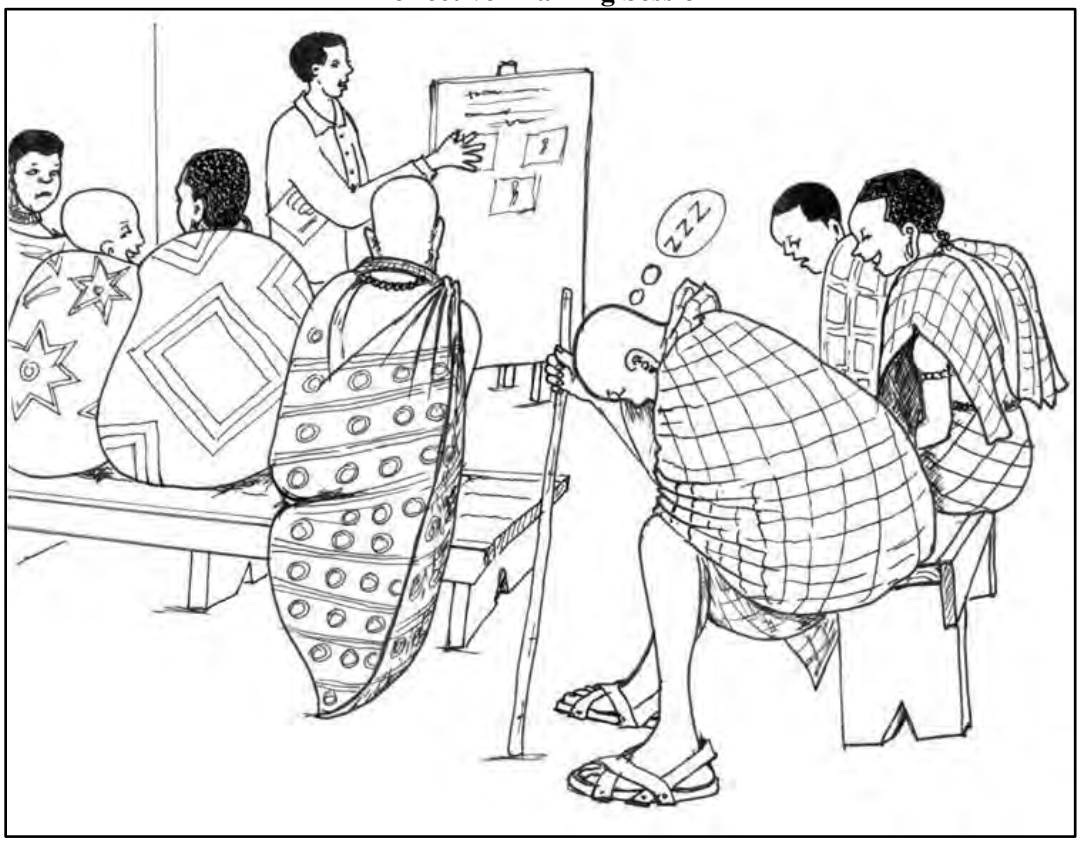
Trainers Designing a Training Program



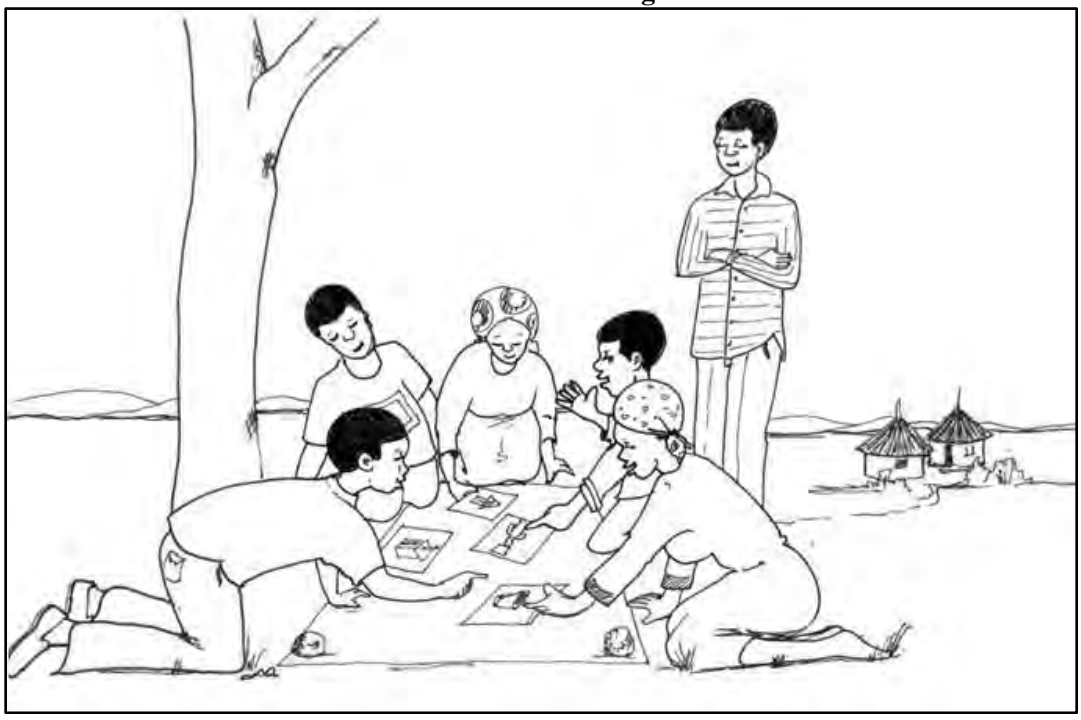
D. Addressing the needs of illiterate participants

The picture illustrations below show effective and ineffective training of illiterate participants:

Ineffective Training Session



Effective Training



To effectively train participants who are illiterate or semi-illiterate, the following participative training techniques are suggested:

a. Ensure that training techniques include visual aids such as pictures and photographs or videos;

Training Session

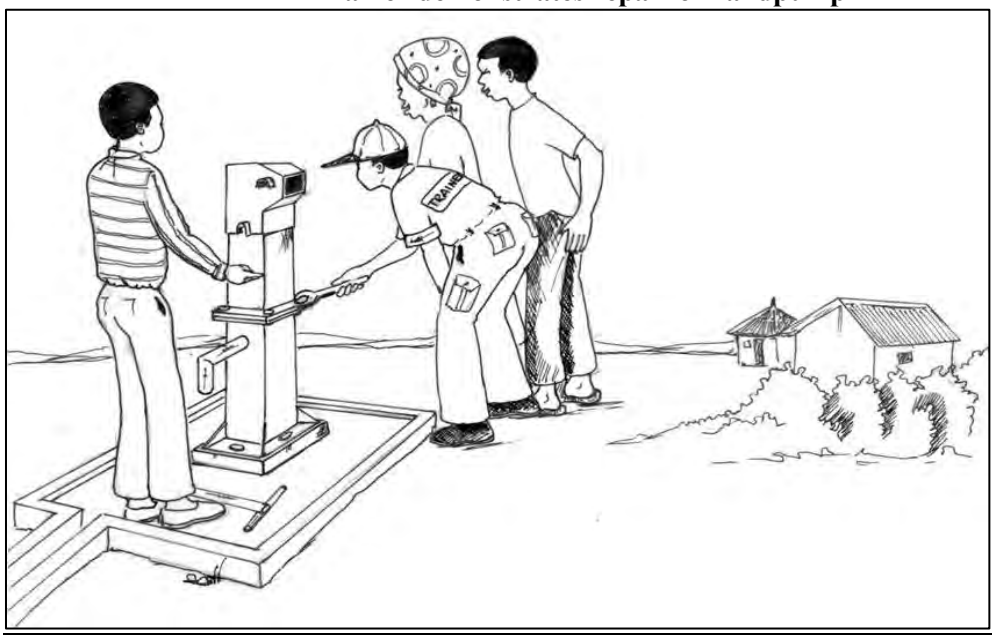
b. Promote the narration of relevant stories; use of songs, fables; poetry; games and use of models;

c. Use training visits i.e. visit a local water supply point for participants to see for themselves; Ensure group discussions on the learning points takes place as much as possible;

Focus Group Discussion

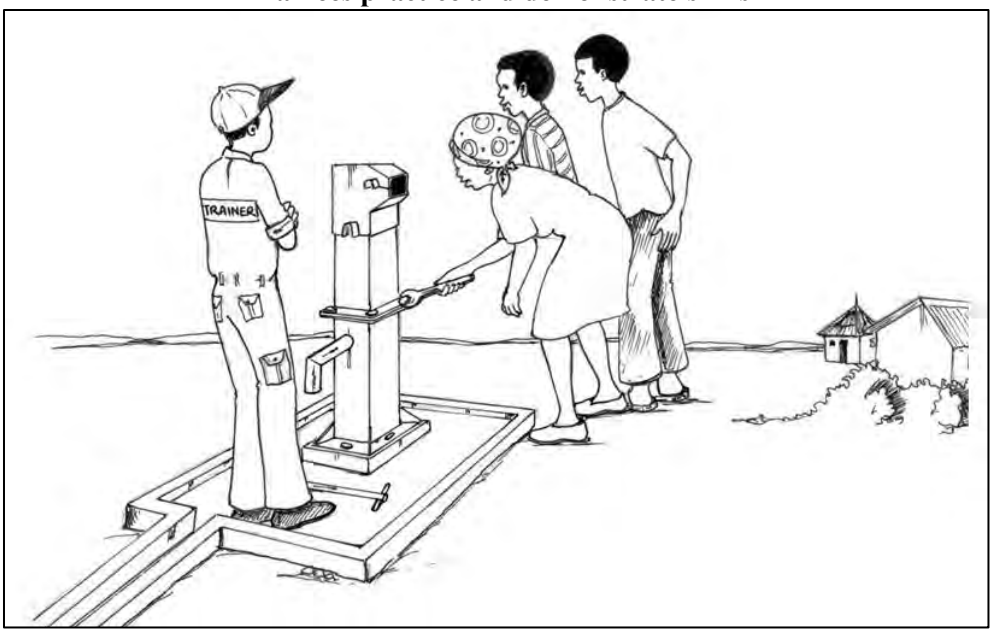
d. Make sure that the facilitators demonstrate skills to participants as much as possible;

Trainer demonstrates repair of handpump



e. Make sure participants have sufficient time during the sessions to practice learned skills as much as possible;

Trainees practice and demonstrate skills



f. Ensure there is time for participants to simulate situations where they train others by explaining how the new knowledge and skills work in real life. This is because when they explain to others, ideas, knowledge and skills are retained much more than if they just practiced and it ended there.

E. How to develop and conduct individual training sessions

From the overall timetable of the training course, each session in that timetable ought to be planned for in detail.

a. Developing individual training sessions

Step 1: Set the objective for each session: The objectives of a session define exactly what it is you would like the participants to be able to do by the end of the session. This keeps the session focused and ensures all the learning points are covered, with you being able to assess the extent of learning by participants.

Step 2: **Ensure that the objectives are measurable:** This means that the objective should detail a specific action that the participants will be able to perform at the end of the training session. Objectives should include words like, "list", "explain", "describe" or "construct". Avoid words like "know" or "understand". They are ambiguous.

Step 3: **Decide the content of the session**:

- Brainstorm with colleagues all the important subjects and learning points;
- Arrange the subjects into a logical order;
- Break the session into a series of clear, simple steps that can be assimilated easily by the participants;
- Ensure each subject is linked to the next to ensure a step-by-step process; and
- Write down the key learning points for each subject.

Step 4: Decide which training techniques to use during the session

- Throughout the training course, use a variety of techniques to make the training as interesting and stimulating as possible;
- Use role plays, exercise, games, case studies, drama and puppets, etc. instead of relying on one or two methods alone;
- Use practical instruction where you are teaching or imparting a skill – "people learn by doing";
- Where participants are illiterate, use appropriate training techniques which do not rely on reading and writing;
- Add more details to the session plans e.g. plan open questions for the participants, write out key learning points, note the timing for each section of the session, and list what equipment and training aids will be used.

Step 5: Write final version of the session plan in detail

- Write down the session plans clearly and neatly so that they can be read easily;
- Using a highlighter pen, make key points stand out and where appropriate use capitals to make the session plan easier to use.

b. How to conduct a training session

i. Tell participants what you are going to cover. Introduce your session with a brief overview of the session's main points;

ii. Tell them the information. In the main portion of the session, explain key points, go over policies, demonstrate procedures, and relate any other information participants need to know;

iii. Tell them what you told them. Conclude with a summary of your opening overview. Use repetition to help participants grasp and retain information;

iv. Always explain what participants are going to see before you show a multimedia portion. This practice creates a better learning environment by guiding participants to know what to look for and what to remember. Explaining the purpose of the multimedia ensures an effective reception for its information;

v. Use as much hands-on training as possible. The most effective training uses all the senses to affect learning. Demonstrate and apply teaching points to create greater understanding and knowledge of the subject;

vi. Test frequently. Tests are most effective when students know they will be quizzed, because they'll pay close attention to the material. Testing is an objective way to determine whether training achieved its goals;

vii. Involve participants. For example, ask participants to share their experiences with the session's topic. Many participants are experienced people who have valuable information to contribute. All participants will get more out of sessions by hearing about the experiences of other participants on the subject —and not just the trainer's lecture points. Hearing different voices also keeps sessions varied and interesting. Structure interaction time into all your sessions;

viii. Repeat questions before answering them. This practice ensures that all participants know what the question is so they can make sense of the answer;

ix. Analyze the session as you go. Always be on the lookout for what works best. When you discover a new technique or method that clicks with the group, note it on your training materials so it can be incorporated into the training outline to be used in future sessions;

x. Keep your session on track. Start on time and finish on time. Don't hold up class waiting for late arrivers. Run the class according to the schedule and don't get too far off course. Opening up discussion among participants may lead to some pertinent tangents, but don't let side issues take over. Ask if there's enough interest to pursue a separate session on that topic, but get this session back to the learning plan;

xi. Put yourself in their shoes. Give frequent breaks, especially for half-day or all-day sessions;

xii. Solicit feedback on the training session. Critiques work best when they are written and anonymous, unless a participant volunteers to discuss his or her thoughts in person. Participants' input is vital for making the next session—and the overall training program—more effective.

F. Developing the Training Materials

Training materials are the materials that the facilitator uses as a guide during the training to ensure that he/she covers the topics using the approaches that he/she has identified as being most appropriate for conveying key messages.

Training materials will include the following:

- Training timetable for the whole course;
- Individual sessions plans written down in detail, including specific activities and exercises in each session;
- Handouts;
- Case studies – written down and made available for each participants;
- Visual aids such as pictures, photographs, models, videos, etc.
- Presentation slides on power point presentations;

- Equipment and other materials such as writing materials, pens, markers, flip chart paper and stand, power point projector, etc.

Prepare all these materials and equipment before the training and ensure they are at the venue on or before the day the training course commences. You need to know which materials and equipment will be required for which session.

G. Selection and training of facilitators

a. Selection of facilitators

Good facilitators should have the following qualities and attributes:

- Ensure the individual has the right behavior, attitude and facilitation skills necessary for effective facilitation. This can be achieved through interviews, observation, etc;
- As much as possible, ensure the facilitator is of the same ethnic group as the participants. This facilitator would know the local language and understand the local culture and sensitivities;
- The facilitator ought to be humble and approachable;
- Have a warm, open, friendly and polite personality;
- Considers him/herself on an equal level to the participants;
- Respects the culture, traditional beliefs and practices of the participants, even if he or she does not share these beliefs;
- Respects the experience, knowledge and skills of the participants;
- Is able and willing to listen to participants and to learn from them;
- Has a genuine desire for the participants to learn;
- Is able to create a safe learning environment so that participants feel confident to express their views and to ask for help if they do not understand something;
- Is flexible and able to respond to participants' needs;
- Has good technical knowledge of community-based water supply systems;
- Is well-organized and a good planner;
- Has good rapport with participants and with the community in general.

b. Training facilitators

Training of Facilitators or Trainers (TOT) is a training course that is designed and conducted specifically to provide participants with knowledge and skills to be effective trainers. A TOT course is frequently used to raise the facilitation skills of people with technical knowledge and skills.

A training of facilitators program should include the following:

- Facilitation skills;
- Participative training techniques;
- How to design training courses;
- How to plan different sessions in a training course;
- How to plan and implement a training event;
- Training on community-based water supply management;
- Cross-cutting issues in community-based water supply management systems.
- Some technical aspects of water infrastructure development e.g. different technology choices;
- Project cycle management;

- Use of participatory rural appraisal tools in training;
- Resource-based conflict management and resolution;
- Water supply during emergencies or crises, including contingency planning measures;
- Water sector reforms or policies and regulations – national water policies and strategies;

H. Planning and implementing the training course or event

A good training program is one that is geared towards meeting the training needs of the participants as much as possible. The following seven steps should be followed in designing and implementing a training course or event:

I. Monitoring the learning process during the training

Monitoring the training/learning process is essential to making the training meaningful and keeping it on track.

- Monitor those components of training that are the focus of that particular training course or session;

- Before the training, develop a baseline for the participants with regard to their knowledge, skills and attitudes on the training course content so that you can monitor progress in learning against this baseline;
- Develop a progress monitoring score card e.g. of 0-10 points and score for knowledge, skills and attitude for each session or day of the training. Maintain consistency in the use of the score card;
- Ask questions, assess how well each individual answers questions and carries out exercises, tasks and performs skills;
- Ensure each participant takes part in the training sessions;
- For assessment of knowledge – have a question list based on the topic or session covered; for assessment of skills – use observation. Watch the participant practice the skill; to assess behavior and attitude- use observation: observe the participant working with WUA members; observe communication skills; how well the participant asks questions and is able to gather information on the water facility as well as the general behavior towards community members in general (open, friendly, respectful).

J. Evaluating the training course

Courses are rarely perfect and there is always room for improvement. Evaluating the course provides invaluable information on how the training can be made more effective and should form an integral part of the training cycle. When evaluating a training course, ask yourself the following two questions:

- What do I want to know about the training from the evaluation?
- How will the information from the evaluation feed into the course, and help me to improve the training?

It is important that the evaluation of the training is carried out in a sensitive and participative manner so that the participants do not feel they are being examined.

- Explain to participants that you are evaluating the training to make sure they have learnt what is required for them to carry out their work, to improve the course for next time and to arrange for follow-up and refresher training;

- Evaluate the training with reference to the course and session objectives.

An example of areas of the training course that should be evaluated:

1. Ask whether the specific objectives of the training course have been met;
2. Ask whether the course was relevant to the participants' work and if so why;
3. What did you like about the overall design and structure of the course?
4. How do you think the design and structure of the course can be improved?
5. What is your assessment of the presentation and facilitation of the training (poor; adequate; good; very good?);
6. What are your comments on the trainer/facilitator in terms of delivery of training and facilitation of learning?
7. Which session did you find most useful and why?
8. Which session did you find least useful and why?
9. Was there anything not included in the training that should have been included? What is it?
10. How would you rate this training course? (poor, adequate, good, very good);
11. Any further comments?

K. Mentoring as part of the training program

The objective of mentoring or coaching is to ensure effective knowledge retention; imparting of skill and change in the way the trainees do things (change in attitude). Mentoring is therefore a combination of activities over time that aims to bring about change in the way those who have been trained perform their tasks or responsibilities.

- After the first training, agree with participants on a performance scorecard based on the objectives of the concluded training;
- Develop SMART indicators with the trainees to monitor performance of tasks e.g. improvements in record keeping; less breakdowns in borehole equipment; increased revenue collection, etc.
- Agree with the trainees how regularly you need to visit, say once every three months, and how often you need to keep in touch by phone and how the trainees can access you when they need support;
- Go back and visit the trainees as agreed with them so that you can assess their skills and knowledge based on the indicators developed with them;
- Conduct the assessment in a methodical way, with each trainee being asked the same questions;
- Remain in constant communication with all the trainees in order to provide instruction or advice and to find out how they are doing. Develop a trust relationship with the trainees so that you are able to influence their learning and way of doing things.
- Agree on indicators that will show that the training has accomplished its objectives. Once these indicators have been met, the disengagement phase is imminent.

L. Defining an exit strategy

A training program or capacity building through training, refresher trainings and mentoring support cannot go on forever. Once you have agreed with the trainees that the training needs identified at the beginning of the training program have largely been met, a disengagement phase has to be implemented. The goal of an exit strategy is to ensure sustainability of program impacts after it has ended. This may require you to do the following:

1. Develop criteria for exiting;
2. Formulate measurable benchmarks of progress in meeting the criteria;
3. Formulate exit approaches to be used e.g. handover capacity building responsibilities to the relevant local government department e.g. Ministry of Water & Irrigation or private sector operator;
4. Develop a timeline for the exit process;
5. Agree with participants (trainees) and the community on action steps, timeframe, resources and responsible parties (i.e. draw up a Community Action Plan (CAP); and
6. Mechanisms to assess progress in implementing the exit strategy

Establishing and maintaining clear communication with trainees and communities about the exit process helps lead to successful exit and sustainable training program impacts. A post-training program evaluation may be a valuable tool for understanding the sustainability of program outcomes and for improving the design and implementation of exit strategies.

MODULE A
SUSTAINABILITY

<table>
<tr><td>MODULE A</td><td>SUSTAINABILITY</td></tr>
<tr><td>SESSION A1</td><td>THE CONCEPT OF SUSTAINABILITY</td></tr>
<tr><td>Introduction</td><td>Sustainability of community managed water projects is a desirable state but difficult to achieve. This module aims to get participants thinking about what a sustainable water project really means and how this relates to problems that typically plague water projects.</td></tr>
<tr><td>Objectives</td><td>To identify what is needed to make a water project sustainable and relate this to their water project.</td></tr>
<tr><td>Outputs</td><td>Participants are clear on the meaning of sustainability</td></tr>
<tr><td>Timing</td><td>40 minutes</td></tr>
<tr><td>Target Group</td><td>Community members, WUA/CBOs leaders, operators, artisans</td></tr>
<tr><td>Appropriate Venue</td><td>A place where participants can clearly hear and participate in the discussions and where distractions are minimised.</td></tr>
<tr><td>Methodology</td><td>Group discussions</td></tr>
<tr><td>Materials</td><td>Pens, flip chart paper, illustrations from Tool 1 (attachments)</td></tr>
<tr><td>Session Guide</td><td></td></tr>
<tr><td>Notes to Facilitator</td><td>Various points regarding sustainability of water projects are listed below.
<table>
<tr><th>Sustainability Factor</th><th>Sustainability Qualifiers</th></tr>
<tr><td>Policy context</td><td>• Policy does not dictate management arrangements
• Capacity is sufficient to implement relevant policies
• Donor practices promote local procurement and/or production
• Government attitudes and practices do not hinder indigenous private sector participation</td></tr>
<tr><td>Management and institutional arrangements</td><td>• Institutional support for community management is budgeted and provided for
• Private sector alternatives to community management are investigated and promoted
• Government capacity is sufficient to fulfil regulatory and monitoring roles</td></tr>
<tr><td>Financial issues</td><td>• External support is minimized and implementation strategies include self supply
• Sustainable subsidies are developed to serve the poorest and most vulnerable
• Transparency and accountability measures are in place for financial management bodies (Government and non-governmental)
• Realistic cost-recovery targets are clearly defined and water tariffs set accordingly
• Sustainable community financing strategies are developed</td></tr>
<tr><td>Community and social aspects</td><td>• Communities are presented with a range of management models to choose from
• Demand is stimulated based on a wide range of community needs (i.e. not just health)
• Community cohesion is not assumed and heterogeneity is recognised as appropriate</td></tr>
</table></td></tr>
</table>

		• Differing levels of poverty are recognized and targeted subsidies developed where needed
	Technology	• Appropriate technology choice is promoted, especially that which is closest to the user • Flexibility in technology options is available and communities have a real choice • There is limited or no importation of specialist equipment • Private sector capacity is developed for drilling and development
	Environment	• Groundwater monitoring systems are in place for water quality and quantity • Government regulation and monitoring of private sector operators and water resources occurs
	Supply chains	• Supply chains for spare parts are linked with manufacturing, technical services and/or pump sales • Indigenous private sector development is promoted with realistic incentives • Non-profit sector support is utilised where no other options are commercially viable
Step 1: Guided discussion using case studies	Different case studies are presented to stimulate a discussion on sustainability. Facilitator should use one or more of these case studies and present either as case studies or adapted as role plays and used for group discussions. Facilitator should present the case study and follow up with questions and discussions **Scenario A - Hand pump** A hand dug well is constructed and fitted with a new hand pump which enables jerry cans to be filled more quickly thereby reducing queuing times. As the well is also closer to the village, women are spending 1-2 hours less per day fetching water. Because no attendant is assigned responsibility of looking after the water point: hygiene around well deteriorates; stagnant water provides a breeding ground for flies and some children get sick. Also children play with the pump, damaging the handle. Preventative maintenance checks (e.g. greasing of chain, tightening of bolts) are not carried out on the pump and it soon breaks down. The village opens up the manhole cover on the well and returns to using rope and bucket system. Water quality deteriorates further and drawing of water becomes less efficient. Queuing time for water collection increases and people complain that the water is dirty again and more children are getting sick. In response to the broken pump the administrator assigns one person as an attendant, however the damage has already been done – the pump is no longer working. No one within the village knows how to repair the pump. Two men were trained	

but both left the village to find work. Although a tool kit was donated to the village, these were taken by individuals and not returned so even if the technical know-how was available the necessary tools to repair the pump are not. Because preventative maintenance was not carried out, the cost of repairing the pump is now much greater. However because no charging system was developed by the committee, the village cannot pay for the required spare parts or the costs of a mechanic to come to the village.

Ask the group to discuss what they could have done differently as a committee to avoid this problem: (the facilitator may guide the discussion but information should come from the group)

- A system for retailing the water should have been agreed before the project was finished and implemented at start-up.
- Somebody should have been assigned responsibility for looking after the pump and well. This person could be paid from revenue collected from the water charges and ensured children knew how to operate the pump correctly and maintained the hygiene around the well.

Scenario B – Solar pump

Although the WUA is aware that there should be a charge for water to cover operation and maintenance costs, an ongoing drought where people have lost livestock will make the water fees to be waived for the first few months following installation of the pump. When a meeting is held to discuss the issue, there is disagreement within the village about payment. Eventually a tariff of 2 shillings per jerry can is agreed but because people used to get water for free they are reluctant to pay and revenue collection is low.

A pump operator and watchman are identified by the village chief to guard the pump and turn it on/off but there is rarely enough money to pay their salaries. Consequently neither is well motivated and they frequently do not turn up at necessary times. This affects the service level and results in long queuing times for water and some people going back to rely on traditional shallow wells (where water quality is poor).

Hygiene around water kiosk and animal watering troughs is poor because no-one is assigned responsibility to maintain cleanliness. This results in a significant loss of water and formation of stagnant conditions. This increases the incidence of diarrhoea within the village.

Solar panels are also not cleaned and this contributes to reduced power and less water. One evening when neither the operator nor guard are on site, a thief steals 3 of the 8 panels effectively paralysing the system.

The chief organises a harambee but the community is unable to afford the cost of new panels. The villagers return to their traditional sources and wait in hope that a non-governmental organization (NGO) or the Government will come and support them with replacement parts. The only NGO in the area is reluctant to invest again only 12 months after fully funding the costs of the initial system.

What could/should have been done differently?
This is also an opportunity for a role play. The donor visits the village to monitor how successful their investment was but they are very shocked to see that the system is not functioning. They want to know why the committee despite considerable training and assurances that they would manage it responsibly have failed in this task. Split the group into two with half the members pretending to be the donor and half are water committee members and have a discussion about how it happened and what could have been done differently.

Scenario C – Poor Management and Dependency
Village X in District Y is a large centre of 4,000 people. The water system was initially constructed with donor money and during the severe 2005/06 drought the same donor stepped into support repairs to the system and operational costs (fuel subsidy) because this is a strategic water source and livestock were dependent on it.

During a follow up visit the donor passes through the village and is keen to see how the community is managing the project. One water kiosk is not functional (door fallen off and no taps functioning) and at a second kiosk, only one of the three taps is functioning and this is leaking profusely as the pipe is being held together with a plastic bag tied with string. Consequently people are siphoning water directly from the reservoir with a hose (or lowering a bucket in to the tank) and the women queuing at the kiosk have to paddle through muddy water.

Break into groups and look at the problem from the perspective of one of the three groups:

1. **Women in the village (water users)**

You can remember how nice the kiosks used to be when the water system was finished. There was no queuing and animals were watered and people fetched water from different places. Since the kiosks developed problems, queuing for water has increased and the quality of water has deteriorated. Sometimes you have to take the same water as the animals directly from the trough. Recently you have noticed that your children are getting sick more often and worry that it is because of the water.

2. **Donor**

You are very disappointed that despite the significant investment and training programme your organisation has provided within less than 2 years the infrastructure and service level has deteriorated and the community has not been able to carry out any repairs. What makes you angry is that the committee are asking for further support to repair taps, an activity that would cost less than 5,000/-. The committee confirms to you that they have 250,000/= in their bank account generated from water kiosk sales, however they cannot explain why they have not repaired the broken taps. You have recently carried out an assessment and know that the water situation in other villages is worse as they have not received the same level of support from government or donor funds, so there is no way your organisation would be prepared to invest more money when the village has not managed previous investments well.

3. Committee

You received a lot of training from the agency that supported construction of the water system and have been banking the revenue collection. Water users complain that repairs are not carried out, water points are overcrowded and dirty and they now have to spend more time than they used to collect water. They do not trust you and there are rumours that committee members are profiting themselves and not re-investing on maintenance of the system. Justify yourself to the community and the donor who wants to know why things are falling apart.

Scenario D – Borehole system with genset and submersible pump

When the borehole system is finished the service level is very high. The need to pay for water to buy fuel is well recognised by all community members as they were involved in the project planning and design process.

Within the village there are three public water kiosks and several private connections. Because private connections are often closer and have fewer queues, some of the private connections become vendors and start to charge for their water. This enables them to profit from the water but deprives the central committee of much needed revenue. Consequently the revenue collected is rarely sufficient to supply sufficient fuel and as a result the pump can only operate for 4 hours per day which is insufficient to pump enough water to meet all the needs of the village.

The poorest section of the community is unable to afford the costs of paying for the water and consequently do not benefit from the project, continuing to rely on traditional sources, more distant and prone to contamination (the WUA had met to discuss concessions for the poorest households but no agreement could be reached).

Although money is collected at water kiosks and fed to the WUA without misappropriation, the committee does not keep proper financial records. When false rumours surface that WUA members are taking funds, the lack of transparency means that the WUA is not able to disprove them. Consequently dissatisfaction grows, collection of fees lowers and a vicious circle arises as service declines and users become more reluctant to pay. This is exacerbated by rumours that some of the richer community members are allowed to water their livestock without paying the full costs.

Consequently the WUA cannot afford the fuel costs to operate the generator, the standard of service reduces and eventually the system is reserved for the dry season when surface sources dry up. This results in the system not being used optimally and very low service levels.

What could the WUA have done to avoid some of these problems?

<table>
<tr><td>Step 2: Identifying aspects of sustainability through analysis of diagrams</td><td>This tool requires the use of the diagrams in Attachment 1.

1. Break participants into pairs or small groups
2. Provide each group with a diagram from Attachment 1.
3. Ask each group to analyse the diagram and explain:

• What the diagram shows;
• What may have contributed to the situation shown in the diagram;
• What should have been done to prevent the situation shown in the diagram, with respect to roles and responsibilities of the water users, management committee, operators</td></tr>
<tr><td>Step 3: What is sustainability for the WUA?</td><td>This step aims to summarise the discussion and points made from Steps1 and 2.

Ask the participants “How can you tell if a water project is being managed sustainability?”

List all their ideas on a flip chart.

Incorporating the answers from the group discussion, develop an understanding of what sustainability means to the community water project.

Sustainability for a water project is being achieved when:

o The water sources are not over-exploited but are naturally replenished;
o Water systems are maintained in a condition which ensures a reliable and adequate water supply;
o The benefits of the supply continue to be realized by all users indefinitely;
o The service delivery process demonstrates a cost-effective use of resources that can be replicated;
o The water supply system is maintained in a condition which is able to provide water services to meet the needs of the growing population and increasing water demand without external support.

The diagram below can help to illustrate the concept of sustainability. The x-axis shows time and the y-axis shows the level of benefits. At project completion, a certain level of benefits is achieved. Thereafter the project may provide increasing or declining benefits, depending on the management of the project. A sustainable project is one where the level of benefits is equal to or better than the level of benefits obtained at project completion.</td></tr>
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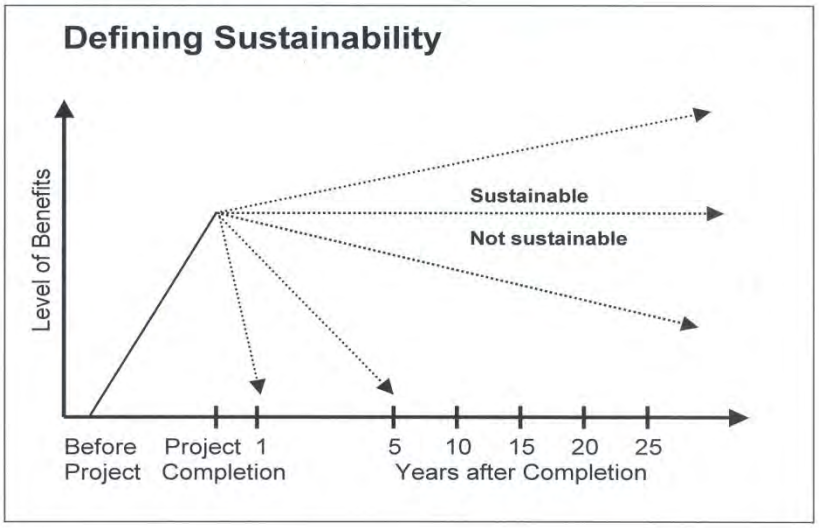
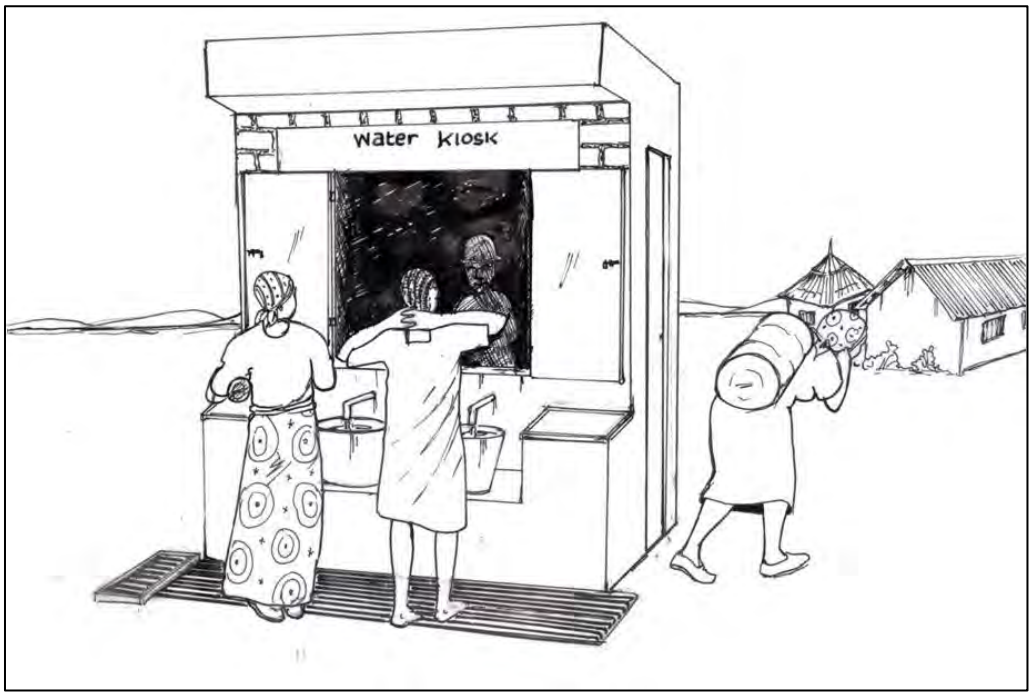
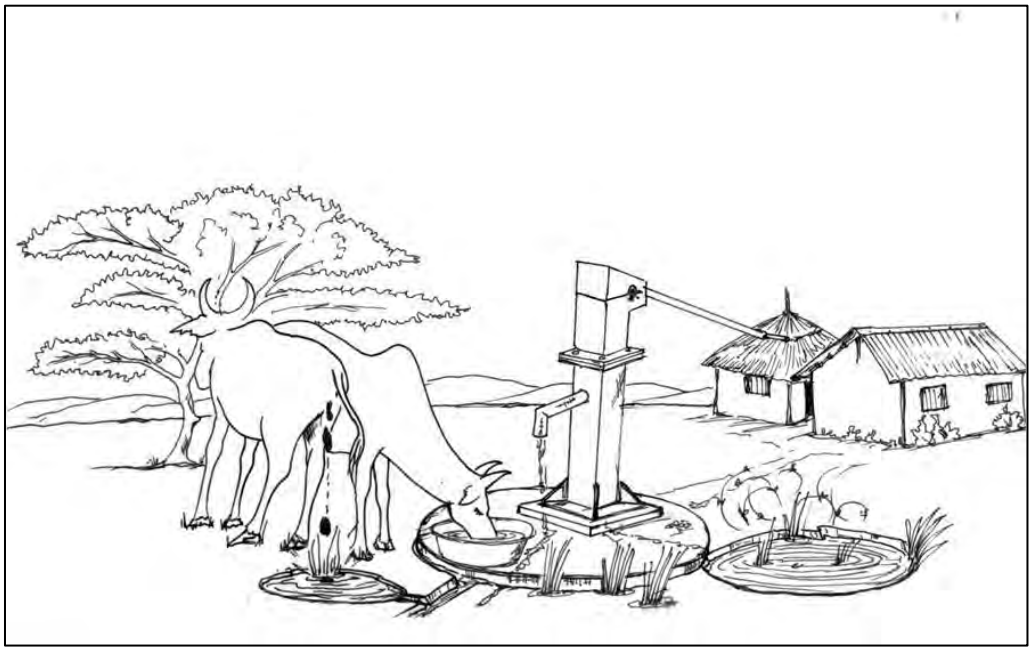
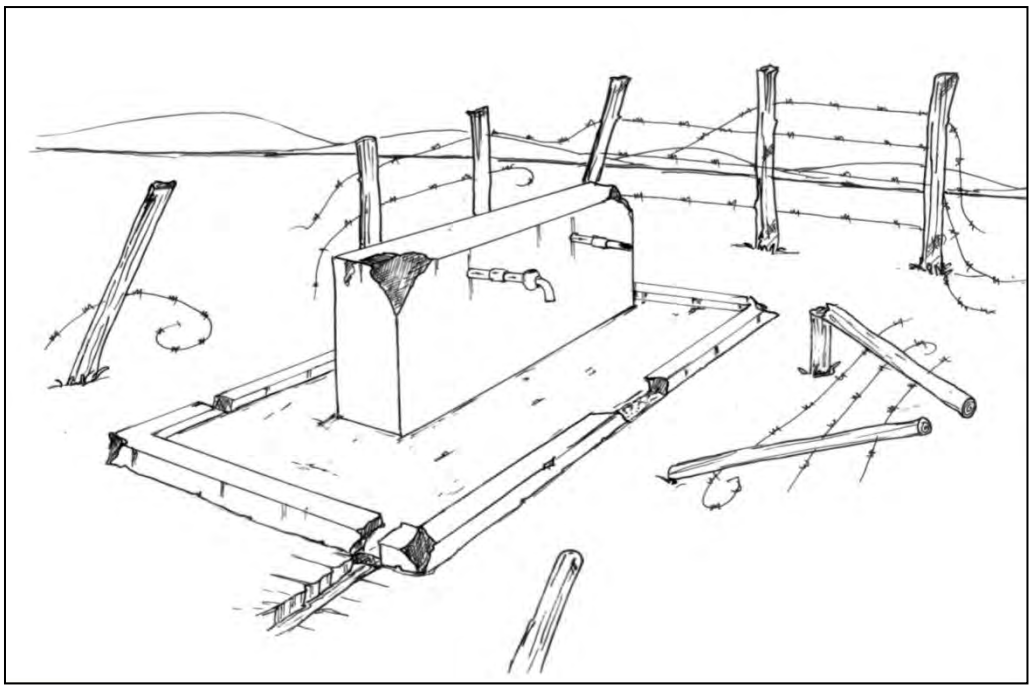
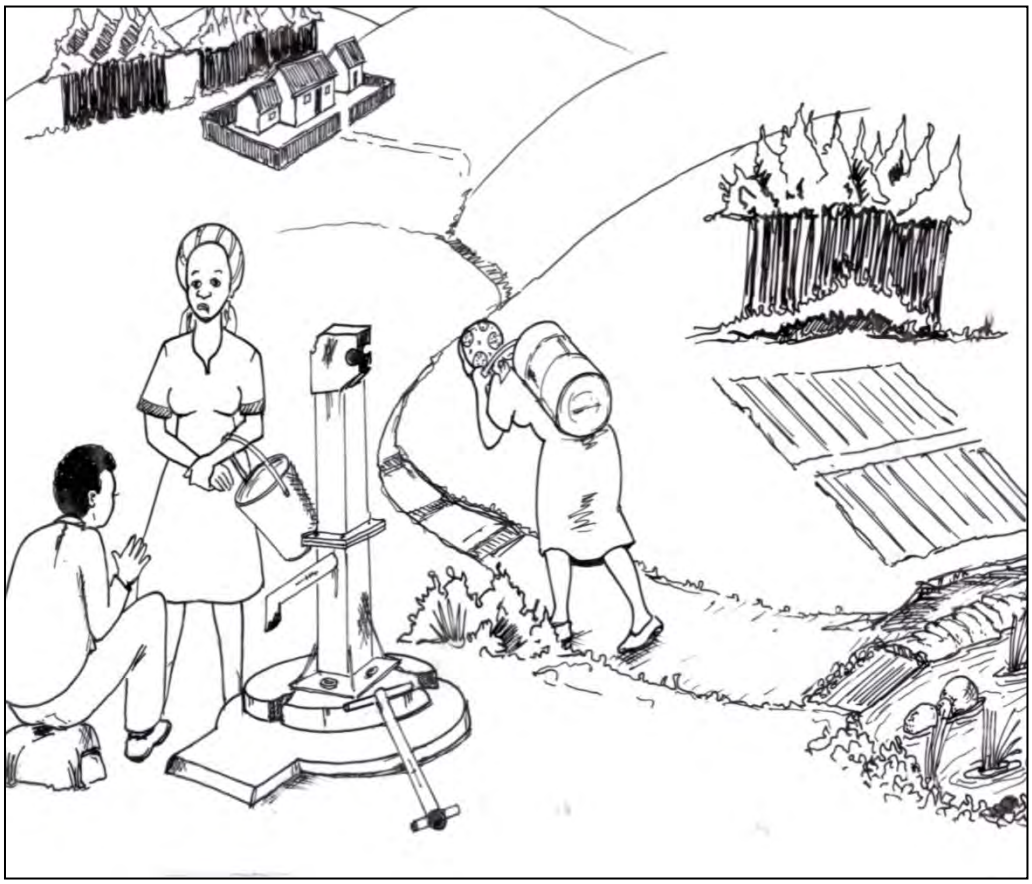
	
Review questions	What are the indicators of a water project that is being managed on a sustainable basis?
Session Attachments	Attachment 1: Tools to provoke discussion

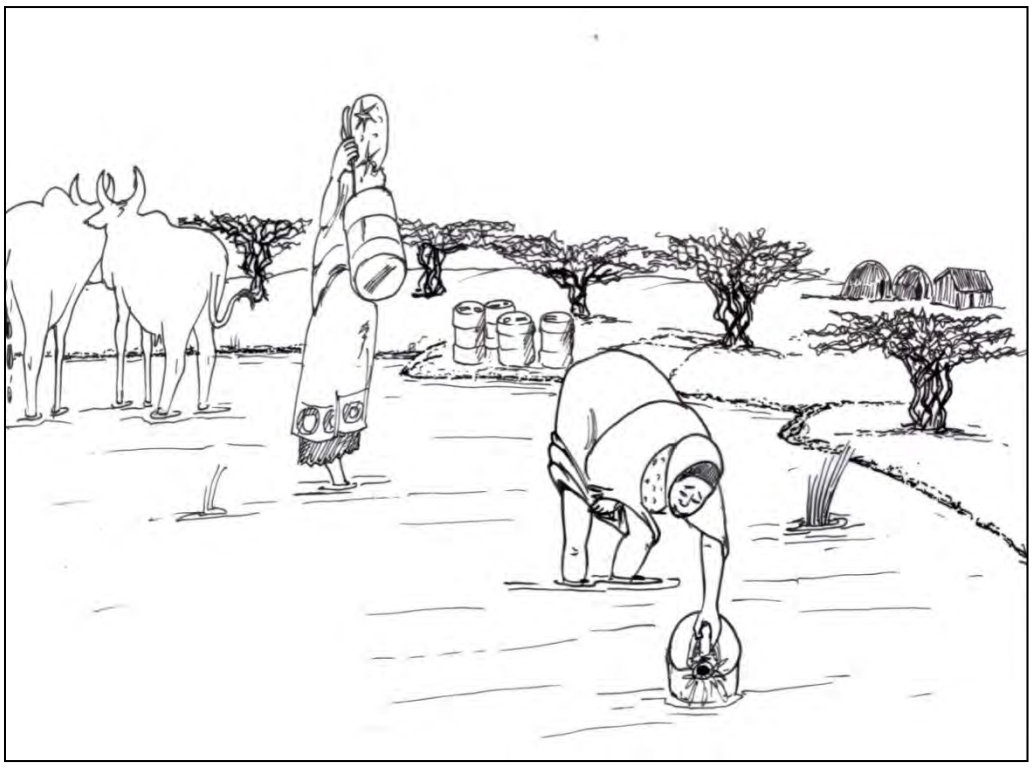
Attachment 1: **Diagrams for discussion on aspects of operation, maintenance and sustainability**

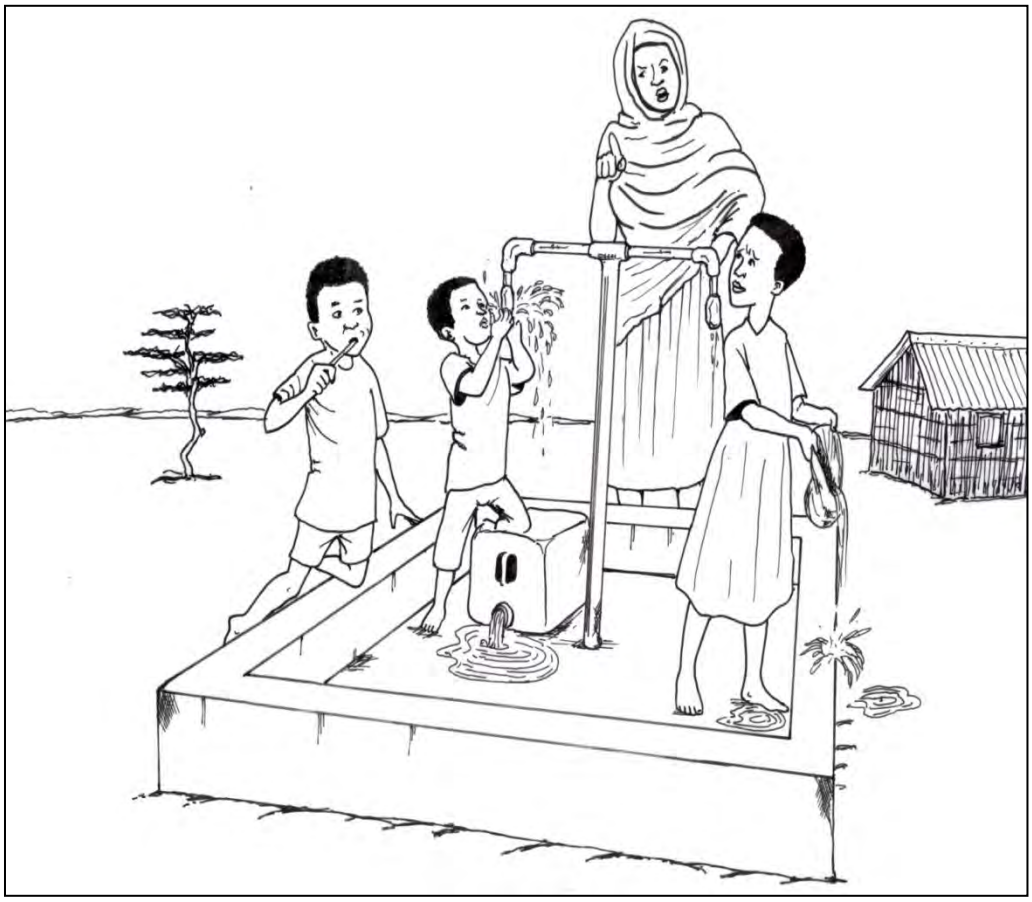












MODULE A	**SUSTAINABILITY**
SESSION A2	**EMPOWERMENT OF WATER USERS**
Introduction	Raising awareness amongst water users of their critical role in holding their WUA committees accountable.
Objective	To make the members aware of their rights, related to access to water services, information and the collective power they have in holding their leaders accountable.
Outputs	Water users' action plan to ensure accountability of committee members
Timing	1 hour
Target Group	Women groups, chiefs, school health clubs, individual households, elders, opinion leaders, and religious leaders.
Appropriate Venue	A place where participants can clearly hear and participate in the discussions and where distractions are minimised.
Methodology	This is not a discrete session which has to follow the agreed format. There may be specific public meetings to tackle the issue but equally important are focus group discussions, meetings with key informants and household visits. The target audience includes community groups, opinion leaders and community members. Emphasising the collective power of communities throughout the course of a training programme and at different points of a project life will be more effective than a one-off training session on the topic. The facilitator needs to be sensitive and balance this awareness raising and empowerment against the possibility that committee members may feel threatened, and be skilful in ensuring that any existing mistrust does not overpower the purpose of the training.
Materials	Felt pens, flip charts
Session Guide	
Supporting Information	Issues of accountability, management indicators and community corrective action.

Issue	Management Indicators	Community Action/checks
Financial Management		
Accountability	Proper book keeping issue receipts against payment for water, invoices for all payments made, stock book	Develop system of auditing by users
Appropriation of funds		Review income against expenditure
Transparency	Water meters as a mechanism to check against lost water/revenue against the collected money	Insist on installation of meters.
Water charging	Up to date records	Ensure WUA maintain paperwork and make it available for inspection
Leadership		
Elections	Fair elections procedures defined within constitution and followed	Insist on limited term of office and democratize elections
Communication	Minutes of meeting shared	Insist that decisions taken

			by committee are minuted and disseminated to users by posting on a public place Annual general meeting where community can question the WUA
		Gender & stakeholder balance of committee	
	Lack of legal redress in dealing with corruption	Bylaws high lighting action against misuse of office	Insist that WUA registers as a society and initiates process to become a WSP.
	Poor service levels/user dissatisfaction		
	Lack of equitable access to water	Byelaws provisions in regard to equity	Ensure that byelaws are appropriate, have been agreed by village as a whole and are followed
	Service level at water points is poor	Byelaws guidance	
	Larger livestock owners not paying in proportion to the amount of water they use.	Byelaws provisions in regard to equity	Public auditing of accounts and comparing revenue against production by use of water meters as a means of quantifying unaccounted for water.
	Conflict between users	Byelaws provisions in regard to conflict resolution	Mechanisms for conflict resolution should be articulated within byelaws.
Step 1: Introductory discussion on holding leaders accountable	• Ask the users or water user groups (basically anyone who takes water from the system) how they hold their leaders accountable. • List all the responses. • Ask the participants to state how they ensure that the WUA committee/leaders are accountable to the WUA, i.e. do they meet their obligations? • List all the responses from the participants. • Let all the points be discussed openly.		
Step 2: Constraints hindering proper service delivery	• Get users' opinions on the key constraints that affect the provision of water in their community. • Ask the groups to write down on pieces of paper all their responses. • Collect the pieces of paper and record the responses on the flip chart for discussions • Discuss the points raised in details in plenary, recording all the emerging insights.		
Step 4: Relationship between water users & management	Make a brief presentation on the following topics: • The WUA committee is there to serve the interests of water users. • Water users should have a right to know what the WUA does – content of meetings, decisions made, how community money is being managed etc. • A constitution or set of by-laws can guide decision making. This sets and		

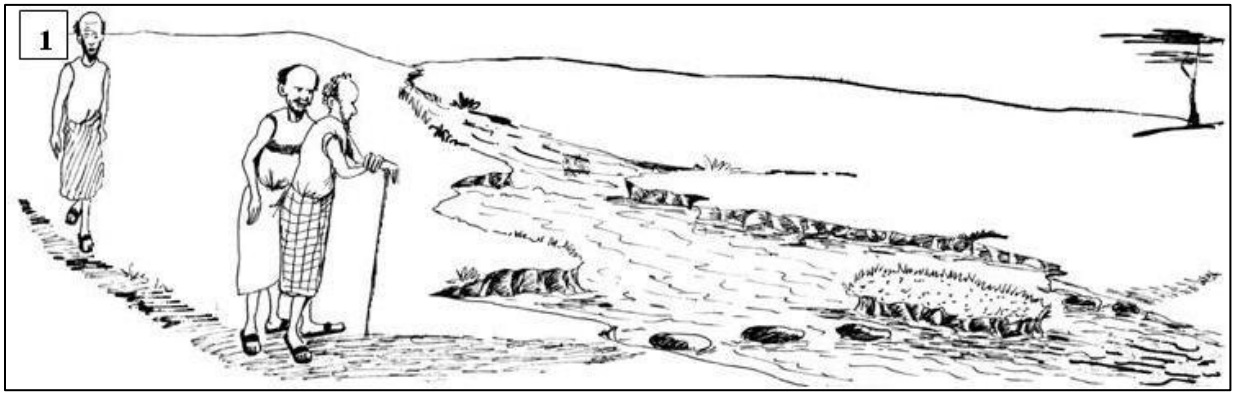
committee	clarifies the limit of the WUA, empowering them to do their job. It can also provide assurance to users that certain practices will be followed and standards of service met. • Failure to disclose information, follow agreed procedures or properly document decisions, incomes or expenditures should be viewed suspiciously and challenged by users. • Users have a right to request information from the WUA leaders and challenge them on issues related to the water system.
Step 5: Rights of Water Users	Facilitators should initiate a discussion on the rights of a water user. • Ask the participants to state the rights of a water user. • Note that with rights come responsibilities • List the rights on a flipchart. • Depending on the answers highlight the following in a short presentation: **Rights of water users** o To attend community meetings, observe committee meetings and/or be informed of the outcome of the meetings. o To influence operating hours for water access. o To scrutinise project funds - know how much money is held in the project account and view all income and expenditure records. o To amend/approve constitution, o To participate in all general meetings o To elect WUA officials
Step 6: Tools water users can use/demand and hold the WUA committee accountable	• Ask the participants if they know the tools they can use to hold committees accountable? • List the tools suggested by the participants and discuss each point • Depending on the answers highlight the following details: **Optional tools water users can use to demand accountability** o Water meter readings at borehole and all outlets (kiosks and animal troughs). E.g. the metered output from a borehole can be compared with the fuel consumption to check that fuel is being used correctly and not sold for other uses. o Metered output at kiosks can be cross checked against revenue received by the operator. o Request committee to publish income, expenditure and bank balances on a public notice board on a weekly or monthly basis as a sign of openness and accountability. o Regular public meeting between the WUA and water users. o Minuted meetings of WUA which are shared through placing on public notice board.
Step 7: Signs of a failing committee	• Ask the participants, what the indicators of a failing committee are? • List their responses and allow for a thorough discussion of all the points. • Depending on the answers highlight the following:

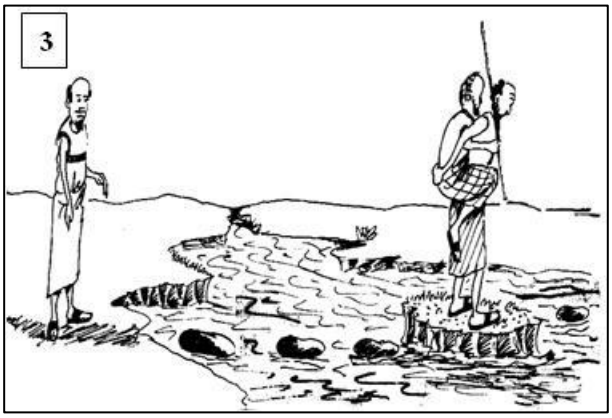
	Indications of failing management o Hand-pump/generator not being promptly repaired o Large queues at water collection points o Conflict between domestic users and livestock owners o Continued external support o Lack of trust between community and their leaders o Stagnant waters around water points o Leaking pipes not being repaired o Broken tap stands o Lack of fuel/replacement parts to power generator o Conflict between WUA and other management structures – elders, Chiefs
Step 8: Development of an Action Plan	Ask the participants to develop an action plan to ensure the WUA committee is accountable to the project members. **Conclusion** Members have a responsibility of ensuring that WUA committee is accountable and that they know how to ensure management committees are accountable.
Review	How can we as users make the WUA committee transparent and accountable? What can water users do to ensure that they also meet their obligation as water users?
Session Attachments	None

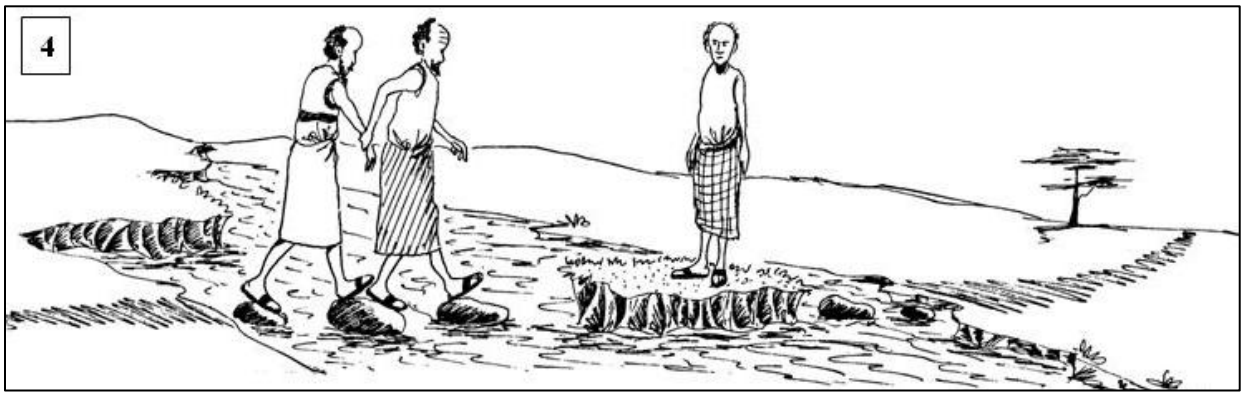
MODULE A	**SUSTAINABILITY**
SESSION A3	**SELF-RELIANCE IN WATER USER ASSOCIATIONS**
Introduction	Dependency of the community on outside support cripples water projects therefore realisation that self reliance is a pillar for ensuring that investments in water and sanitation facilities do not go to waste is important.
Objective	The participants will be able to: o Recognise the problems of dependency o Recognise the need for self-reliance
Outputs	A statement of the collective actions that community members can undertake to ensure self-reliance in their WUA and to avoid dependency
Timing	1 hour
Target Group	Water committee, community members, leaders, caretakers, entrepreneurs,
Appropriate Venue	A place where participants can clearly hear and participate in the discussions and where distractions are minimised.
Methodology	This session makes use of a role play to initiate a discussion on the concept of self-reliance
Materials	Chalk or stones, rope papers, to mark out scene for role play
Session Guide	
Step 1: Record participants' perceptions of their dependency or self-reliance status	• Ask the participants to describe self reliance and dependency in their own words and what it means in their society or culture? • Record the responses on a flip chart. • Ask the participants to illustrate a self reliant WUA and a dependant WUA
Step 2: Use role play to illustrate the concepts of dependency and self-reliance	Use a Role Play to illustrate the problems of dependency. **This role play can be used to discuss issues of education or development. Its main purpose is to look deeply at the question of dependency and self-reliance. It raises the question of doing things 'for' people or doing things 'with' people.** **ROLE PLAY** The facilitators can do the role play themselves or ask the community members to take part. **Option 1 - The River Code** **This is a mime or a play without words.** Two lines fairly wide apart are drawn on the floor in chalk to represent the banks of the river. Strings can also be used if one does not want to draw on the floor. Stones or pieces of paper are used to represent stepping stones in the river and an island (a stone or paper) is put in the middle of the river. **Scenario of role play** Two men in a hurry come to the river and look for a place to cross. The current is very strong and they are both afraid to cross. A 3rd man comes along and sees their difficulty. He leads them up the river and shows them the stepping stones. He encourages them to step on them but both are afraid, so he agrees to take one on his back. By the time he gets in the middle of the river, the man on his back seems very heavy and he has become very tired, so he puts him on the little island.

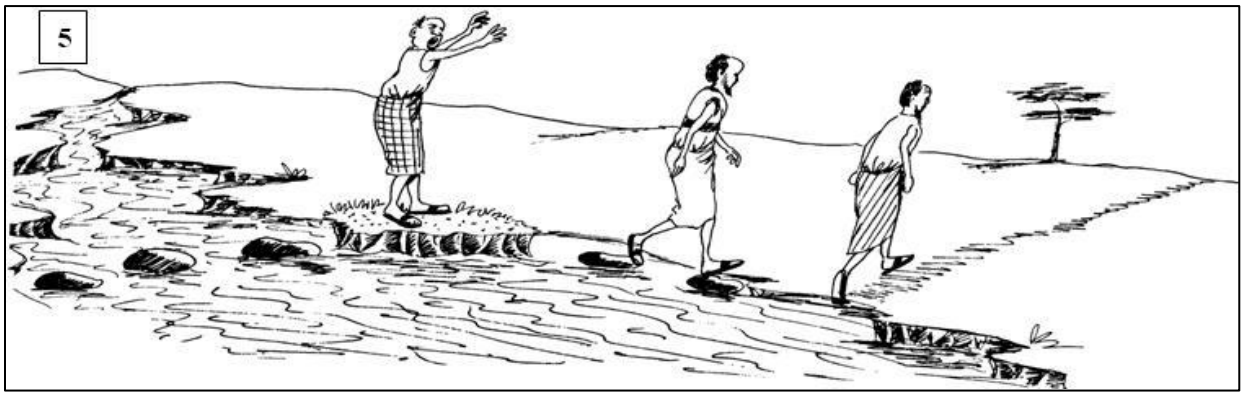
	The 3rd man goes back to fetch the 2nd man who also wants to climb on his back. But he refuses. Instead he takes his hand and encourages him to step on the stones himself. Halfway across the 2nd man starts to manage alone. They both cross the river. When they get to the other side, they are extremely pleased with themselves and they walk off together, completely forgetting the 1st man, sitting alone on the island. He tries to get their attention, but they do not notice his frantic gestures for help. **Decoding the role play - Ask the participants the following questions**; o What did you see happening in the role play? o What different approaches were used to help the two men across the river? o Who could each person represent in real life in your community? o What does each side of the river represent in real life? o Why does this happen? o Where do you think your community has reached in crossing "the river?" o What can the community do to ensure that they have crossed the river? Record the responses. **Option 2 - Milking code** The facilitators can do the role play themselves or ask the community members to take part. This is a mime or a play without words. **Role play scenario** Four people present the following scenario. One person will be a cow to be milked, one an old man, two of his sons or daughters The old man milks the cows every morning. One of his children always offers support and has learnt how to milk although not very well, the other is always provided with the milk. The old man goes for a safari that will take him a few days. The next day after the Mzee left the household is at a standstill. The children started arguing and the child who knows how to milk, milks him/herself some milk to drink while the other child stays hungry for 2 days until the Mzee comes back. **Decoding the role play - Discussion questions** o What did you see happening in the play? o What different approaches were used to help the 2 children? o Who could each child represent in real life? o Why does this happen? o Where do you think your community has reached in "milking the cow"?
Review	Why is self -reliance important in your WUA? What can you do to ensure that the water facility is not dependant on outside support at all?
Session Attachments	Attachment 1: Illustration of the River Code Attachment 2: Illustration of the Milking Code

Attachment 1: River code

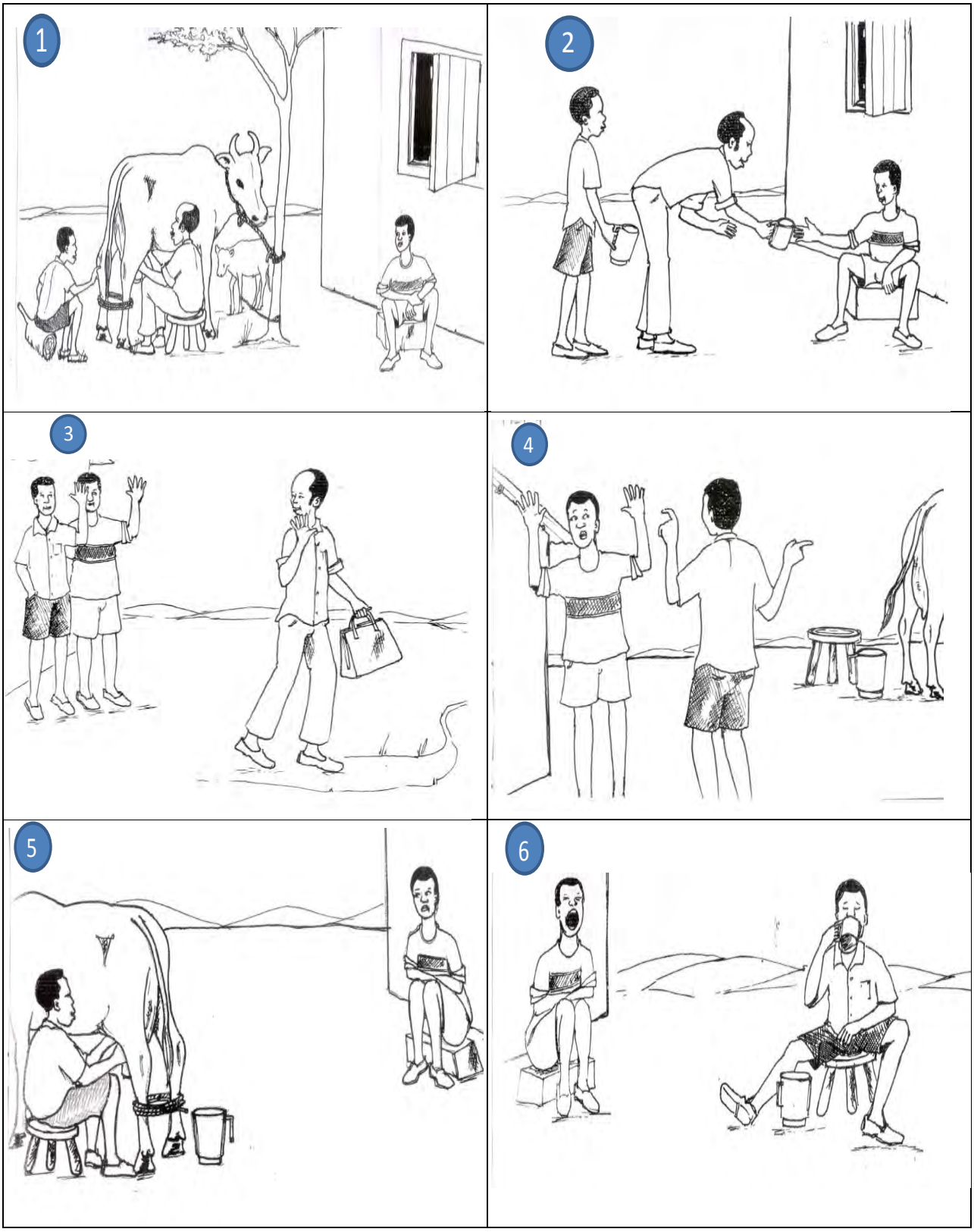








Attachment 2: Milking Code



MODULE A	**SUSTAINABILITY**
SESSION A4	**EQUAL REPRESENTATION**
Introduction	Equal representation of men, women and youth in projects is necessary, therefore the participants need to be aware of the reasons why it is important to fully involve women, youth and also men in decision making.
Objectives	o To raise awareness of the benefits to be gained by applying a balanced gender approach towards management of water systems. o To challenge participants to fully involve women and men and youth in management of the water systems.
Timing	1 hour
Outputs	Action plan on involvement of men, women and youth in water and sanitation.
Target Group	The community members, WUA committees, community opinion leaders
Appropriate Venue	A place where participants can clearly hear and participate in the discussions and where distractions are minimised.
Methodology	This session uses various exercises to help participants explore the impact of attitudes and prevailing practices in regard to gender and challenges the participants to reconsider the importance of equal representation in water supply management structures. This session should be carried out at the beginning of a training programme as gender is a key consideration for the whole decision-making and management structure which will be presented later. If the group is dominated by men, exclusion of women from this early stage will further undermine the role of women and contributing to a continuation of this inequality. Depending on the makeup of the group and feedback it may be necessary to arrange more detailed and focused gender sessions as a follow up to this training module. Subject to the gender balance of the group the facilitator(s) should ask participants why more women are not present. At this point listen and note down the explanations, ask if others agree but do not challenge them directly. Clearly cultural sensitivities must be respected so the need to have a local facilitator is important; however cultural issues will not change the well researched reality that management improves when both women and men are involved in decision making
Materials	Blue and red coloured cards for exercise
Session Guide	
Supporting Information	**What is Gender?** Gender relates to both men and women. A gender based approach looks at the social differences between men and women to seek a balance, which optimises the roles and responsibilities of both men and women. **Why is a gender approach relevant?** Women are the managers of water and sanitation at the household level. It is women who spend up to several hours per day on the task of fetching water. It logically follows that in order for a water system to adequately meet the needs of its beneficiaries; women should not only be consulted but should also be actively involved from the project planning stage through to completion and operation of the system. However it is common that water management committees, who take decisions related to planning and management, consist only of men. The following is a list of reasons and benefits why women and men should be

	involved in management and decision making related to a water project. ***Why should there be equal gender representation in the WUA?*** o Women are the principal users of a water system. It is in their interests more than anyone else for the water system to function properly. o As principal users of water, women are the best judges of the most suitable standard of service required (e.g. when water point should be open) and are the first to recognise problems. o Women have considerable knowledge of existing water sources, the amount of water, which ones are seasonal and perennial, information that is very important at the planning stage. o Women and men's opinions and preferences may differ. It should not be assumed that an all-male committee will always represent the best interests of all users of a water system. Within Kenya women and girls represent more than half the population of the village, if they are left out you lose the opinions, good ideas and commitment of the majority of the community. o Women are less likely to leave the village to seek work. Oxfam's past experience has shown than a significant number of men trained are not on hand to deal with problems when they arise, because they have left the village for work or national service. (Members who are likely to leave the village for a prolonged period should not be chosen as members of the committee or to be an attendant or technician). Experience from around the world has consistently demonstrated a strong link between participation of women and a project's success. A review of USAID water and sanitation projects over a 12 year period shows that a strong positive correlation exists between women's level of participation and the achievement of project objectives. Failure to properly consult women early in project planning in extreme cases has resulted in non-use of water systems. Opinions that women cannot perform maintenance and repair tasks are based more on stereotyped gender concepts than on any real inability. Many studies have demonstrated that women may well make better maintenance and repair workers than men. This is based on the direct concern and personal interest of women in their water supply, regular visits to the water point, women's greater sensitivity to social pressure from other women to do a good job, the importance of health aspects, and labour mobility of men.
Step 1: Initial discussion on gender	• Ask the participants to state whether youth, male and female are involved in decision making and if not, why not? List the answers • Discuss all the responses in plenary. • Ask them to state what can be done to encourage women and men youth participation in WUA management. • Ask them what can be done to ensure that everyone's interests i.e. for women,

<table>
<tr><td></td><td>men, and youth is catered for and also ensure active involvement in management of water services.</td></tr>
<tr><td>Step 2: Group exercise on gender and water</td><td>
Begin this exercise by highlighting the role women play as managers of water.

This exercise is aimed at illustrating the important role women play in relation to water supply and the contrasting lack of power and decision making associated with management of resources.

1. Distribute the following cards to each participant and explain the purpose of each card:
• one red card represents men;
• one blue card represents women;
• one black card represents youth.

2. Ask specific questions relating to water use and which group is most likely to be involved in the stated activity.

3. For each question, the participants should respond by:

• Raising one colour card for men or women;
• Raising the black card for youth and either blue or red card to distinguish the gender of the youth.

Use the following matrix to record responses.
<table>
<tr><th></th><th colspan="2">Adult</th><th colspan="2">Youth</th></tr>
<tr><td></td><td>Men</td><td>Women</td><td>Male</td><td>Female</td></tr>
<tr><td>Who makes the rules and regulations concerning the use, operation and opening hours of the water system?</td><td></td><td></td><td></td><td></td></tr>
<tr><td>Who collects water most of the time?</td><td></td><td></td><td></td><td></td></tr>
<tr><td>Who forms the majority in the community (men, women or youth)?</td><td></td><td></td><td></td><td></td></tr>
<tr><td>Who manages water in the home and is responsible for hygiene within the home?</td><td></td><td></td><td></td><td></td></tr>
<tr><td>Who takes decisions within the water committee?</td><td></td><td></td><td></td><td></td></tr>
<tr><td>Who contributes to the construction of the water system?</td><td></td><td></td><td></td><td></td></tr>
<tr><td>Who educates the children on proper hygiene behaviour?</td><td></td><td></td><td></td><td></td></tr>
<tr><td>Who has benefited most from the water project?</td><td></td><td></td><td></td><td></td></tr>
<tr><td>Prior to the project who used to collect and transport water?</td><td></td><td></td><td></td><td></td></tr>
<tr><td>Who decided where the project water point was to be located?</td><td></td><td></td><td></td><td></td></tr>
</table>
Ask the group to reflect on the issues and to comment on any differences that they observed (e.g. difference in access to and control of resources, decision-making, working, etc)
</td></tr>
</table>

Step 3: Benefits of a gender approach	**This session is an interactive presentation** • Ask participants *why they think it is important to involve women in planning, management and decision making issues?* • Or alternatively if they disagree, why it is not necessary? • Make a note or write their answers on a flip chart. • Ask participants *why they think it is important to involve youth in planning, management and decision making issues?* • List the responses • Add additional points that may have been overlooked. **Note to Facilitator** Disagreement may arise during the discussion and the facilitator should try to let the participants express their views. Note down any reasons given by participants concerning why women and youth should not or are not able to participate/fulfil certain tasks.
Step 4: Considerations in implementing a gender approach	Ask participants to explain "why are women and youth not represented (or poorly represented) in the committees?" Ask participants to consider actions they could take as a committee, or individuals, to overcome these constraints. This exercise can be done in groups or in a plenary session at the discretion of the facilitator. The emphasis of the discussions should be on positive actions that can be taken to overcome constraints/barriers to female and youth involvement, rather than excuses. Ideally this should result in development of an action plan to ensure that, if not equal, there is a more balanced gender representation in decision making positions. The facilitator can make the following short presentation: Why are women and youth excluded from decision making? **Men's attitudes**: Some men don't see women as equals in decision-making. They feel that men should do the talking and women should listen. Men don't want to lose their authority at home or in the community. **Women's attitudes**: Some women accept men's dominant role and lack confidence in their own ability and are afraid to speak in meetings with men. **Youth's attitude**: the youth disregard water and sanitation roles. They think that it is the work of the elders. **Agency/Government staff attitudes**: Do we also contribute to exclusion of women by focusing attention on men at meetings, not encouraging women to give their ideas? **Workload pressures:** Women are so busy with work that they have little time to attend meetings. We may inadvertently exclude them by planning poorly timed meetings.
Step 5: How to involve women and youth in decision making	• Ask the participants what they can do differently to ensure participation of women and youth. • Record all the responses • Probe further by asking why they are not taking action now and what they can

	do to ensure active participation in future? **Steps that can be taken to encourage broader gender participation in project affairs:** o Committee members can directly encourage women and youth to take an active interest. o Meetings should be arranged at a convenient time and place for women and youth to attend. o At meetings encourage women to sit in the front row along with men and not at the back where they are left out of the discussion. o Encourage the youth to attend meetings along with their parents. o Don't focus your attention on the adult men. Encourage women and youth to speak, when they talk, make sure people listen and their views are taken seriously. o If women are silent, use small groups to get them talking. o If women meet on their own they can express their ideas without interference from men. o Older women, without small children to look after, may be suitable to work on the committee, as they may be more independent and have more time for such work. o Encourage women and youth by getting them to see the importance of their contribution to the development of the water supply. o Review election process of committee members and allow for representation as a rule. o Consider changing constitution to insist on a mixed gender committee **Conclusion** Representation of men, women and youth in water user committee is necessary for the sustainability of WUAs. All the categories of the population bring in all the ideas of knowledge into the management hence strengthening the WUAs.
Outputs	Action plan on involvement of women and youth in water and sanitation.
Review	What can committees do to ensure active participation of women and youth in water and sanitation project?
Session Attachments	Attachment 1 – Role play on participation in decision making

Attachment 1: Role play on participation in decision-making

This role play can be used to highlight who is consulted when projects are designed. The following steps describe the role play:

1. The facilitator uses the diagrams overleaf or writes the name of a different character on an index card and gives one diagram or one card to each participant. Characters from the community can include:

Old woman	Illiterate unemployed man
Handicapped youth	Member of water committee
Boy child	Pastor
Girl child	Peasant farmer
Chief	Water project chairman
Pastoralist	Councilor
Community Elder	Unmarried woman
Young woman	

2. The facilitator asks all participants to stand in a line, facing forwards, shoulder to shoulder.
3. The participants are told to take on the character of the card or diagram that they have been given;
4. Participants are given the following instructions:
    a. They will be asked various questions and if their individual character would answer „Yes' then that character should take one big step forwards.

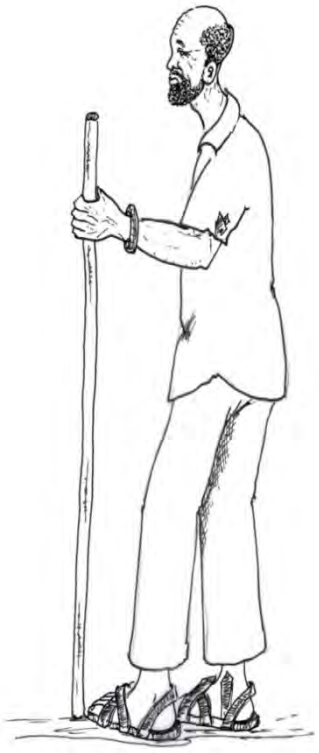
5. The facilitator asks the following questions:

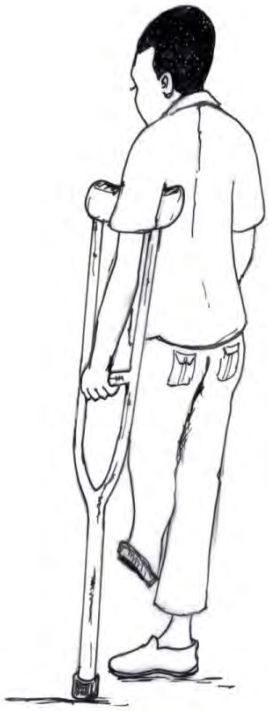
    a. Are you a member of the community? (This is to check that everyone understands the instructions) – All participants should take one big step forward;
    b. Did you finish primary school?
    c. Are you a member of a committee?
    d. Does somebody else in your household prepare your evening meal?
    e. Does somebody else in the household fetch your water?
    f. When important visitors come to the community, are you asked to speak to them?
    g. Do you read a newspaper?
    h. Do you speak English?
    i. Do you speak at community meetings?

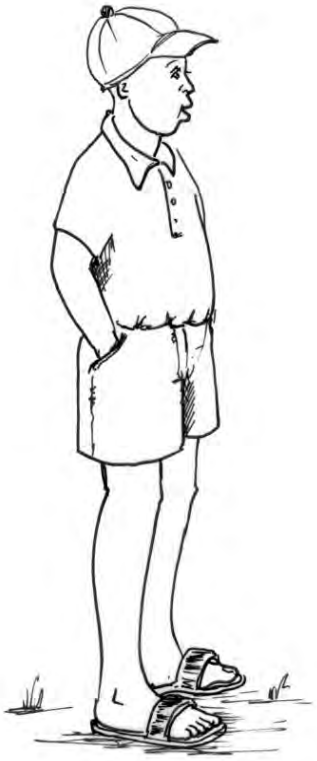
The result is that those members of the community who answer „yes' to many of the questions move forwards. The facilitator then adopts the character of a visitor to the community and greets those nearest to him/her, asking them their characters.

The facilitator then goes to those at the back and asks those at the back to state their characters.

The object is to highlight who is „consulted' when visitors come to a community and who is excluded from the discussions.








CHIEF
HOLY BIBLE


COUNCILLOR

MODULE A	**SUSTAINABILITY**
SESSION A5	**A RIGHTS BASED APPROACH TO WUA MANAGEMENT**
Introduction	Water is a public good. The Rights-based approach (RBA) in water and sanitation not only looks at the rights of humans to access water but also that of the environment. Rights to water refer to people's needs of water and also the needs of the ecosystem to use water.
Objective	• To understand the concept of a Rights Based Approach • To recognise the inequitable access to resources at the community/household level • To come up with ways to mainstream the rights of the marginalised in water and sanitation
Outputs	Raised awareness among participants on the meaning and application of a RBA within the WUA
Timing	1 hour
Target Group	WUA committee and community members
Appropriate Venue	A place where participants can clearly hear and participate in the discussions and where distractions are minimised.
Methodology	This session takes the participants through a discussion on the meaning of a Rights Based Approach using guided group discussions and short presentations.
Materials	Paper, pens, cards, flip charts, cards made from manila paper
Session Guide	
Supporting Information	**What is a Rights Based Approach?** It is a conceptual framework for development that is based on human rights and directed towards strengthening and protecting them. Human rights are our birthright and are inherent and inalienable. It identifies rights-holders and their entitlements and responsibilities, and corresponding duty-bearers and their obligations, and works towards strengthening the capacities of rights-holders to make their claims and meet their responsibilities and of duty-bearers to meet their obligations.
Step 1: Introductory discussion	Ask the participants what they understand by RBA? List the responses on a flipchart. Allow for comprehensive discussions The facilitator can make the following presentation
Step 2: How is RBA approach used in development?	• Ask the participants to identify the duty bearers' and rights holders in the water sector and the WUA. • List all the responses and discuss them exhaustively. • Ask them to state how they deal with the duty bearers and rights holders and what they can do to improve the relationship. • List responses and allow for discussions. **Make the following short presentation:** How is the RBA an appropriate development strategy? The RBA aims at strengthening the capacity of duty bearers (governments) and empowering the rights holders (community). This approach can reduce local communities' dependency on aid by improving government capacity as the duty

	bearer. There are two stakeholder groups in rights-based development, the rights holders, or the group who does not experience full rights, and the duty bearers, for whom it is mandated to provide equitable access to public goods for their citizens. The duty bearers and the rights holders have an active role in development. The duty bearers are accountable for respecting, protecting, and fulfilling human rights.
Step 3: RBA approach in reference to water and sanitation	The facilitator should direct the discussion towards the implication of a rights based approach with respect to water and sanitation. A RBA in the context of water and sanitation would look at access to resources for marginalized populations. **RBA and Water Access** With human rights in mind this approach ensures that there is access to water for all both upstream and downstream people in respect to water resources and water supplies. **RBA and Environment** Ensures that environmental issues are addressed at all levels. Mitigation measures should also be articulated and implemented. **RBA and Pro-poor Strategy** This means having a tariff structure which benefits the poor and equal representation of the poor in the WUAs. **RBA and the Disabled** The disabled should also be considered for ease of access to water and sanitation. They should also participate in the process of design and developing infrastructure with respect to location, access and cost of water and sanitation facilities. Opportunities for employment should also be considered. **RBA and HIV/AIDS** This means that the HIV/AIDS awareness creation will be inbuilt in its programmes. This will ensure that the infected and affected by HIV/AIDS will be given equal rights in water access. **RBA and Monitoring and Evaluation** This means that all the above issues/values will be periodically monitored and evaluated to make sure that the RBA approach of protecting and promoting human rights is being adhered to. **RBA and the Elderly** Ensures that the elderly access have water resources on equal terms with everybody else.
Step 4: Right to Water in the Kenyan Constitution	What does the new constitution in Kenya say about the right to water? (See Attachment 3) Chapter 4: Bill of Rights Article 43 – Economic and social rights: Every person has a right: o To accessible and adequate housing o To reasonable standards of sanitation

	○ To clean and safe water in adequate quantities Does this mean that every Kenyan has a right to FREE water? No It means Kenyans have a right to clean and safe water at a fair price.
Step 5: Identification of marginalised groups	• Ask the participants to identify other groups within the community whose rights are not included in development of water facilities. • Ask them to identify how the needs of these groups can be addressed? • Record the answers. Incorporating the responses give the following presentation: Ensuring rights are embraced in water projects: ○ Through specific water resource management activities and inclusion through mainstreaming into planning activities ○ Empowering and educating the affected population on their rights and on avenues to demand for them when threatened ○ Capacity building of the rights holders to know and claim their rights ○ Capacity building of the committee and other duty bearers to facilitate the inclusion of these groups.
Review	Ask the participants to highlight the importance of using a RBA within the WUA? What ways can RBA be strengthened within the WUA activities and operations?
Session Attachments	Attachment 1 – RBA approach in reference to water and sanitation Attachment 2 – The value of a rights-based approach Attachment 3 – Right to water in the new Kenyan Constitution

Attachment 1: Human Rights

What kinds of human rights obligations are there?

Obligations are generally of three kinds: to respect, to protect and to fulfil human rights:

To respect human rights means simply not to interfere with their enjoyment. For instance, States should refrain from carrying out forced evictions and not arbitrarily restrict the right to vote or the freedom of association.

To fulfil human rights means to take steps progressively to realize the right in question. This obligation is sometimes subdivided into obligations to facilitate and to provide for its realization. The former refers to the obligation of the State to engage proactively in activities that would strengthen people's ability to meet their own needs, for instance, creating conditions in which the WUA can provide the water services that are required by the squatters.

The obligation to" provide" goes one step further, involving direct provision of services if the right(s) concerned cannot be realized otherwise, for example to compensate for and to help groups that are unable to provide for themselves

Attachment 2: The Value of a Rights-based Approach

RBA and gender mainstreaming

It provides for the inclusion of the rights of women into the development process. Women have been a marginalised group for many generations. The inclusion of youth is also important and they should be actively engaged.

RBA and development

A process guided by RBA takes a holistic view of its social, physical and natural environment. It also considers the social and political framework that determines the relationship and resulting claims, duties and obligations.

RBA and conflict resolution

With human rights in mind incorporating the concerns and rights of all concerned into the programme design can prevents conflicts. This can be done by undertaking a social impact assessment and risk analysis of any development initiative. Capacity building and opening of channels to air grievances is appropriate in a RBA.

RBA and participation

Participation means that all stakeholders have and feel ownership and control over the development process. It ensures that all the stakeholders are consulted and made a part of the process that makes decisions.

RBA and capacity development

It should be based on building the capacities of the rights holders to be able to claim their rights and of duty bearers to fulfil their obligations. Each training module should be tailored with this in mind

Attachment 3: Right to Water in the new Kenyan Constitution
Summary of Points from Chapter 4: Bill of Rights

Article 19 – Rights and Fundamental Freedoms

- Framework for policies
- Rights belong to each individual and are not granted by the state and are subject only to the limitations contemplated in the Constitution.

Article 42 – Environment: Every person has the right to a clean and healthy environment which includes protecting the environment for the benefit of present and future generations and to enforce Article 70 (Enforcement of Environmental Protection)

Article 43 – Economic and social rights: Every person has a right:

- To accessible and adequate housing,
- To reasonable standards of sanitation and
- To clean and safe water in adequate quantities.

Article 22 – Enforcement of the Bill of Rights
Every person has right to institute court proceedings if a right has been infringed upon:

- No fees should be required to start proceedings, minimal formalities, no restrictions on procedure, any expert may appear as a friend of the court
- Court proceedings can start even without subsidiary legislation

Article 23 – High Court has jurisdiction to hear & determine cases, but:

- Can be delegated by legislation to sub-ordinate courts
- Relief includes an order for compensation

MODULE B
WUA GOVERNANCE

MODULE B	**WUA GOVERNANCE**
SESSION B1	**GROUP DYNAMICS**
Appropriate Facilitator Background	The facilitator (facilitation team) should be individuals with backgrounds in group management, or public office leadership acquainted with the subject.
Introduction	Most community managed water projects emerge through collection action by community members organised around a group which meets and makes decisions. Groups or teams can achieve more than the total effort of individual members. Whenever groups/teams are formed, the needs and values of individual members often come to play creating what are called group dynamics. Group dynamics is the interplay between the values, strengths and weaknesses of individual members of a group.
Objective	By the end of the session, participants should be able to: 1. To define a group; 2. To discuss factors that hold groups together; 3. To discuss types and roles of different styles of leadership for different types of groups
Outputs	Understanding leadership, group formation processes and accommodating other group members despite the differences.
Timing	1 hour
Target Group	Management committee members and community opinion leaders
Appropriate Venue	A suitable facility within the community where participants can hear and focus on the discussions without unnecessary distractions. The Cooperative Squares Exercise requires a table for each group of five participants.
Methodology	• Group discussions and plenary presentations • Q&A • Short presentation
Materials	Flip charts, marker pens, masking tapes, handouts, pens, and notebooks Materials for the Cooperative Squares Exercise **To prepare the Cooperative Squares Exercise** 1. Prepare five identical squares (photocopy Attachment 1); 2. Cut each square into triangles following the lines shown on Attachment 1. This results in 25 triangle pieces, when combined properly make 5 squares; 3. Mix up the 25 shapes; 4. From the 25 pieces, place five shapes into an envelope and repeat for five envelopes; 5. These 5 envelopes make up the material required for one group of five participants; 6. Repeat the exercise for each group of five people.
Session Guide	
Supporting Information	**Definition:** A group is a collection of people sharing a common sense of identity, with a common goal, and an awareness of the needs and conditions of other members.

A group is a collection of people who share, most if not all, of the following characteristics:

- A definable membership;
- Belonging;
- A sense of shared purpose;
- Interdependence;
- Interaction;
- Ability to act in unitary manner.

Group Structure

Groups are not unorganized mobs. They have a structure that shapes the behaviour of members and makes it possible to explain and predict a large portion of individual behaviour within the group and performance of the group itself.

The structural variables include:

- Formal leadership;
- Roles;
- Norms;
- Group status;
- Group size;
- Composition of the group (Homogenous/heterogeneous);
- The degree of group cohesiveness.

Group Behaviour Analysis

A group's behaviour, cohesiveness and development changes and evolves. This process is often described by group dynamics experts in four stages: forming, storming, norming and performing.

Behaviour/Cohesiveness	**Development**
Stage 1: Forming A WUA establishes why it should exist. It finds out what tasks, rules and methods it is going to adopt to achieve its objectives. It believes in the leader.	***Undeveloped Team*** Feelings are avoided; objectives are uncertain. Group starts to acquire information and resources and mostly relies on the leader for decisions.
Stage 2: Storming During the storming stage a WUA develops internal conflict and members resist tasks and by-laws/rules and emotional levels are high.	***Experimenting Team*** Issues are faced more openly and listening takes place.
Stage 3: Norming In this stage, conflict is settled; cooperation develops; views, opinions and ideas are exchanged and new standards of relations (norms) are developed	***Consolidating Team*** Personal interaction is established on a cooperative basis, tasks and roles are clarified, objectives agreed and tentative procedures implemented
Stage 4: Performing At this stage teamwork is achieved; roles are flexible; solutions to problems are	***Mature Team*** Feelings are open, a wide range of options considered before decisions

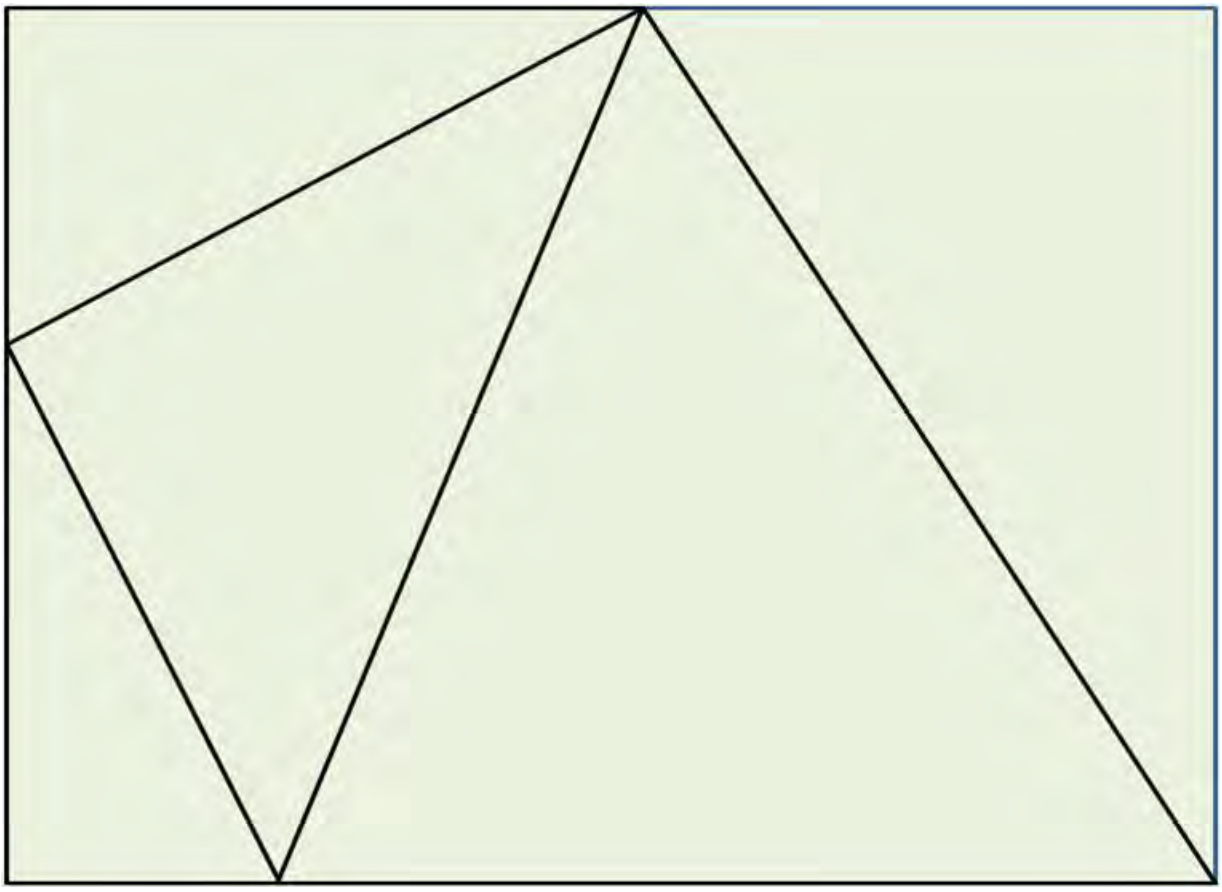
	found and implemented are made, working styles are methodical, leadership style is participatory, individuals are flexible and the group recognizes its responsibility. Group dynamics change and evolve. Periods of internal conflict are not necessarily detrimental to the group nor are they terminal but rather are a way for the group to realign itself to be consistent with its objectives and aspirations and to be more inclusive and democratic. Conflict should therefore be expected and managed democratically and effectively as part of the group development process. Groups develop common standards of social and work behaviour, which are expected of individuals in the group. Once standards have been developed, there are strong pressures on people to conform to them, and this makes the groups perform better.
Step 1: Defining a group	• Ask the participants whether they belong to a group; • Ask the participants to state why groups are formed; • Ask them to discuss some advantages of belonging to a group; • Ask them to discuss some disadvantages of belonging to a group. The facilitator should conclude by describing what is group dynamics using the output from the above discussion. ***Reasons for Formation of Groups:*** • Certain tasks can only be performed through the combined effort of a number of individuals working together; • Groups may encourage cooperation between members; • Groups may provide companionship and a source of mutual understanding and support from colleagues; • Membership of a group provides the individual with a sense of belonging; • The group provides guidelines on generally acceptable behaviour; • The group may provide protection for its membership. **Disadvantages of having a group:** • It can be time consuming in making decisions; • It can promote dependency of individuals on the group.
Step 2: Group exercise to motivate discussion on understanding Group Dynamics	This exercise is a game that is undertaken by the participants to motivate a discussion on the way individuals interact within a group. **Cooperative squares exercise** **Procedure** i. The facilitator begins by explaining what is essential to successful group cooperation. ii. Ask the participants to form groups of five and sit around a table. (It is possible to have one extra person to observe each group).

	iii. Issue each participant with an envelope that contains 5 paper triangles iv. The facilitator then reads the instructions to the whole group. ***Instructions*** Each of the participants will have an envelope, which has pieces of cardboard/paper for forming squares (See attachment 1). When the animator gives the signal to begin, the task for the group is to form ***five squares of equal size***. The task will not be completed until each individual has before him/her a perfect square of the same size as those in front of the other group members. ***Rules*** 1. No member may speak. The task must be done in silence 2. You may not take or ask for a piece from other person but you can give pieces to others. Ask if there are any questions and answer them. 1. Give each group a set of shapes. 2. Ask the groups to begin work. The animator watches the tables during the exercise to enforce the rules. 3. Check the table that completes the exercise first 4. When the task is completed, ask each group to discuss the following questions. ***Discussion Questions*** a) In what way do you think each of you helped or hindered the group in completing its task? b) How did members feel when someone holding a key piece did not see the solution? c) How did members feel when someone completed a square incorrectly and then sat back without helping the group further? d) What feelings did they think that person had? e) How did members feel about the person who could not see the solution as quickly as others? f) How are some of the things you learnt from this game true in real life and problems you have in your own situation? g) How did the group that completed the task first manage to do so and what can we learn from them about cooperation?
Step 3: Group Exercise to demonstrate the power of collective action	**Purpose** • To enable participants to appreciate the effectiveness of team work unlike individual efforts in overcoming community problems. • To create an environment in which the participants can start building bridges within their communities in problem solving **Materials** • 10 Match-sticks or toothpicks or splinters **Procedure** • Ask one of the participants to volunteer and step in front; • Ask the volunteer to break one match-stick and tell the rest of the participants

	how easy or difficult the exercise is; • Ask the volunteer to take a bundle of ten match-sticks and repeat the exercise; • Ask the participants to reflect on the results of the two approaches in so far as it relates to solving community problems; • Ask the volunteer to separate the bundle and break the individual sticks one at a time. **Note to Facilitator** The bundle represents a community (group) approach while each stick represents the individual community member. The lesson is that the community is stronger than the sum of its individual members. This is only tenable so long as they act as a team because as the team breaks up then it becomes weaker and unable to deal with their problems. In conclusion it is clear that **"Umoja ni nguvu, utengano ni udhaifu" (Unity is strength, division is weakness)**
Step 4: Discussion on Effective Groups	Ask the participants what they think makes for an effective group? Use the answers to draw out the following points: **Characteristics of an Effective Group:** • A belief in shared aims and objectives. • A sense of commitment to the group. • Acceptance of group values and norms. • A feeling of mutual trust and dependency. • Full participation by all members and decision making by consensus. • A free flow of information and communication. • Open expression of feelings and disagreements. • The resolution of conflicts by members themselves. • A lower level of turnover, absenteeism, errors and complaints
Step 5: Group Development	1. Start a discussion on factors that influence group behaviour and list them on a flip chart. 2. Ask participants to describe one group that succeeded and one that failed in their communities and discuss the reasons for success or failure of the groups. **Factors that hold a group together** - Similarity of work - Physical proximity - Group size (smaller rather than large) - Commitment to deal with threats from outside and within - The prospects of rewards - Leadership style of the committee /manager - Common social factors (age, race, social status, etc)
Review	What are the main advantages of having a group? What makes an effective group?

Session Attachments	Paper Triangles for Group Work

Attachment 1: Picture of Square (Cut along lines with a very straight edge)



<table>
<tr><td>MODULE B</td><td>WUA GOVERNANCE</td></tr>
<tr><td>SESSION B2</td><td>LEADERSHIP SKILLS</td></tr>
<tr><td>Appropriate Facilitator Background</td><td>The facilitator (facilitation team) should be individuals with backgrounds in group management, or public office leadership</td></tr>
<tr><td>Introduction</td><td>A leader is a person who has the ability to influence the community to work in harmony and to achieve a set goal in an organization

This session aims at enhancing participants' knowledge on different leadership styles in any given community managed water project. The style of leadership is extremely important in any project aiming at full participation of all members in a liberating process and self-reliant development.</td></tr>
<tr><td>Objective</td><td>By the end of the session, participants should be able to:
1. Appreciate the need for leadership;
2. Identify different leadership styles and their effect;
3. Identify different qualities of an effective leader.</td></tr>
<tr><td>Outputs</td><td>Participants can identify the qualities of an effective leader</td></tr>
<tr><td>Timing</td><td>1 hour</td></tr>
<tr><td>Target Group</td><td>WUA and community members</td></tr>
<tr><td>Appropriate Venue</td><td>A suitable facility within the community where participants can hear and focus on the discussions without unnecessary distractions.</td></tr>
<tr><td>Methodology</td><td>• Group discussions and plenary presentations
• Q&A
• Short presentation</td></tr>
<tr><td>Materials</td><td>Flip charts marker pens, masking tapes, handouts, pens, and notebooks</td></tr>
<tr><td>Session Guide</td><td></td></tr>
<tr><td>Supporting Information</td><td>Definition of leadership
Leadership is the art of mobilizing, organizing, guiding and directing the resources of a group or team in order to achieve a defined goal. Leaders come in different forms/titles, for instance, presidents, prime ministers, kings, queens, pastors, chiefs, elders, chairmen, and committee members.

Different Leadership Styles
<table>
<tr><th>Leadership Styles</th><th>Characteristics</th></tr>
<tr><td>Authoritative</td><td>• Meets the group and initiates a discussion on the agreed agenda.
• Calls for ideas but does not listen to the group members.
• Opposes and rejects the ideas of group members
• Imposes his/her decision on the group and then walks away.
• Group members grumble and show disapproval.</td></tr>
<tr><td>Democratic</td><td>• The chairperson opens the discussion and gets ideas from all the group members.
• The merits and demerits of all proposals are discussed.
• Finally facilitates the group to reach consensus on the discussion agenda.</td></tr>
</table></td></tr>
</table>

	Passive (Laissez faire)	• Opens the discussion but shows little or no interest in the discussion • May be using mobile phone or reading newspaper and makes no suggestions, • Approves everything said in the discussion (probably by nodding his head), • Allows group members to talk as they may want and • Finally the meeting ends without making a decision.

Terminology associated with Elections

- Election - the process of selecting a candidate to represent interests of others who have a common goal.
- Appointment – choosing a person through writing.
- Nomination – choosing a person through a word of mouth (verbal statement).
- Electoral area - a region that has a common elected representative
- Returning Officer - a person appointed by the authority e.g. the Minister or Government to be in charge of an electoral process in a defined electoral area.
- Presiding Officer - a person in charge of an electoral process.

Eligibility for Election

An aspiring candidate normally presents him/her –self to the members (people / members) for consideration of the election. From experience the eligibility for election depends on;

- Age — A candidate should be between 21 and 70 years of age;
- Active — A candidate must be active in the affairs or interests of the WUA;
- Has interest — A candidate must have interest in the WUA;
- Literate — A candidate must have basic literacy;
- Competent — A candidate must not be delinquent or of unsound mind;
- Character — Must have good character and be a role model.

Models of Elections

There are various styles of conducting an election, the main ones being:

- Secret ballot;
- Show by hands/Raising hands;
- Queuing, popularly known as "Mlolongo".

All these styles or strategies have one common feature i.e. they provide the principle of "One-person-one-vote"

Timing of Election

Elections are conducted periodically and must be spelt out very clearly in the regulations/ constitution of the WUA.

Terms of Office

Elected persons hold office for a specified period of time, which is defined in the constitution. The life of an office is normally linked to timing of elections.

Appeal Against an Election

	Traditionally there are accepted ways of solving common disputes in a community, which may include election disputes. Rather than go through the expense of another election the authority may use a number of methods to settle election dispute such as: • Panel of elders • Arbitration. • "A Chance Method" to decide the winner. Such methods are; - Flipping a coin - Taking a number from a box **Conclusion** Holding proper elections is one way of sustaining interest in community organizations. However elections can be volatile where there are personal interests that are served through leadership positions within the WUA.
Step 1: Role Play	**Role play 1- A play on a school that is run under relaxed or passive (laissez faire) style of leadership** **Actors:** One participant to act as the school head teacher, the other one as the school bursar and 8 others as students. Whenever the students ask for anything like meat, loaves of bread and other luxuries, the headmaster instructs the bursar to purchase so that the students can enjoy life as they wish. He even allows the students to go out whenever they wish to. Eventually the school collapses because of bankruptcy and the "don't care" attitude. In plenary sharing, participants are asked: • What can we learn from this exercise as it relates to leadership? • What did you see? • Does it happen? • Why did it happen? • What could have prevented the school from collapsing? • What is leadership? What is the role of a leader? How are they identified and elected in the community • Participants share and the facilitator summarizes by defining leadership and roles of a leader and stating clearly that leadership styles depend on the situation and can be disastrous if applied carelessly.
Step 2: Qualities of an Effective Leader	**Group Exercise** • Divide participants into groups • Ask each group to brainstorm on the following; - Who is a leader? - How do you identify a good leader? - What are the qualities of a good leader? - Name 5 leaders you like and list the reasons you like them. • Each group to record the responses and present in a plenary session where the facilitator will bring out the aspects of leadership as discussed.

	Through the discussion draw out the following points: **Qualities of a Good leader** • **Acceptability** - A person who commands respect and self-discipline. Has good interpersonal relations and meets minimum community norms of good conduct. • **Job-Competence** – Has a track record of exemplary performance in a skill area or areas. • **Ability to listen** – Listens patiently for meaning and understanding. • **Tolerance** – Has the ability to listen to and accommodate dissenting views and constructive criticism. • **Delegation** – willing and able to share responsibilities in order to build the potential of others. • **Flexibility** – open to change and reason. • **Communicative Competence** – Can influence others through logical and effective speech. • **Empathy** – ability to enter into others' feelings as a way of understanding a situation. • **Self-Organisation** – sets an example on personal orderliness. • **Self-confidence** – inspires confidence in others because he/she has the same. • **Honesty** – Can be trusted at all times. • **Reliability** – Is dependable on words, promises and deeds. • **Impartial** – is guided by fairness, truth and justice in making all decisions.
Step 3: Eligibility for Leadership	Ask participants to identify eligibility criteria for leadership positions (committee members and officials) of a community project. The purpose is to get the participants' thinking about who should be eligible for leadership positions. [The facilitator should be aware that this may be uncomfortable for existing leaders if they do not meet the eligibility criteria proposed by the group. The facilitator should therefore put all the participants at ease about the discussion] Once the group has formulated the eligibility criteria, the facilitator should ask whether these criteria are reflected in the WUA Constitution.

	Eligibility for Leadership Every organization has certain standards and eligibility criteria for election into leadership positions . In addition to WUA constitutional requirements, leaders to public office must also comply with the national constitutional standards of leaders' ethics. Possible eligibility criteria includes: • Functionally literate with at least basic education standard e.g. Kenya Certificate of Primary Education (KCPE); • Aged 21 years and above; • A registered member of the WUA or water project; • Be free of any debt owed to the project; • Have no criminal record; • Be of sound mind. A process of vetting of community leaders to ensure they meet the criteria defined in the WUA constitution is important as it acts as a check on the electoral process. This ensures that unqualified persons do not enter into positions of leadership. **A note of caution:** These guidelines should be applied with due consideration for communities with low literacy or traditional governance structures. They may place more importance on age and position within the society when electing leaders for the WUA.
Step 4: Leadership Styles	Demonstration through role plays is a good way of illustrating the different styles of leadership (authoritative, democratic, laissez faire (passive)). Briefly explain the different styles of leadership. Get four participants to sit in a group and act out the different leadership styles with each member taking a turn at being chairman although with a different style. Each mini-play should take no more than one or two minutes. After all the leadership styles have been demonstrated, the facilitator should facilitate a discussion by asking the following questions: a) What did you see? b) What were the differences in each leader? c) Which leadership is more effective? It should be noted that the different leadership styles may be necessary at different times in the life of a group to achieve objectives. Democratic leadership is often preferred as it is more effective in keeping the group together.
Step 5: Choosing Leaders	1. Facilitator should make a brief presentation on the different methods of choosing a leader, using the following points:

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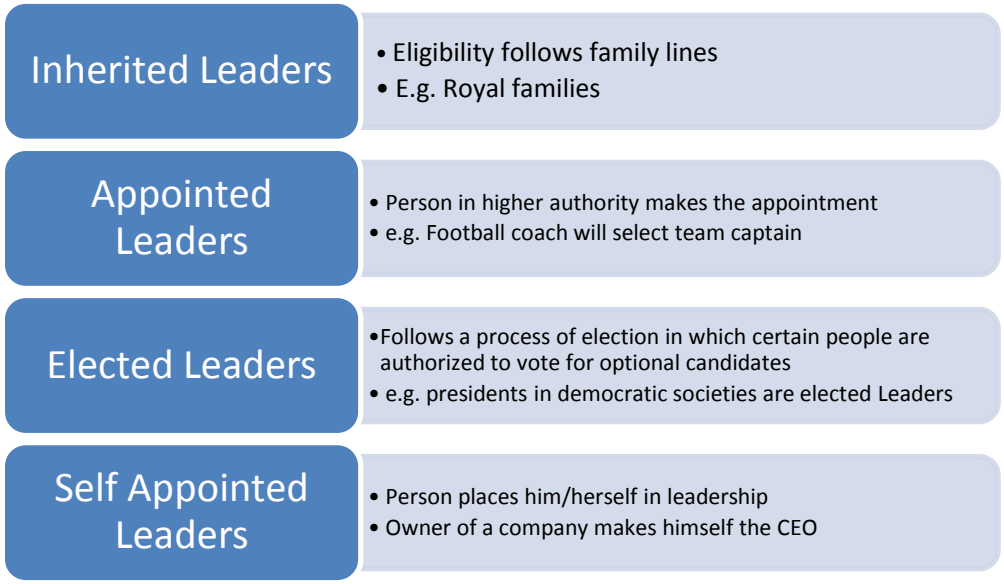
<tr><td></td><td>


2. Ask the participants to state how their WUA leaders were elected;
3. List the methods that are highlighted by the group. Allow them to discuss the strengths and weaknesses of every method;
4. Discuss the process of conducting an election that serves the interests of the WUA.
• An election is the process of selecting a candidate to represent interests of others with a common goal.
• Elections should be done periodically in a duly convened meeting according to the constitution of the WUA.
5. Discuss the following with reference to the WUA constitution. Does the constitution state clearly:
• Who Should Carry Out Elections?
• Timing of Election?
• Models/Types of Elections (raising hands, clapping, secret ballot etc)?
• Election Procedures?
• Terms of Office of the WUA leaders?
• Appeal against an Election?</td></tr>
<tr><td>Review</td><td>• Why does a WUA need good leaders?
• What are the qualities of a good leader?
• How does the WUA makes sure that it gets good leaders?</td></tr>
<tr><td>Session Attachments</td><td>None</td></tr>
</table>

MODULE B	**WUA GOVERNANCE**
SESSION B3	**MAKING AND USING A WUACONSTITUTION**
Appropriate Facilitator Background	The facilitator (facilitation team) should be individuals with a background in public service administration
Introduction	Preparation of any constitution is usually a process that involves experts, plus WUA members and other stakeholders. This session is appropriate to groups who are developing a constitution or groups who need to review/amend their constitution.
Objective	By the end of the session participants should be able to: • Describe the key elements of a constitution; • Set up an interim task team (of interim officials) from members to prepare a draft constitution for a community water project; • Discuss and agree the provisions of draft WUA constitution.
Outputs	An understanding of constitution making as demonstrated by a draft constitution of a WUA based on a template
Timing	3 hours
Target Group	All WUA members, WUA committee, and local leaders
Appropriate Venue	Community hall or a facility within the community
Methodology	• Demonstration/observation • Illustrations in practice/simulation • Short presentations/question and answer
Materials	• Flip Charts and marker pens; • Pens (different colours), note books; • Constitution outline with questions to stimulate discussions and a developed draft constitution
Session Guide	
Step 1: Role Play to draw out constitutional issues	Ask three participants to perform a role play depicting two water users arguing with a committee member over various issues related to the community water project. One user is more informed than the other. Some of the issues in the discussion should include: • complaints about the way rules and regulations are exercised; • the shortfalls in the by-laws; • questions on the objectives of the project; • the role of the leadership and committees; • role of the project members and consumers; • Who sets the tariff and how; • Who controls the funds and what are funds spent on. Discussion Questions: 1. What are the issues being raised by the members who are asking questions? 2. How can the WUA solve the problem? The facilitator will ask the participants the following questions to help them review the necessary issues in their proposed constitution/by-laws: 1. What are the existing water rules and regulations currently in use in their project?

	2. What issues would they like the water management committee to address (some objectives will come up here)? 3. What will be the roles of the members, office bearers? 4. For how long will the office bearers be in office (elections)? 5. How often will the committee hold meetings? 6. In What format would they like to keep the records of their deliberations? 7. What other things would they want in their rules e.g. on lateness, membership etc? Once they answer these questions in plenary the facilitator will provide them with a model constitution (See Attachment) to discuss and develop the sections required. After this they will report in plenary and agree on the model to adopt.
Step 2: Importance of a Constitution	Ask participants to discuss the purpose of a group constitution. The facilitator should draw out the following points. **A constitution defines:** • Objectives of the group • Organisational structure with committees and officials • Who has authority to make decisions on behalf of the group • What funds can be used for and how they should be accounted for • How to elect leaders and how long they can stay in office • How often meetings should be held and how they should be conducted • How the constitution can be changed A good constitution should: • Help the group to realise its objectives • Protect individual interests within the context of serving the group objectives • Minimise risk to the project from authoritarian or weak leadership • Provide systems of accountability to the membership • Make the group operate efficiently • Minimise conflicts by being clear on rules and procedures.
Step 3A: Drafting a new WUA constitution	1. Divide participants into several groups of 5-6 people each and give each group the draft outline of a constitution (See Attachment 1) and ask them to describe each article briefly in bullet points. 2. Facilitator should support the groups where there is lack of understanding 3. In plenary, ask one group to share their points for the first articles of the constitution, then rotate through the groups so that all groups get to present their points 4. On each article, allow the other groups to comment and allow time for discussion. 5. If there is disagreement, note the different opinions and move on. This helps to isolate the ‚contentious issues' which require adequate time and dialogue to develop agreement.
Step 3B: Reviewing a WUA Constitution	If the WUA has an existing constitution, ask the participants to brainstorm and identify issues related to the constitution where the following situations arise: • There are components of the constitution that are ignored;

	• There are conflicts within the group regarding the meaning of sections of the constitution; • There are problems within the group for which the constitution does not provide direction or clarity; The facilitator should write the answers down on a flip chart. • Map out the areas of the constitution that need to be amended; • Make suggestions on possible amendments; • Identify the correct process for taking these suggestions to the management committee for presentation at the AGM or to get the management committee to form a task force to look into the required amendments. It should be noted that changes to the constitution are not binding unless endorsed by the WUA members at a bona fide AGM or special general meeting (SGM).
Step 4: Using a Constitution	1. The facilitator should ask participants to explore the areas where they feel that the constitution is frequently overlooked. Write the answers on a flip chart. 2. Ask participants to identify and discuss the reasons why the constitution is overlooked and identify ways to minimize these situations. 3. The participants should also be asked to consider what the risks are to the group when the constitution is overlooked. Many WUAs ignore certain aspects of their constitution whenever it is expedient. Common cases where WUA constitutions are overlooked include: • Timing of AGMs; • Conduct of AGM; • Notice period for AGM; • Frequency of elections; • Holding committee meetings when there is a lack of quorum; • Utilisation of funds for purposes stated in constitution Steps that a group can take to minimize the constitution being overlooked are: • Ensure all project members have a copy of the constitution and have had a chance to be „inducted' into the constitution; • Appoint an oversight or audit sub-committee whose job it is to ensure that the constitution is followed and to raise any points to the main committee where the constitution is overlooked; • In cases where the constitution is impractical, then it is necessary to make a change to the constitution so that it can be followed more easily.

	The risk to the group in the event that the constitution is not followed includes: • Authority of the constitution is diluted and no longer serves as the guiding tool for the group; • Conflicts can arise because the „rules' have been suspended; • Fraud and malpractices can be allowed to continue without the members realizing.
Review	1. What is the purpose of a constitution? 2. How is a constitution enforced? 3. Who has the role of enforcing the constitution?
Session Attachments	Attachment 1: Discussion questions for a WUA constitution Attachment 2: Sample Constitution

Attachment 1: WUA Constitution Outline1

Questions to guide the thinking that should go into the preparation of a Constitution

Name
What is the name of the organization?

Vision and/or Mission

Objectives
A)
B)
C)
D)

Membership
Who is eligible to be a member? (Including whether household or individual)
What conditions or requirements are members required to fulfil?
Is there need for membership fee, how are charges determined?
What are the penalties for failure to comply with the rules and regulations or grounds for expulsion?
What benefits does an expelled member or one who leaves voluntarily get or expect?
How are new members admitted?

Administrative Structure
a) Who has responsibility for policies and strategic directions (e.g. Management Committee)?
b) Who has responsibility for day to day running of the affairs of the WUA? E.g. employed personnel such as caretaker, funds collector and/or manager. It is possible that some of the committee members will take on this role. The chairperson for example may act as a manager; the treasurer may act as a funds collector. If the work is fairly full time, they will have to decide how they should be paid for their services.

WUA Management Committee
Who the committee shall consist of? (E.g. chairperson, vice chairperson, secretary, vice secretary, treasurer)
What are their roles?
How shall they be appointed (e.g. through elections? nominations? both?)?
Should they receive any stipend (allowances) for their services? (E.g. to cover lunch, travel etc)
How long can Committee members hold office? Can they be re-elected?
Why, how and when can committee members be removed from office before the end of their term?
What action can be taken against committee members and office bearers for mismanagement?

Duties of Committee Members

a) Specify duties of committee members

Meetings

How many types of meetings will be held?
How often will these be held?

[1] Adapted from WSTF, CPC, Doc 00, Orientation Guidelines

What is the purpose of each type of meeting?
How many people are required for a Quorum? (E.g. two thirds)
What place and time will meetings be convened?
What will be the procedure for calling and conducting meetings (e.g. notices, agendas)?

Control of Funds
What are legitimate expenditures? How should these be decided?
Who will administer funds?
What signatories and approval is required before funds can be released?
Who will be responsible for accounts and how often will these be updated?
What mechanisms are there for cross checking accounts (e.g. a separate committee)?
What are the procedures for annual accounts? (e.g. to be prepared, audited and presented to all members at the AGM)
What penalties are there for misuse of funds?

Auditors
How often should accounts be audited?
Who will be the internal auditors and how will they be chosen?
How will they crosscheck the validity of accounts?
To whom should audited accounts be presented?
Which external bodies should be free to check audited accounts?

Legal Provisions
Who will be liable for mismanagement of the group's finances and its assets?
What are the procedures in the case of the above?
Who owns WUA assets?
Who owns the water source?

Amendments to Constitution
How can amendments to the constitution be made? When and with whose approval?

Dissolution of WUA
What procedures are required for the dissolution of the WUA?

Attachment 2: Sample Constitution (Abbreviated)

SAMPLE CONSTITUTION

Note: This sample constitution forms a basis for discussion. Further details or more comprehensive sample constitutions are available. The services of a lawyer can be helpful in developing a constitution.

Article 1: Name

The society shall be known as: XXXXXXXX

Article 2: Area of Operation

The WUA covers a given specified area in a location or sub-location.

Article 3: Objective

To serve the interest of xxxxxx village by ensuring the equitable access to water for all users

Article 4: The Membership

The criteria for WUA membership is:

1. Resident of XXXXX village or area;
2. Be at least 21 years (exceptions can be made for youth headed households);
3. Only one person within each household will be eligible for membership.

The application for membership shall be submitted to the Management Committee (MC) who shall accept or reject the application.

a) Cessation from Membership

A WUA member shall lose membership if:

1. He/she has been suspended from membership;
2. Voluntary withdrawal;
3. Death

b) Suspension from Membership

The management committee (MC) shall suspend a member and this will be ratified by the Annual General Meeting (AGM). The following reasons may make a member to be suspended;

1. Misusing the WUA facilities;
2. Disobeying the constitution;
3. Failing to pay dues for a period of time.

After suspension from membership a member shall not continue getting services until AGM reverses the suspension. However MC shall refund membership fee if a member withdraws voluntary. Any refund shall be less any debt owed by the member to the WUA.

Article 5: Activities of the WUA

The activities of the WUA shall be to:

1. Conduct regular meetings to discuss issues related to management of the water supply.
2. Manage income and expenditure in the best interests to the community and in an open and transparent way.
3. Initiate maintenance activities to ensure that a satisfactory service level is maintained.
4. Recruit and monitor performance of project staff (guard(s), operator(s).
5. Mediate in community disputes that may arise regarding use of, or access to, water.

Article 6: Committee Members

A WUA member shall be eligible to be considered for election to serve in the committee if he/she meets the following criteria:

1. Over the age of 18 years;
2. Is a fully paid up member;
3. Has no debts to the WUA;
4. Does not have any criminal record.

The committee shall consist of 9 members with no less than one third from each gender.

Article 7 - The Management Committee

(a) The Management Committee (MC) will consist of 9 members from which the office bearers will be drawn.
(b) Management committee members due for election, shall be elected at the first General Meeting in the new term. Election of the committee members shall be by secret ballot, queue voting, or show of hands.
(c) The Management Committee shall meet at such times and places as it shall resolve but shall meet not less than once every month.
(d) Any vacancies for members of the committee caused by death or resignation shall be filled by the Management Committee until the subsequent General Meeting of the WUA.
(e) The quorum for the committee meeting shall not be less than one half of the committee members.
(f) When deemed necessary and if considered essential for the operation of the organisation, the Association shall have the power to create certain auxiliary bodies and committees to deal with specific tasks.

Article 8 - Duties of the Management Committee

(a) The Management Committee shall be responsible for the management of the Association and for this purpose may give directions to the office bearers as to the manner in which, within the law, they shall perform their duties.
(b) All moneys disbursed on behalf of the Association shall be authorised by the Management Committee;
(c) The Management Committee shall establish a Finance sub-Committee, a Procurement sub-Committee and a Monitoring/Audit Sub-committee.

Article 9: Office Bearers

The office bearers of the Association shall be:

1. Chairperson

2. Secretary
3. Treasurer

Additionally three ordinary committee members will be identified to act on behalf of each office bearer, upon delegation, when they are absent or unable to fulfil their role.

Article 10: Duties of Office Bearers

a) Chairperson

The chairperson shall preside over all meetings of the committee and general meetings.
The chair shall be responsible for the filing of WUA annual returns with the registering authority.

b) Secretary

The secretary shall deal with all correspondence of the Association. S/he shall issue notices convening all meetings of the committee and general meetings and shall be responsible for keeping minutes of such meetings and preserving records for future reference.

c) Treasurer

The treasurer shall receive and dispense funds under the direction of the committee. S/he shall be responsible for ensuring proper documentation of all transactions is kept and that receipts are issued for all money received and expenditure paid.

Article 11: Duties of Ordinary Committee Members

1. Designated members will deputise for office bearers as necessary.
2. Represent the views of water users at meetings and be involved in decision making on their behalf.
3. Ensure Committee is meeting its mandate in an open and transparent way and in the best interests of water users.
4. Monitor the performance of the office bearers and report any mismanagement.
5. Disseminate information and decisions made during committee meetings back to the water users.

Article 12: Meetings

1. There shall be two classes of meetings – Committee meetings and general meetings.
2. Committee meetings shall be held once per month. A quorum is considered to be present with more than half of the committee members in attendance. Ordinary water users are entitled to request to attend these meetings.
3. General Meetings should be held at least once per year with the purpose of enabling the committee to present the status of accounts to water users and explain actions taken by the committee. The general meeting gives an opportunity for water users to highlight issues, air any grievances and hold elected committee members accountable for their actions.
4. Upon request and with support of 10 water users an extraordinary meeting can be called to discuss specific urgent matters that cannot wait for a committee or general meeting.
5. Minutes from all meetings shall be documented and made available to any interested parties.

Article 13: Sources of WUA Funds

Funds of the WUA shall be raised from the following sources: -

1. Membership fees

2. Subscriptions
3. Deposits
4. Donations
5. Profits
6. Loans

Article 14: Use of WUA Funds

WUA funds shall be used to meet the following expenses:

1. Office expenses (Telephones, stationeries)
2. Operational expenses.
3. Development
4. Audit fees
5. Insurance
6. Salaries and allowances for staff

Other expenses shall be as approved by the AGM.

Article 15: Control of WUA Funds

The MC shall control expenses of the WUA and in particular.

1. The WUA funds shall not be paid in form of dividends or gifts;
2. The treasurer shall collect all funds and account for the same;
3. The treasurer shall bank all funds in the WUA bank account;
4. Three officials, one of who shall be the treasurer, shall sign all cheques.
5. The AGM shall be notified of any loss of funds.

Article 16: Procurement and care of WUA Property

i) A member shall protect the WUA property.
ii) Water shall be used for purposes of domestic, livestock and business.
iii) Constitution abuse shall not be entertained.

There shall be a procurement sub-committee.
The procurement sub-committee shall procure all stocks required by the WUA after the approval of the MC.

Article 17: Books of the WUA

The WUA shall keep up to-date books of accounts which a member has a right of inspecting. To inspect such books a member shall be required to give seven days notice to the WUA.

Article 18: Auditors

The WUA financial year shall commence at the beginning of every year. The MC shall appoint an auditor who shall be approved by the AGM. The responsibilities of the auditors shall be: -

i. To audit all books of accounts once a year.
ii. To ensure the WUA funds are well used
iii. To ensure accountability.
iv. To collect all debts.
v. To ensure books of accounts are maintained.
vi. Members are informed of the audit report.

Article 19: Amendment of the Constitution

The MC shall amend the by-laws subject to member's approval in an AGM. Two-thirds of the membership shall constitute a quorum of amending the by-law.

Article 20: Arbitration

The MC members shall sort out any arbitration or dispute and where they are unable the dispute shall be referred to the local representative of the Department of Social Services.

Article 21: Elections

Elections shall be held every 2 years by ballot. All water users are eligible to vote.
Committee members shall not serve more than two terms in office.
Where a member can no longer fulfil his/her role on the committee an election will be held to fill that vacancy.

Article 22: Accountability

The committee shall be accountable to water users at all times and upon request will allow accounts to be scrutinised by any registered water user. Notwithstanding the above, before elections take place, all accounts and project records shall be checked by ordinary committee members and their findings made public.

Article 23: Dissolution

A WUA shall stand dissolve if 75% of the registered members vote for its dissolution. Any assets and liabilities of the WUA will be handed over to any other organization with similar objectives or handed to the government of Kenya through the ministry (at the time) in-charge of water.

MODULE B	**WUA GOVERNANCE**
SESSION B4	**ROLES AND RESPONSIBILITIES**
Appropriate Facilitator Background	The facilitator (facilitation team) should be individuals with background in public administration.
Introduction	Every human organization and enterprise always needs a number of tasks to be undertaken for it to be successful. For an organization such as a community managed water project, the roles will differ from area to area and depending on the size of the project, but in general there is the need to delegate certain tasks to particular groups or individuals.
Objective	By the end of the session participants should be able to: 1. Define the terms "roles" and "responsibilities" 2. Discuss the roles and responsibilities of members and officials of a community water project
Outputs	Increased awareness regarding the roles and responsibilities of WUA members and leaders.
Timing	2 hours
Target Group	Water committee members, WUA members
Appropriate Venue	Community hall or a facility within the community where participants can interact without many distractions.
Methodology	• Demonstration/observation • Illustrations in practice/simulation • Short presentations/question and answer
Materials	• Illustrations; • Flip Charts and marker pens; • Pens (different colours), note books; • - WUA constitution
Session Guide	
Supporting Information	**Definitions** A **role** is what the society expects of an individual or group of individuals. A **responsibility** is the component of a job that serves as a unit of work. In brief, when we look at our own constitution a role can be said to be the position or the office while a responsibility is what the office does. For example the **role** of a WUA treasurer is to keep the resources of the group in safe custody; the **responsibilities** may include maintaining books of accounts, issuing receipts for all monies received, banking, etc. See Attachment 1 for additional information on roles and responsibilities relevant to a WUA.
Step 1: Define the terms "roles" and "responsibilities"	Ask participants to mention one of the smallest human organizations they know. [Probe for family unit, clan, or a local primary school] Ask who does what in a nuclear household unit with mother, father and children and write on the flip chart the tasks done by the man, the woman, and the children [Listen for gender division of tasks as well]. In the case of a primary school, ask **what is expected** of the following persons holding office: • Head teacher;

	• PTA committee member; • Parent; • Pupil; • Teacher; • Watchman etc By identifying the specific expectations of the community we establish the roles of each member. For example the **ROLES** of the headmaster might include : • Provide leadership to the entire school; • Supervise the work of the teachers; • Manage the resources of the school. For each of these roles, the headmaster himself or the school committee might assign various tasks or **RESPONSIBILITIES** to be performed in order to provide leadership or supervise the teachers. For example, under supervision of teachers, responsibilities may include: • Keeping the list of teachers attendance every day; • Holding regular staff meetings; • Monitoring the teachers' performance; • Motivate teachers through reward system for good performance and punishment for failing to perform. Notes to facilitator: In plenary, help participants to discuss the roles of different offices in their communities such as the chief, the religious leaders, a father, the school headmaster, the political leaders. Make sure not mix between the roles and responsibilities of these offices.
Step 2: Discussing the roles and responsibilities of members and officers of a community water project	1. Identify the different positions with the water project. These should include: a. Customer b. Project member c. Chairman d. Secretary e. Treasurer f. Ordinary Committee member g. Auditor h. Management Committee i. Finance Sub-committee j. Procurement Sub-committee k. Audit Sub-committee l. Project employee/staff 2. Divide the participants into groups and assign one or two positions to a group. Ask each group to discuss the roles and responsibilities of the

	different offices. Ask them to list these on a flip chart being careful not to mix roles and responsibilities (See Attachment 1). Check whether the roles and responsibilities are consistent with the WUA constitution. Discuss the ideas emerging in plenary and ensure that there is clarity in defining roles and responsibilities
Review	What is the difference between a role and a responsibility? What is the role of a project member and why is this role the most important?
Session Attachments	Attachment 1: Roles and responsibilities of some of the offices

Attachment 1: Roles and responsibilities of some WUA positions

Position	Role	Responsibilities
Water user	To use the water responsibly and efficiently	• Pay the bills on time • Report leaks/bursts
Project Members	To ensure the project continues to provide value for money giving the benefits it was developed to provide To keep the leaders accountable in ensuring the service delivery	• Developing and following an effective constitution • Electing an effective management committee • Keeping the management committee accountable for their actions • Attending project meetings when required and giving ideas on how best to run the project • Participate in community work whenever necessary • Offer to serve in the leadership
Management Committee	To manage the project effectively and sustainably	• To organize and call AGM and other meetings • To run project bank account • To prepare project budgets • To recruit and employ staff • To plan and implement water development activities including tariff setting, metering, membership registration, society registration, etc • To ensure equitable distribution of project benefits • To keep and maintain project records • To ensure project accounts are audited • Conflict resolution
Chairman	Provide leadership to the management committee to enable it to fulfil its roles	• Chair all project meetings • Guide on project policy matters • Ensure all project records are properly maintained • Ensure smooth running of project activities • Enforcement of by-laws
Secretary	Keep all the records of the organization	• To record minutes of all meetings • To maintain a Minute Book • To maintain a Members Register • To ensure that the water supply correspondence is correctly and efficiently attended to
Treasurer	To be responsible for all finances of the organization	• Keep records of the WUA assets and finances • To check all payments • To sign all payment vouchers • To ensure banking of all monies received on behalf of the water supply

MODULE B	**WUA GOVERNANCE**
SESSION B5	**EFFECTIVE MEETINGS AND MAKING DECISIONS**
Appropriate Facilitator Background	The facilitator (facilitation team) should preferably be individuals with background in public administration
Introduction	Decision-making is one of the skills needed by leaders. In fact leaders are always making decisions i.e. choosing among alternatives. An organization of any size will always require regular meetings at which decisions are made. The issue is that many WUAs hold meetings which are ineffective or inefficient. This session aims to improve the decision making process within a WUA.
Objective	By the end of the session participants should be able to: 1. Differentiate between the different types of meetings in the WUA constitution; 2. Discuss the procedures for conducting meetings and decision making; 3. Importance of minutes of a WUA meeting and how to take them.
Outputs	Appreciate the need for and processes of conducting WUA meetings and simulate a meeting process
Timing	2 hours
Target Group	All WUA members, WUA committee members, and local leaders
Appropriate Venue	Community hall or a facility within the community where participants can discuss without too many distractions
Methodology	• Demonstration/observation • Role Play • Illustrations in practice/simulation • Short presentations/question and answer
Materials	• Illustrations; • Flip Charts and marker pens; • Pens (different colours), note books; • WUA constitution
Session Guide	
Supporting Information	**Terminology** • **Quorum** – This is the minimum number of people who must be present at a meeting in order for it to proceed and make decisions. Every meeting has the minimum number of attendees expected to be present for the meeting to be valid and for decisions taken to be legitimate. Where it is not stipulated in the constitution, the members should set the quorum and abide by it in the minutes. • **Agenda** – Agenda is the list of topics or issues to be discussed at a meeting. • **Minutes** – Minutes are a recording of the proceedings and decisions made at a meeting. (See Attachment 2: Outline of Minutes) • **List of Members Present** – This is a list of all persons present by name and title (where necessary) and should be indicated at the top of the minutes or attached to the minutes if the list is too long. The minutes should indicate who among those present was chairing the meeting. • **Absent with apologies –** Whenever a meeting is held, some members may be unable to attend. These members should send their apologies and the apologies should be recorded in the "Absent with Apologies" section of

<table>
<tr><td></td><td>the minutes.</td></tr>
<tr><td>Step 1: Types of meetings in the WUA constitution</td><td>Facilitator should ask participants to list the different kinds of meetings that are specified in the WUA constitution or, for a new group, which kind of meetings take place in a neighbouring group or school.

Facilitator should ask the participants to describe the purpose of different meetings.

Different Types of WUA Meetings

1. Committee Meetings
• Held regularly, e.g. once every month by the project committee members;
• To discuss matters mainly concerning administration of the project.

2. Sub-Committee Meetings
• A project committee may divide itself into various sub-committees;
• These hold their meetings as necessary to discuss specific matters of the project

3. Annual General Meetings
• Organized and called by the committee once every year;
• The purpose is to inform members about issues concerning their project accounts and other specific matters (such as elections and project progress).

4. Special General Meetings
• Held when there is special business to be discussed by the members.
• These meetings are often seen as extra-ordinary meetings.</td></tr>
<tr><td>Step 2: Procedures for conducting meetings</td><td>Facilitator should conduct a ROLE PLAY, taking the role of chairman, while appointing others to be the secretary, treasurer and two committee members. The facilitator will lead a brief meeting and will demonstrate how to hold a meeting by following the proper procedure for a meeting.

The facilitator should use the role play to illustrate the following points:

1. Proper announcement (notice) of the meeting prior to the date of the meeting including the agenda, time and venue of the meeting;
2. Reference to the WUA constitution on matters related to absence of committee members at meetings;
3. Keeping the meeting on agenda points and not deviating into non-agenda issues;
4. Ensuring that AOB issues are not treated as agenda items.</td></tr>
</table>

Sequence of Events in a Meeting

1. Chairman calls the meeting to order;
2. Meeting may start with a word of prayer if appropriate;
3. Chairman checks quorum and secretary lists the members present;
4. Chairman checks for members „absent with apologies' – these are noted in the minutes.
5. Chairman checks for members „absent without apologies'
6. Chairman reviews the Agenda which may be:
    a. Read and confirm minutes of last meeting;
    b. Matters arising from the minutes;
    c. Specific agenda items for this meeting.
7. Minutes of previous meeting are read and confirmed or amended;
8. Review Minutes of previous meeting and address any issues or action points that were identified and get a report on progress (except for any issues that are on the agenda for this meeting);
9. Discuss the specific agenda items for this meeting.
    a. The chairman introduces each agenda item and then seeks contributions from members, guiding the discussions until the time for decision making;
    b. The chairman outlines what has been discussed and asks members which direction they want to go;
    c. Members may agree around a certain position. If there is no common agreement, the decision can be made through a vote using various methods;
    d. Once a resolution is made on the matter, the secretary makes a brief summary of the points that were raised and records the resolution in the minutes book and it becomes the official position of the meeting;
    e. The secretary should read the resolution as recorded so that members agree with the wording and meaning;
    f. The secretary should also record clearly if the resolution also states that a certain action should be taken and by whom. This makes „Matters Arising' in the next meeting easier.
10. The chairman will ask each member if they have any other business (AOB). Note that AOB is generally not an opportunity for decision making but rather for raising issues that could be put on the agenda for the subsequent meeting if required or bringing points of information for the leadership team.
11. The chairman will announce the end of the meeting and set the date for the next meeting;
12. It is often good to close with a prayer again as this gives a good rounded conclusion to the meeting.

	After the role play, the facilitator should ask participants whether they have any problems with the way their meetings are conducted. These may include: • Meetings take too long; • Meetings are not focused on agenda issues; • Takes too long to come to a decision; • No agenda is provided before the meeting; • No minutes are available from the last meeting. The facilitator should allow a discussion of these problems and brainstorm on ways to overcome the stated problems.
Step 3: The decision making processes	Facilitator should ask participants to describe a recent decision of the WUA. Use this example to illustrate the different stages in the decision making process. **Stages of Making Decisions** • Gathering the facts • Consulting those involved • Making the decision • Explaining the decision • Monitoring the process and results of the decision. The facilitator may also want to discuss the advantages of different types of decision making e.g. Consensus, Ballot, Secret Ballot. It is useful to discuss when a different form of decision making is appropriate (e.g. secret ballot at an AGM to allow individuals to make their decision free from any pressure). **Difficulties in Decision Making** 1. The facilitator should ask the participants to describe various issues that may affect the quality or speed of making decisions. 2. List these points on a flip chart. 3. Brainstorm on ways to minimise or overcome these complications

<table>
<tr><td></td><td>Decisions may be difficult to make due to the following issues:

• Fear of consequences – “what if the members reject the decision?”
• Lack of information – insufficient information to know with confidence what the options are;
• Conflicting loyalties – when the leader is in more than one CBO/WUA;
• Interpersonal conflict – personal differences;
• Hidden agenda – if individual committee members have personal interests or conflicts;
• Blundering method – making a decision without testing consensus;
• Inadequate leadership – restriction of opinion / discussion;
• Clash interests – opposing interests.</td></tr>
<tr><td>Step 4: Minute Taking</td><td>Discuss the formats of minutes using various templates and reviewing the minutes of the group if these are available.

Minutes are an important record of WUA meetings and decisions and so should be taken accurately and kept safely.

Minutes are generally taken and kept by the WUA secretary

Format of Minutes

MINUTES OF JUA KALI WATER ASSOCIATION COMMITTEE MEETING HELD ON 07/07/1999 AT PROJECT OFFICE

Members Present: List of persons present
Members Absent with Apologies
Agenda of the meeting
Meeting started at 10:00 am
Minutes:
Minute 1999/001 Resolution. Action by ……
Minute 1999/002 Resolution. Action by ……
…..
…..
AOB
Meeting ended at 12:00</td></tr>
<tr><td>Review</td><td>What should the chairman do to keep a meeting focused?
What is the purpose of keeping minutes?</td></tr>
<tr><td>Session Attachments</td><td>None</td></tr>
</table>

MODULE B	**WUA GOVERNANCE**
SESSION B6	**EFFECTIVE COMMUNICATION**
Appropriate Facilitator Background	The facilitator (facilitation team) should be individual(s) with backgrounds in development communication or public administration, (e.g. teachers, social workers etc)
Introduction	Many WUAs fail to invest sufficient attention to establishing systems for effective communication between the management committee and members or between the WUA and the government departments. The net result is that poor communication becomes an impediment to the efficient operations of the project.
Objective	To build the understanding and skills of the WUA committee members for effective communication
Outputs	Participants are able to distinguish what makes effective communication.
Timing	1 hour
Target Group	All WUA members
Appropriate Venue	A facility within the community where members can focus on the discussions and be free from unnecessary distractions.
Methodology	Facilitation, role-plays, focus group and plenary discussions
Materials	Paper hammer made from manila paper, improvised *"mabati",* Felt Pens, Flip Charts, handouts, ball for „Ball Game'.
Session Guide	
Supporting Information	**Definition of Communication** Communication is the passing of information from the mind of sender to a receiver through a channel with feedback. Other scholars call it the creation of understanding between a message sender and receiver. However, communication takes different forms in different contexts. **Terminology** • **Source/Sender:** The person initiating the communication process and who has information they want to pass • **Message:** Content of the information • **Channel:** The means through which the message is passed (Baraza, Mass communication media, word of mouth, letter etc) • **Receiver:** The person to whom the message is passed • **Feedback:** Response of the receiver to the message Communication is a central part of our lives. Verbal or written, or even non-verbal communication is essential to almost everything we do. You communicate your thoughts, your feelings, and your desires. You communicate whether and by how much you like, respect and trust a person. You communicate happiness, uncertainty, delight, and confidence. Communication is an important tool in managing groups and conflicts. Effective communication skills tend to hold the community together. Free sharing of information is critical to the development of high performing teams. Where information is controlled and manipulated, mistrust and suspicion usually arise.

	Some effective channels of communication and information sharing include: • Public rallies or barazas • Workshops and seminars • Drama/role plays • Interpersonal and informal interactions • Person to person contacts • Pictures/posters/charts/billboards • Audio visual aids e.g. film shows
Step 1: Introducing topic of effective communication	**Role play** A father is busy working in his workshop. He wants to straighten out a piece of iron sheeting(‚*mabati*') but he is unable to do it alone hence he needs somebody to assist him straightening the iron sheet by hitting it with a hammer while he himself is holding. He shouts to his timid son to come and help. Father says to the son **"When I nod my head, hit it hard and fast?"** He places the iron sheet on a wooden/metal bench and holds it with pliers then goes ahead and nods his head as anticipated by the son. After the sign the boy hits the father's head hard instead of the iron sheet. **Discussion** 1. What did you see? 2. What did you hear? 3. What happened? 4. What should the father have done? 5. What does that tell us about communication? Conclude the discussion by saying – "communication is what is heard and not what is said".
Step 2: Defining communication	Ask participants what they understand by the term communication and discuss the responses to make sure all the elements of the definition are included.
Step 3: Describing the purpose of communication in a WUA	Use the following role play to explore issues in communication. **Role play: The Ball game** Have a small ball that participants can use for this role play. All participants should take part in this role play. 1. All participants stand together in circle. 2. Tell the participants that they can speak only if they are holding the ball otherwise they should remain silent and listen to what is being said. 3. When an individual has finished talking they can pass the ball on

	– either to someone with their hand raised who is requesting to speak, or to someone else. 4. Participants may also place the ball in the centre of the circle on the floor, from where it can be picked up by anyone in the group. This may exclude the shyer people. If someone receives the ball and does not want to speak, they can just pass it on. After the exercise, discuss what it felt like to hold the object, to receive it unasked and to receive it when requested. Those who were given the ball without asking might have felt uncomfortable and have felt forced to participate. The game encourages a listening attitude; it allows quieter members of a group the opportunity to speak. It also makes more dominant members conscious of the amount they are speaking since they are holding the ball. Once the procedures are learnt and become automatic, many groups find this a very useful way of organising group discussions. It dispenses with the need for an authoritative chairperson as the rules are built in. It often helps with later plenary sessions, when participants will refer back to the ball game to ensure that everyone has the chance to speak. One variation is to allow participants to turn their back on a speaker if they are bored with them, or find what they are saying irrelevant. This is a very direct act, which serves to stimulate discussion during the feedback session. Discuss in plenary why the communication process sometimes fails. • Some of the communication barriers include: Background, clanism, personality, age difference, feelings, language barrier, attitude, education, rumours, sabotage, poor planning, ignorance, environment, hatred, different status, class differences, prejudice • Misunderstanding of message due to: poor listening/receiving, using wrong media, and misinterpretations of message, choosing wrong audience, usage of didactic format instead of participatory kind of communication, wrong assumptions, different perceptions, lack of interest, poor organisation, cultural differences, distortion of the communication, personal interest, economic differences, competition.
Step 4: Discussing elements of effective communication	**Role plays** Ask six volunteers, to present three role-plays. Each pair decides what subject is to be discussed. It is better to pair two men, a man and a woman and two women, if possible. **Role Play One:** • Two people meet

	• One of them begins to talk and gets so excited and involved in what he/she is saying that he/she pays no attention to the other. • The other tries several times to speak, to ask a question, respond or make a suggestion, but the first person talks on. So the second person remains silent and gives up trying to respond. • The play ends when the point has been made. **Role Play Two:** • Two people meet and both start telling the other what they are concerned about. • Each has a different topic and neither is listening to the other as both are talking at the same time. • The play ends when the point has been made. **Role Play Three:** • Two people meet, greet each other and start a dialogue. • Each one asks questions about each other's interests, listens and responds to the other's answers and shares their own news and opinions. Discuss the role plays: 1. What did you observe in each play? 2. What helped or hindered effective communication? 3. What did you learn from each of the role-plays? 4. What can we do to help make communication as good as possible in your group? Summarize the session as follows: 1. One – way (monologue) communication of telling others what to do cannot lead to mutual understanding; 2. Communication is not effective unless people are talking about the same agenda; 3. Communication cannot occur unless people listen to what is being said; 4. Dialogue (two – way) communication is brought about by listening to ideas and opinions of others through orderly discussion. 5. Showing interest in the subject of discussion and exchanging views facilitates communication. a. In group discussions dialogue is the only sure way of achieving mutual understanding or learning from one another. b. Group members and leaders need to use and practice dialogue for decision making in groups.

Step 5: Discussing Report Writing	The facilitator should ask participants to name some of the reports that are prepared for the WUA? Using the responses, the facilitator should provide a brief presentation on the purpose of reports and how to prepare a good report. **Reporting** is a form of communication. Reporting is the means (verbal and written) of keeping all stakeholders informed. Regular reporting is critical for community development projects. Why should this be planned? Regular reporting on projects of an organization helps to capture and document data and lessons as they happen. Reports also provide a window into the project for people outside the project. What should be included in a project report? Discuss. When writing a report one should always have in mind the audience of the report and what will be useful for them. It is important to ask: • What is the objective or purpose of the report? • Content of the report, i.e. what information is contained in the report? • Addressee of the report i.e. who the report is written to? • Areas of interest to be covered i.e. what should be included in the report? • What should be the key headings and sub-headings? • What should be the source of the information?
Review	Is communication what is heard or what is said? Why is effective communication important?
Session Attachments	Attachment 1: Tips for Report Writing

Attachment 1: Tips for Report Writing

TEN tips to good report writing.

1. Take the Readers' Seat: Design your writing for readers who do not have too much time to read and no time to waste;
2. Put the bottom line on top. Start with one of these: conclusion, action request, recommendation, summary/overview
3. Brainstorm/Sort/Prioritize: Your reader wants structure. Common structural systems go from; general to particular, most important to least important; comparison and contrast; process or time sequence, or a combination of any of the above.
4. Package your products for the eye: Use visual tools to communicate: headings, short paragraphs, bullet lists and white spaces
5. Use simple Words: utilize = Use; Commence=start; escalating = rising; terminate = stop
6. Dump dead words: afford an opportunity – allow; for the purpose of – to; subsequent to – after
7. Go for the verb: change the verb-nouns to pure verbs: e.g. impose a requirement = require; establish a reduction – reduce; make a decision – decide; undertake a study – study.
8. Go for the Active Voice: A proposal was reviewed by the committee - the committee reviewed a proposal; the concept was created by us – we created the concept.
9. Avoid long sentences – Give your readers a break. If a sentence runs more than three lines, break it into two.
10. Edit yourself: Best times: an hour or a day after you write; there is no such thing as a perfect first draft.

MODULE B	**WUA GOVERNANCE**
SESSION B7	**CONFLICT MANAGEMENT**
Appropriate Facilitator Background	The facilitator (facilitation team) should be individuals with backgrounds in group management, public office leadership acquainted with the subject.
Introduction	The session provides an opportunity for the group to discuss conflicts and raise their awareness of measures that the group can take to avoid or manage conflicts.
Objective	By the end of the session, participants should be able to: 1. Identify causes of conflict that can arise over group management; 2. Identify and discuss steps that groups can take to minimize conflicts.
Outputs	A set of guidelines or procedures in place to minimize conflicts
Timing	1 hour
Target Group	All WUA members
Appropriate Venue	Any facility within the community where discussions can be conducted without unnecessary distractions
Methodology	This is intended to be an **ACTIVITY** and a **DISCUSSION** session aimed at coming up with conflict issues arising from water use and how to resolve them. The discussions will build on existing experiences of participants regarding these issues. Role play, guided discussions, group discussion, and brainstorming will also be used.
Materials	Flip charts, marker pens, note books and pens, WUA Constitution/by-laws.
Session Guide	
Supporting Information	**Different forms of conflict resolution** 1. Consensus building (low level issues) 2. Facilitation (jointly owned solutions) 3. Mediation (seeking common ground) 4. Fact Finding (technical solution) 5. Arbitration (judge)
Step 1: Identifying causes of conflict	Start by getting two community members to hold a pen/stick together and draw a cow/camel on a piece of paper/ground. Ask them to carry out the task without talking (they can use gestures and signs only). 

	Discussion Questions • What difficulties do you think the drawers faced in carrying out the task? • To the drawers – What conflict did you face in carrying out the task? • What could they have done to draw a better camel? • What kind of conflicts can arise in the process of running a water project? Facilitator should write responses on flip chart.
Step 2: Negotiation Skills	**Define negotiation** Negotiating is a communication situation in which two or more individuals or parties make a series of concessions in order to forge a mutually agreed upon settlement. In mediation, a third party mediates or manages the communication so that the disputants can create their own settlement. Negotiating or bargaining is a communicative process between two interdependent parties with differing goals who are attempting to produce a joint decision. **Activity: The (20) Twenty shilling coin.** **Material required:** A (20) shilling coin for each pair of participants. 1. 1. Ask the group members to form pairs, preferably with someone they do not know. 2. Give each pair a twenty (20) Shilling coin between them. 2. Tell them that they have exactly 5 minutes to decide between them who is going to get the coin. The only rules are that they are not allowed physical contact (violence) during the discussion period. If they cannot decide who is to collect the (20) twenty shilling coin, it is returned to you. When the time is up you can lead a discussion on negotiation and decision making techniques **Discussion points:** What types of techniques did the group use? 1. Were all of the negotiations honest? 2. How did people feel about a time limit being imposed?
Step 3: Defining and discussing Conflicts	**Definition** Conflict is defined as „clash of interests between two or more parties when at least one of the parties seeks to assert its interests at the expense of another party's interests'. **Causes of Conflicts – Brainstorming Session** Ask participants to identify some of the common factors that cause conflicts. These may include struggle over resources, poor leadership, nepotism etc.

Step 4: Steps to Minimising Conflicts

Ask participants to identify steps that the group or WUA can take to minimize or manage conflicts. Write the answers on a flipchart.

The facilitator can use the answers to elaborate on all options for reducing conflicts.

Options for reducing conflicts

- Frequent and timely meetings can help to reduce conflicts.
- Transparency and accountability especially in finances and groups/committees assets will ensure that conflicts are easily resolved. Production of records i.e. treasurers report and reading in the AGMs will always ensure confidence.
- Timely elections – It is important for leaders to renew their mandate by calling for the elections at the scheduled time. The elections must always be transparent.
- Conflicts can be managed through regular consultations among officials and members. This reduces suspicions and unnecessary rumours.
- Open tendering and staff recruitment for groups/committees with such provisions will reduce conflict. This will always encourage professionalism and reduce such vices as nepotism, favouritism, clan-ism.
- Gender balanced committees are normally stable and more accountable. Groups are encouraged to include all interested parties in the composition of the committees.
- Sometimes coercion/force may be used to resolve conflicts. Errant members who refuse to reform may be suspended or expelled to safeguard the interests of the group. However coercion must be used as a last resort.
- Co-option may help in solving/reducing conflicts. Some relevant stakeholders may be included in a project if their inclusion will add value to the objective of the group/committee.
- Training of officials/members can reduce conflict; training increases efficiency and effectiveness of the group leaders. For members it increases participation especially on community contribution and decision-making.

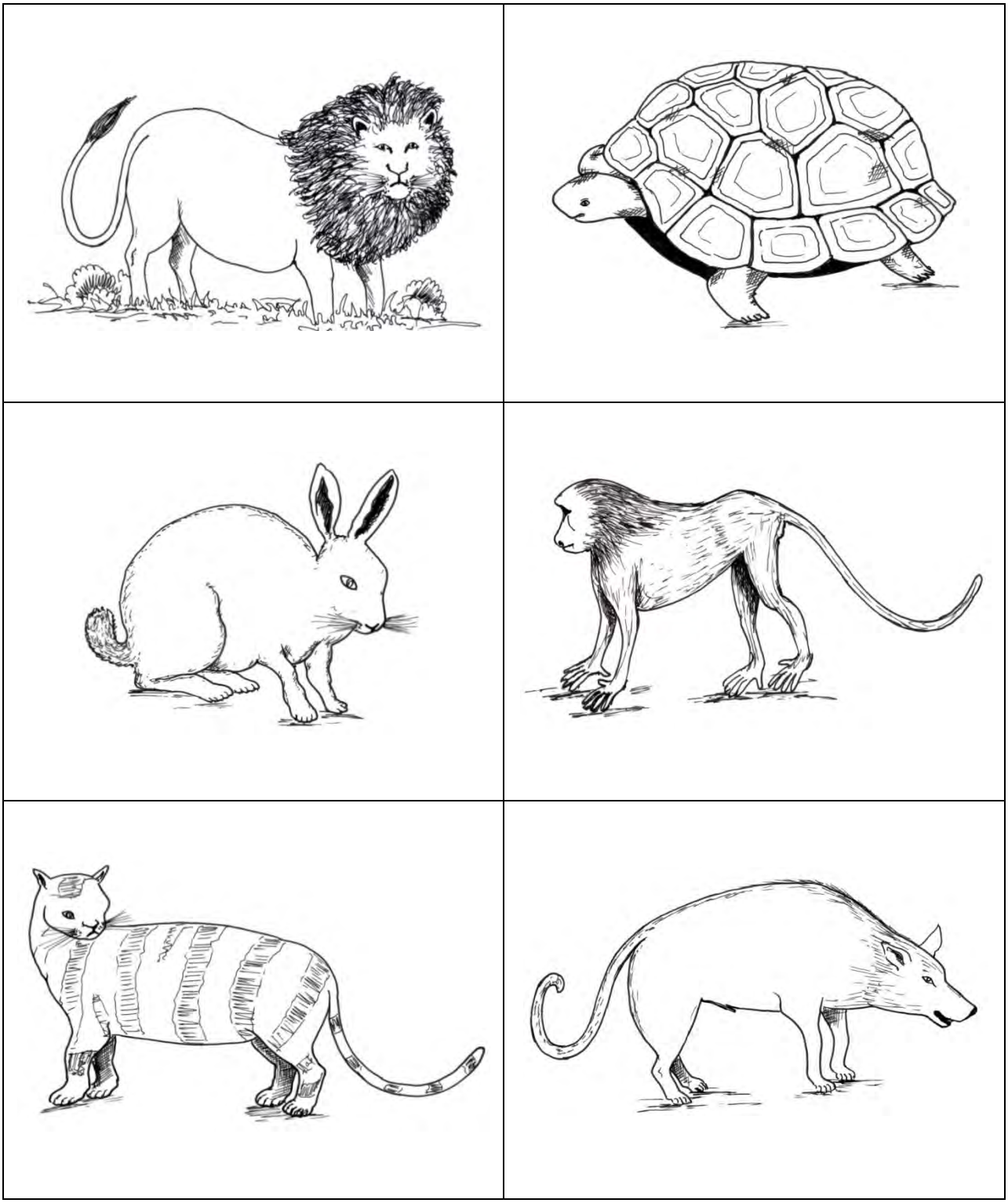
Possible steps to manage a conflict include:

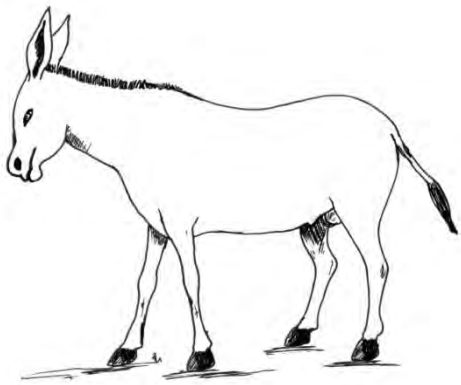
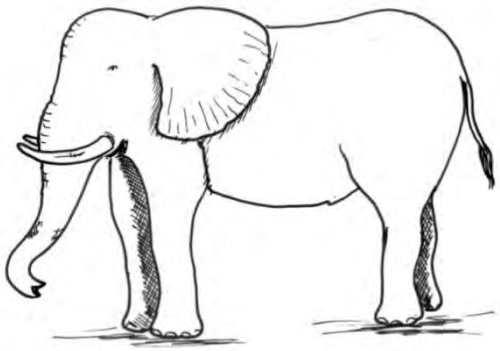
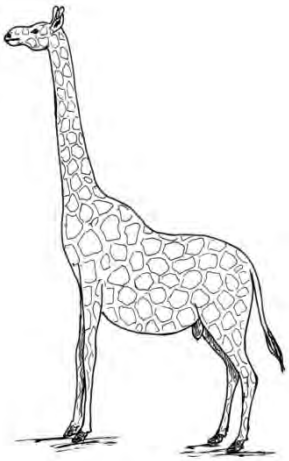
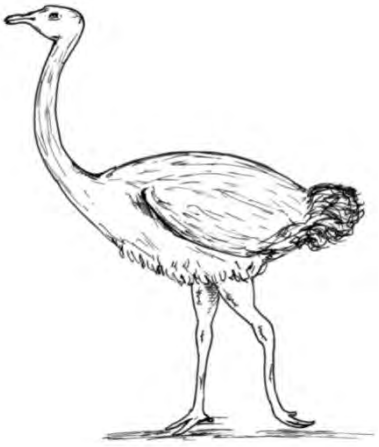
1. Acceptance of the conflict is the first step towards resolving it. Appreciate the reality and identify the exact nature, extent and ascertain the possible cause.
2. Identify the parties to the conflict. This requires an understanding of the topic and it may require information gathering.
3. Seek an authoritative facilitator/arbitrator. This may require notifying authorities or water project committee, depending on the scale of the conflict.

	4. Address the conflict in a timely way so that the parties to the conflict know that a solution is being sought. 5. Seek open dialogue between the parties to see if an amicable solution can be found. 6. If open dialogue does not work, then try alternative from of conflict resolution which include: 7. Mediation; 8. Arbitration.
Step 5: Recognising behaviour within a conflict situation	Behaviour associated with certain animals is used to illustrate typical behaviour during conflict situations. **Procedures**: Ask participants to form groups of two. Assign one of the following animals to each group and ask participants to identify how their animal typically acts and relate this to typical behaviour during conflict situations. Allow each group to describe their animal and its behaviour in conflict situations. **Typical behaviours of some animals:** • The lion who fights so strongly that often he intimidates others • The rabbit who, when he sees conflict, decides to run away • The tortoise who withdraws and lets others become involved in the conflicts. It becomes their problem. • The fox that waits for the proper moment during, or even after the conflict situation has gone, to pounce upon or attack the group members supporting the conflicting viewpoints. • The monkey who becomes nervous and anxious when conflict develops and tries to make everyone happy or forget the conflict by telling jokes. • The cat who wants sympathy. He may tell of a situation that personally happened to him in order to bring everyone over to his side. • The donkey who will not be moved. He becomes stubborn and decides that his viewpoint is the only one to be considered. • The giraffe who seems to be above it all and remains distant and aloof during the whole time the conflict occurs; he looks down on others' contributions because of his experience and superior education. • The ostrich who buries his head in the sand and pretends that the conflict does not exist. • The elephant who blocks any move to resolve the conflict situation. He places himself in the middle of the road and will let no one pass by. **Discussion** Use the discussion to illustrate the different characters and discuss how these characters should be handled during conflict situations.

Review	Conflicts can be destructive but they can also be constructive. Describe a situation where a conflict could be destructive, and another case where a conflict could be constructive.
Session Attachments	Attachment 1: Sketches of animals

Attachment 1:Animal Sketches



MODULE B	**WUA GOVERNANCE**
SESSION B8	**COMMUNITY BASED MONITORING AND EVALUATION**
Appropriate Facilitator Background	Community facilitator with experience in setting up community based monitoring and evaluation systems
Introduction	Community based monitoring and evaluation (CBM&E) is a system undertaken by the community to monitor and evaluate the performance of their system
Objective	• Raise awareness on purpose and importance of community based monitoring and evaluation • To establish a community based monitoring and evaluation system
Outputs	An M & E Plan which includes: • A list of indicators to be monitored; • Monitoring Tools
Timing	Session should take approximately two hours
Target Group	Management committee members and community resource persons
Appropriate Venue	Meeting hall where participants can clearly hear and participate in the discussions and where distractions are minimised.
Methodology	- Group discussion; Plenary discussions
Materials	- Flip Charts - Pens
Session Guide	
Supporting Information	• **Monitoring** is a system of regular checks and measurements to determine changes in performance. • **Evaluation** is the process of reviewing the information from the monitoring process to determine what course of action, if any, is required • An **M & E system** is a tool for the project management to help improve the way the system is run, to improve efficiency and to provide a track record to demonstrate what the performance is. **Common faults of M & E Systems** o Not linked to project decisions o Poorly formulated (too little thinking at outset) o Too ambitious (too much data required) o Insufficient priority (data is not collected or evaluated on a routine basis) o Lack of involvement of beneficiaries
Step 1: Identifying M & E Systems from our daily lives	The facilitator should make a brief presentation to introduce the topic. Ask participants to provide examples of M & E Systems from their daily lives. The following items can be considered: o Vehicle work-tickets o Work Timesheets

<table>
<tr><td></td><td>

Water/Electricity meter readings
Duty Rosters
Child Health Card
Attendance Register at School
School/College Term Reports & Exams
Visitors Books in GOK &WUA Offices

The important point is that M & E Systems are part of our lives because they are useful.
</td></tr>
<tr><td>Step 2: Why establish an M & E System?</td><td>
Ask the participants what value would be gained by having an M & E System for the water project/scheme?

The facilitator should use the answers to draw out the following points:

Builds ownership of how the system is performing and serving the members;
Supports decision making by identifying areas which are performing well and others which are not performing well;
Enables the project to make better decisions because data is available to inform the decision making process;
Simplifies data collection by being focused on certain types of data;
Helps the project to know what action is making an impact and whether changes are required;
Supports accountability and transparency by making data available for the committee and members.

</td></tr>
<tr><td>Step 3: Review of data collection systems within the project</td><td>
The facilitator should ask the participants to list the kind of data that is currently being kept by the project, how frequently and by who. A table similar to the one below can be developed.

<table>
<tr><th>Type of Data</th><th>Who Collects Data</th><th>How Frequently</th></tr>
<tr><td>Record of WUA Decisions</td><td>Secretary - Minutes of meetings</td><td>Each committee meeting or AGM</td></tr>
<tr><td>Attendance at Committee Meetings</td><td>Secretary</td><td>Each committee meeting</td></tr>
<tr><td>Income and expenditure</td><td>Accountant or treasurer</td><td>Daily</td></tr>
<tr><td>Pumping Hours</td><td>Pump attendant</td><td>Daily</td></tr>
<tr><td>Water Use at Kiosks</td><td>Water kiosk attendant</td><td>Daily</td></tr>
<tr><td>Observations on Water quality</td><td>Water users</td><td>Not recorded</td></tr>
<tr><td>Visitors to the water project</td><td>Chairman in the Visitors Book</td><td>Each visit</td></tr>
<tr><td>Work attendance for casuals</td><td>Chairman or project manager</td><td>Every day</td></tr>
</table>

Clearly data is being kept by the project but the question is whether the data is organised in a way that provides a comprehensive picture on how the project is performing and whether the data is reviewed properly to
</td></tr>
</table>

	help in decision making. The M & E system should be linked to the aspirations of the project members.
Step 4: Reviewing project objectives	The facilitator should ask the participants to identify the project objectives. These may include statements such as ‚provision of water to all the members'. The facilitator should provoke a more detailed discussion on what exactly the project members want or expect in relation to: • How much water per person per day? • How far should the water points be from the households? • How much should the water cost? • What water quality is acceptable? • What level of reliability is acceptable? The facilitator should also probe on what expectations the members have of their management committee: • Should women be given an opportunity to serve on the management committee? • Should the financial records be made public? • Should procurement or employment opportunities by advertised? From this discussion, draw up a list of objectives or expectations that the members have. The objectives can be grouped according to the following categories: 1. Water Services 2. Sanitation Services 3. Hygiene Practices 4. Health 5. Livelihood improvement 6. Project management or governance 7. Provision for vulnerable groups
Step 5: Defining Indicators	An indicator is something that can be measured objectively (i.e. whoever does the measurement will come up with the same answer), easily and which provides useful information. The facilitator should make use of the list of expectations and objectives defined in the previous step and ask participants to identify indicators that could be used to measure progress of the water project towards meeting those expectations. **Note of caution:** Identifying easily measurable indictors is NOT easy! Select indicators that are simple and easy to measure. Restrict the number of indicators. Identify a list of a maximum of 8 to 10 indicators in total (See attachment

<table>
<tr><td></td><td>1 for possible indicators) that would help to summarise the progress of the project.</td></tr>
<tr><td>Step 6: M & E Plan</td><td>The facilitator should lead the participants through a discussion to develop a M & E Plan which includes:

• Indicator Matrix;
• Data collection Tools;
• Process of data evaluation and reporting.

Using the indicators identified in Step 5, ask participants to identify who will gather the data and how often.

Prepare a matrix as shown below.

<table>
<tr><th>Indicator</th><th>Who Collects Data</th><th>How Frequently</th></tr>
<tr><td></td><td></td><td></td></tr>
<tr><td></td><td></td><td></td></tr>
<tr><td></td><td></td><td></td></tr>
</table>

Preparation of Data Collection Tools
Consider each indicator and identify the tool or form that will be used to gather this data. The tool should be simple and clear.

Evaluation of Monitoring Data
The M & E Plan is not complete unless the monitoring data is evaluated and its implications considered. The purpose of the evaluation is to see whether the data indicates progress or deterioration of the project towards meeting the expectations of the project members.

This should be a responsibility of the monitoring or audit sub-committee to check:

1. That the monitoring data is being collected;
2. To evaluate the data and report to the main committee on the findings;
3. The evaluation process should be placed as an agenda item for the audit sub-committee meetings.</td></tr>
<tr><td>Review</td><td>1. What is a monitoring and evaluation system used for?
2. What will happen to the data monitoring if the data is never evaluated?</td></tr>
<tr><td>Session Attachments</td><td>1. Sample Indicator Matrix</td></tr>
</table>

Attachment 1: Sample Indicator Matrix

Component	Indicator	Units	What does it measure?
Water Services			
	Proportion of active water kiosks	%	Proportion of water kiosks that are not working
	Proportion of active individual connections	No.	Number of active consumers of a water project
	Proportion of operational water points (e.g. hand-pumps)	%	Proportion of water points that are not operational
	Proportion of schools with an operational water point in or within 200 metres of the school compound	%	No. of schools that have proper access to water
	Avg. Monthly Production	m3/month	Water available for piped schemes
	UfW = Vol. consumed/Vol. produced (%)	%	Unaccounted for Water (only possible to measure this in a metered system)
Sanitation Services			
	Avg. No. girls/stance across all schools in project area	No.	No. of female students with adequate access to improved sanitation facilities in schools
	Avg. No. boys/stance across all schools in project area	No.	No. of male students with adequate access to improved sanitation facilities in schools
Community Hygiene Practices			
	% of schools with designated place for hand-washing with water & soap near the latrines and which are being used by students	%	No. of schools with adequate hand washing facilities
Health Impacts			
	% of households with cases of diarrhoea in last two weeks	%	Incidence of water borne disease
Community Participation In Project			
	% community contribution to total project cost	%	
	% members attending AGM	%	
Participation of Women in Project			
	% women attending AGM	%	Gender inclusion

	% women on management committee	%	
Governance in Project			
	Avg. Monthly Revenue	Ksh/month	
	Total No. of days with no supply due to mechanical breakdowns	No.	Performance of operation and maintenance systems
	Audit Report presented at AGM	Yes/No	Financial accountability
Sustainability of Project			
	No. of committee meetings within last 12 months	No.	Regular committee meetings
	% attendance at committee meetings	No.	Committee commitment
	Operating Ratio = rev/exp	%	Ability to pay operating expenses
Environmental Health			
	% of water points with garbage or faeces around water point	%	Pollution around water points
	% of water points that have proper drainage	%	Maintenance of drainage around water points

MODULE C
LEGAL AFFAIRS

Overview

This module provides support to water projects in addressing legal matters that pertain to the project. Essentially the water sector reforms oblige water projects to operate on commercial principles which means that projects should be compliant to the laws of Kenya and ensure that all contractual and legal matters are properly addressed. The leadership within the community water project should take responsibility for ensuring the project is fully compliant with statutory requirements and principles of good governance.

<table>
<tr><td>MODULE C</td><td>LEGAL AFFAIRS</td></tr>
<tr><td>SESSION C1</td><td>LEGAL REGISTRATION</td></tr>
<tr><td>Appropriate Facilitator Background</td><td>Community trainer with experience in community water projects (with good understanding on legal issues applicable to community water supply systems); a technical officer from the county water office conversant with legal matters; community development assistant from the Department of Social Services</td></tr>
<tr><td>Introduction</td><td>This session focuses on legal registration of a community group responsible for developing and managing a water supply system which could be composed of various point sources and/or a piped scheme.</td></tr>
<tr><td>Objective</td><td>The objective of this session is to enable the project to decide what form of legal registration is appropriate and to take action to become registered or to update their registration status.</td></tr>
<tr><td>Outputs</td><td>• Raised awareness on the different registration options and their advantages and disadvantages
• Community Action Plan</td></tr>
<tr><td>Timing</td><td>Session should take approximately 1 – 2 hours</td></tr>
<tr><td>Target Group</td><td>Group members and committee members</td></tr>
<tr><td>Appropriate Venue</td><td>A place where participants can clearly hear and participate in the discussions and where distractions are minimised.</td></tr>
<tr><td>Methodology</td><td>Information sharing through a Question and Answer approach and Guided Discussions.</td></tr>
<tr><td>Materials</td><td>- Flip Charts, pens, registration information sheet</td></tr>
<tr><td>Session Guide</td><td></td></tr>
<tr><td>Supporting Information</td><td>Terminology
<table>
<tr><th>Name of Group</th><th>Definition</th></tr>
<tr><td>SHG - Self Help Group</td><td>Group of community members who are registered with Department of Social Services</td></tr>
<tr><td>CBO - Community based organisation</td><td>Generic term used for any group made up of a number of local individuals or groups who have registered with Department of Social Services</td></tr>
<tr><td>NGO - Non-governmental organisation</td><td>Any organisation that is registered under the NGO Act</td></tr>
<tr><td>FBO - Faith based organisation</td><td>Organisation that operates under a registered religious body.</td></tr>
<tr><td>WUA – Water Users Association</td><td>Group of community members registered under Societies Act with the Registrar of Societies for the purpose of developing and providing water services.</td></tr>
<tr><td>WRUA – Water Resource Users Association</td><td>Group of community members registered under Societies Act with the Registrar of Societies for the purpose of managing the water</td></tr>
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<table>
<tr><td></td><td>
<table>
<tr><td></td><td>resources and conserving the catchment and riparian areas</td></tr>
<tr><td>CO-OP – Cooperative Society</td><td>Group of community members registered under Cooperatives Act for the purpose of undertaking a common activity. Frequently used for groups interested in providing opportunities for savings and loans for its members.</td></tr>
<tr><td>SO – Support Organisation</td><td>Any registered organisation that provides technical support services to various water sector bodies</td></tr>
<tr><td>Company</td><td>Organisation registered with the Registrar of Companies to advance its objectives.</td></tr>
<tr><td>Trust</td><td>Organisation registered as a legal trust where trustees and beneficiaries are clearly defined.</td></tr>
</table>
</td></tr>
<tr><td>Step 1: Introduction</td><td>For new groups, the facilitator should ask the participants to identify other groups within the community and to report on the type or level of registration of the group.

For existing groups, the facilitator can ask the group to explain why the group chose the form of registration that it has. Establish whether the group is satisfied with this form of registration. What benefits and or constraints has the group faced with this level of registration?</td></tr>
<tr><td>Step 2: New Group - Selection of Registration Option

Or

Existing Group seeking to change/upgrade registration</td><td>The facilitator can explain the different options and the benefits and disadvantages of each type of registration.
(See Attachment 1: Information Sheet on Group Registration).

The group may chose to consult with other groups, a lawyer or different government offices before making a decision.

The group will need to develop a Constitution which is consistent with the form of registration that has been agreed on. (See Module B – WUA Governance for Developing a Constitution)</td></tr>
<tr><td>Step 3: Developing a Plan of Action</td><td>Once the form of registration has been decided, the group should make a Plan of Action for compiling the application form and required documents and fees.

<table>
<tr><th>TASK</th><th>RESPONSIBLE</th><th>TIMEFRAME</th></tr>
<tr><td></td><td></td><td></td></tr>
<tr><td></td><td></td><td></td></tr>
<tr><td></td><td></td><td></td></tr>
</table>
</td></tr>
<tr><td>Review</td><td>1. What are the main forms of registration available to a community based water project?
2. What does it mean for a water project to be registered as a legal entity?</td></tr>
<tr><td>Session Attachments</td><td>Attachment 1: Information Sheet on Group Registration</td></tr>
</table>

Attachment 1: Information Sheet on Group Registration

A. Registration with the Department of Social Services as a SELF HELP GROUP (SHG) or COMMUNITY BASED ORGANISATION (CBO).

This form of registration is frequently used by groups that are starting up. Membership is open to those that meet the membership requirements (as explained in the group constitution/bylaws).

Benefits: Application process is quick, and cheap. Registration allows group to meet & open a bank account. Registration provides official recognition to the group so the group can raise funds and undertake its activities. Group may be able to obtain a loan although this is bank specific. Group can apply for funds from funding agencies. The group is not required to submit tax returns to KRA.
Constraints: Registration does NOT provide legal recognition therefore the group cannot enter into contracts or own assets (not unless the group appoints individual(s) or legally registered organisations as trustees who can act in all legal matters on behalf of the group). Oversight of the group by the DSDO.

Registration Process:

1. Obtain application form from District Development Officer (DDO) or District Social Development Officer (DSDO);
2. Fill in form and submit signed form to DSDO with:
    a. Constitution or Bylaws of group
    b. List of Members
    c. Names of interim officials and ID numbers
    d. Minutes of meeting electing interim officials
    e. Pay the registration fee
3. The DSDO will sign and stamp the form and issue a Certificate of Registration.

Maintaining Registration: No mandatory requirements (this may change).

B. Registration with the Registrar of Societies as an Association

This form of registration is appropriate for membership groups. Membership is open to those that meet the membership requirements (as explained in the constitution of the group). This form of registration is popular with community based water projects who may become a Water Users Association (WUA) and a water service provider especially in rural areas.

Benefits: Registration provides full legal recognition. This allows the group to meet, open a bank account, conduct its affairs, raise funds, take loans (this is bank specific), enter into contracts and own assets. The group is required to obtain a PIN certificate and submit tax returns to KRA for PAYE and Withholding Tax.
Constraints: The application is more complicated and takes longer (typically 2 – 3 months). Oversight is by the Registrar of Societies.
Registration Process:

1. Obtain application form from Registrar of Societies (Attorney General's Office). At the district level this is at the Law Courts
2. Fill in form and submit signed form to same office with:
    a. Constitution of group
    b. List of Members

c. Names of officials and ID numbers
d. Minutes of meeting electing officials
e. Application Fee
f. For water projects, a letter of no-objection from Ministry of Water and Irrigation. This can be obtained from the District Water Office.

3. The group officials should accompany the application so that the office can interview the officials regarding the group's objectives.
4. The Registrar of Societies will send a letter to group stating whether the application has been accepted or rejected.
5. If approved, the group can go to collect the Certificate of Registration.

Maintaining Registration: Submit Annual returns to Registrar of Societies using official form which documents changes to officials and any changes to constitution of the association.

C. Registration with the Ministry of Cooperatives as a Co-operative Society

This form of registration is appropriate for membership groups. Membership is open to those that meet the membership requirement (as specified in group constitution). This form of registration has not been widely used in the water sector but is a legitimate option. This option has typically been associated with helping members with savings, loans and cooperative investments. These cooperatives are commonly called SACCOs - Savings and Credit Cooperatives.

Benefits: Registration provides full legal recognition. This allows the group to meet, open a bank account, conduct its affairs, raise funds, enter into contracts and own assets. The Cooperative may provide saving opportunities and access to credit facilities although this is group and bank dependent. The group can provide dividends to its members. Importantly, the Ministry of Cooperatives provides oversight on the cooperative groups, conducting audits, helping to resolve disputes, overseeing elections, etc. The Ministry also provides financial management and governance training to cooperative groups. In addition, registration as a cooperative provides the group with preferential access to financing from the Coop Bank. The group is required to obtain a PIN certificate and submit tax returns to KRA for PAYE, Withholding Tax and Bank Interest.

Constraints: Registration typically takes 1-3 months. The group is required to comply with the requirements and regulations of the Cooperative Act.

Registration Process:

1. Obtain application form from Ministry of Cooperatives (District Cooperatives Office - DCO)
2. Fill in form and submit signed form to same office with:
    a. Constitution of group
    b. List of Members
    c. Names of officials and ID numbers
    d. Minutes of meeting electing officials
    e. Application Fee
    f. For water projects, a letter of no-objection from Ministry of Water and Irrigation. This can be obtained from the District Water Officer.
3. The group officials should accompany the application so that the office can interview the officials regarding the group's objectives
4. The DCO will send the application to the Ministry Headquarters for approval.
5. If approved, the group can go to collect the Certificate of Registration

Maintaining Registration: Submit Quarterly returns to the Ministry of Cooperatives using official form and adhere to other requirements of the Co-operative Act.

D. Registration as a Private Company with the Registrar of Companies

This form of registration is appropriate for individuals intending to invest in a commercial venture. This form of registration has not been widely used in the water sector but is a legitimate option. Access to become a member or shareholder is governed by the Articles of Association of the Company.

There are various registration options for private companies which include:

- Private company with limited liability
- Private company limited by guarantee
- Not-For-Profit Private Company limited by guarantee

It is advisable to obtain the services of a lawyer to understand the benefits and disadvantages for each option and its suitability for the proposed venture.

Benefits: Registration provides full legal recognition. This allows the group to meet, open a bank account, conduct its affairs, raise funds, enter into contracts and own assets. Registration process is quick (21 days).

Constraints: The Company must obtain a PIN certificate. The company must submit tax returns and is subject to taxation on profit. Application process is typically undertaken with the support of a lawyer to prepare the Articles of Association and to undertake the application process. The company also requires a Company Secretary. The application process, higher level of scrutiny on accounts by KRA and the Company Secretary mean that the overhead for a company is typically higher than for other forms of registration.

Registration Process:

1. Obtain application form from Registrar of Companies
2. Fill in form and submit signed form to same office with:
    a. Articles of Association
    b. List of Shareholders
    c. Names of officials and ID numbers of Directors
    d. Name of Company Secretary
    e. Application Fee
3. If approved, the group can collect the Certificate of Registration

Maintaining Registration: Company Secretary must submit Annual returns to the Registrar of Companies

E. Registration as a Trust

This form of registration is appropriate where a set of assets that belong to one entity are assigned into the care of another entity to be used as specified in the Trust Deed. This form of registration has not been widely used in the water sector but is a legitimate option. In the case of community based water projects, the assets may belong to the community but are placed, through the instrument of a Trust Deed, under the care and management of a group of individuals (trustees) to manage and operate the project for the benefit of the community.

It is advisable to obtain the services of a lawyer to understand the benefits and disadvantages of the Trust option and procedure to be followed to set up a Trust for a community based water project. The lawyer would also assist in the preparation and registration of the Trust Deed. Trust Deeds, like land titles, are registered with government.

F. Registration as an NGO

While there are many NGOs operating in the water sector these tend to offer technical and/or financial support to community water projects and do not tend to operate and manage the water supply systems.

MODULE C	**LEGAL AFFAIRS**
SESSION C2	**COMPLIANCE TO STATUTORY AND GOOD GOVERNANCE REQUIREMENTS**
Appropriate Facilitator Background	Community trainer with experience in community water projects (with good understanding on statutory requirements); a technical officer from the county water office conversant with legal/statutory matters;
Introduction	Community water projects need to comply with the relevant Kenyan laws. In addition, proper contracts and attention to legal matters can help to safeguard the project from disputes that may be disruptive, costly and or time consuming to resolve. Each community water project will need to develop a compliance check list that is appropriate to its project.
Objective	The objective of this session is to draw up a Statutory and Good Governance Compliance Check List.
Outputs	• Increased awareness on laws pertinent to a community water supply system • Statutory and Good Governance Compliance Check List • Plan of Action for following up on compliance Check List
Timing	Session should take approximately1 - 2 hours, depending on complexity of project
Target Group	WUA Committee Members and Community Leaders
Appropriate Venue	A place where participants can clearly hear and participate in the discussions and where distractions are minimised.
Methodology	Information sharing through a Question and Answer approach and Guided Discussions
Materials	Flip Charts Pens
Session Guide	
Supporting Information	The facilitator should be careful so that the WUA is not overwhelmed by all the statutory and legal requirements. Whether the requirements are applicable will depend on the nature and scale of the water project. A comprehensive checklist is provided in Attachment 1. This should be amended to suit each project.
Step 1: Introduction – Making sure everyone understands the scope of the discussion	The facilitator will start by explaining the topic: • Legal compliance – means compliance to any laws of Kenya that apply to the project • Contractual matters – any contracts between the water project and another person or organisation The facilitator can ask participants to name various aspects from personal experience that relate to statutory compliance: e.g.: • Registering a birth or death • Registering for an ID card • Obtaining a business permit • Obtaining a livestock movement permit • Submitting tax returns • You must register as a voter if you want to vote • Obtain a Marriage certificate; The facilitator can ask participants to name various examples of written

contracts that they can describe. These may include:

- Contract with someone to buy or sell something;
- Contract with a bank (application form) for a bank account;
- Contract with a Mobile Phone Company;
- Contract with a water project for water supply (customer contract);
- Contract with staff in the house or business.

To expand further, the facilitator can ask various questions to build a broader understanding on contractual matters.

Question	Answer
What is a contract?	Mutual agreement between two or more parties
Why should a contract be written down?	To legalise it, prevent denial or changes to the terms of the agreement, evidence of the agreement
What is an unwritten contract?	Citizen's contract, verbal agreements between two or more people, oath,

Note: It is advisable for a water project to seek professional legal advice for contracts that cover complicated arrangements or for large sums.

(See Attachment 2 for a Contract Outline)

Step 2: Importance of legal compliance and proper contracts

The facilitator will explain the purpose and importance of the water project meeting all the legal requirements and having proper contracts in place.

Facilitator can ask participants to brainstorm on **benefits** of being compliant to the laws of the Kenya and of having proper contracts.

Facilitator should contrast with the **consequences of NON-Compliance** to laws and good governance practices.

The benefits of legal compliance

- Legal recognition means the project can open bank accounts;
- Compliance with laws in regard to permits and licenses means the project will not be closed down or harassed by government officials for non-compliance;
- Project assets will be protected from disputes on ownership;
- Project will be protected from poor service by service providers through use of proper contracts;
- Proper written contracts will minimise disputes and provide clear information on what has been agreed between the contracting parties.

	Consequences of non-compliance to legal affairs • Lack of medical and workman insurance for staff exposes the project to legal disputes and high costs; • Lack of fire and theft insurance exposes project to risk of loss of assets; • Failure to pay PAYE, NHIF and NSSF for staff will mean the project will have to pay penalties or fines; • Accumulated back-log in fees or levies will disrupt cash flow.
Step 3: Identify legal matters relevant to this project	The facilitator can ask the participants to identify aspects of the water project that involve compliance with Kenyan laws or contractual matters. The facilitator should write the answers on a flip chart, leaving room to indicate the status of the project with respect to each topic. Answers may include: **Statutory Compliance** • Registration - Ministry of Culture and Social Services, Registrar of Societies, Company • Statutory Requirements for salaried staff - PAYE, NHIF, NSSF • Authorisation & Water permit from WRMA • EIA License from NEMA • Wayleaves from Kenya Forest Service (if applicable) • Service Provision Agreement or License with the relevant water service board or WSP **Contractual Matters** • Land title deeds or lease documents • Wayleaves from land owners • Vehicle logbooks & documentation on ownership of assets (handover documents, receipts) • Contracts with staff • Customer Contracts (between the water project and its customers) • Customer Contracts (between the water project and service providers like KPLC, bulk water service provider, security firms, etc) • Maintenance contracts • Insurance of project assets for fire & theft, third party liability, workmen compensation.
Step 4: Review Status of compliance	The facilitator needs to be aware of which legal requirements are relevant to the project (See Facilitator notes attached to this session). Using the Sample Statutory and Good Governance Compliance Check List (Session attachments), the facilitator can discuss relevant items and find out: 1. Which statutory requirements apply to the particular community water project?

<table>
<tr><td></td><td>2. Compliance status of each requirement?
3. Reasons for non-compliance, if applicable.

Note: Where it is not clear whether the requirement is applicable or how to become compliant, then the facilitator can plan with committee members on which is the most appropriate office to visit. Options may include DWO, WSB, lawyers, Insurance Agents, NSSF or NHIF offices, KRA, etc. The Plan of Action should include these consultations.</td></tr>
<tr><td>Step 5: Draw up a Plan of Action to Improve Compliance</td><td>• Identify which of the compliance matters needs to be addressed
• Allocate time and responsibilities

<table><tr><th>COMPLIANCE ISSUE</th><th>WHAT NEEDS TO BE DONE</th><th>WHEN</th><th>WHO</th></tr><tr><td></td><td></td><td></td><td></td></tr><tr><td></td><td></td><td></td><td></td></tr><tr><td></td><td></td><td></td><td></td></tr></table></td></tr>
<tr><td>Review Questions</td><td>Facilitator should ask the following questions to check whether the session objectives have been met:
• Does the water project have to be compliant to the laws of Kenya? If so, why?
• Which statutory requirements are difficult to comply with and why?
• How often will the audit committee check on the compliance status?</td></tr>
<tr><td>Session Attachments</td><td>1. Statutory and Good Governance Compliance Check List
2. Generic Outline of Contract</td></tr>
</table>

Attachment 1: STATUTORY AND GOOD GOVERNANCE COMPLIANCE CHECK LIST

Name of Water Project			
Date			
Relevant Act	**Item**	**Status**	**Action Required**
REGISTRATION			
Societies Act Cooperatives Act Companies Act Trusts Act	**Associations, Cooperatives, Trusts & Companies**		
	Annual Returns to Registrar		
	Registration for PIN Number		
	AGM		
	Elections		
	Annual Accounts		
	Annual Budget		
	Annual External Audit Report		
	Amendments to Constitution		
	Annual Business License		
TAXATION			
Income Tax Act	**Associations, Cooperatives, Trusts & Companies**		
	Registration for NHIF		
	Registration for NSSF		
	PAYE Remittances		
	Withholding Tax Remittances		
	PAYE Annual Returns		
	PAYE quarterly returns		
	Withholding Tax Annual Returns		
	Internal Tax Audit		
	Any relevant local government taxes		
Income Tax Act	**Companies**		
	Quarterly Tax Returns		
	Annual Tax Returns		
INSURANCE			
Work Injury Benefits Act (WIBA)	Registration		
	Insurance Cover		
	Register of earnings		
	Notice of injury		
Occupation Safety and Health Act	Registration with the directorate		
	Incidence reporting		
	Health & Safety audit		
	First Aid Kit		
	Protective Personal Equipment (Clothing, hard hats, gloves, etc)		
Security	Insurance of Assets against Fire & Theft		
	Contract with Security Firm/Staff		
3rd Party Liability	3rd Party Liability (in case of accidental harm)		
EMPLOYMENT			

Employment Act	Staff Contracts		
	Conditions of Service		
	Timesheets		
	Leave records		
	Records on payments, dismissals, termination, disputes, appointments, etc		
	Record of Staff Trainings		
HELB Act	Report to HELB on graduates recruited		
	Monthly deductions remittances		
RBA Act	Registration		
	Deductions remittances		
Public Health Act	Medical certificates for staff in water treatment plant		
ENVIRONMENT			
NEMA Act	EIA license		
	Environmental Management & Monitoring Plan		
	Annual Environmental Audit		
Water Act 2002	Master Water Meter		
	Abstraction permit		
	Water Use Charges		
	Service Provision Agreement or license		
	Levies to Water Service Board or WSP		
	Annual financial returns to WSB/WSP		
	Record of Water Quality		
	Codes of Practice		
	Customer Contracts		
Forest Act	Way leave obtained		
	Way leave Fees		
Land Act	Land title deeds		
	Land Rent		
	Leasehold agreements		
	Municipal rates		
	Wayleaves		
	Other land agreements		
BUSINESS DEVELOPMENT			
	Business Plan		

Signed by: Chairman Audit/Monitoring Sub-Committee_____ Date: _____

Signed by Chairman Main Committee _____ Date: _____

Attachment 2: GENERIC OUTLINE OF CONTRACT

Title: Contract for (topic of the contract)

This contract is made on (date) between

(1) (Name of Party A) of (Full Address of Party A, Box, telephone, email, etc) and (ID or Registration Number if appropriate), represented by (Name of Representative), hereinafter referred to as (abbreviation for Party A or a generic title like „client' or „employer').

And

(2) (Name of Party B) of (Full Address of Party A, Box, telephone, email, etc) and (ID or Registration Number if appropriate), represented by (Name of Representative), hereinafter referred to as (abbreviation for Party B or a generic title like „contractor' or „employee').

The parties agree as follows:

A. Details of what Party A will do or provide

B. Details of what Party B will do or provide

C. Timeframe for deliverables

D. Payment and Currency (How much will be paid, how, when, on what conditions)

E. Any Exclusions or Specific Conditions of Contract

F. Means of Terminating the Contract

G. Means of Resolving Disputes

H. Duration of the Contract

I. Signatures

Signature for Party A		**Signature for Party B**	
Full Name		**Full Name**	
Date		**Date**	

MODULE C	**LEGAL AFFAIRS**
SESSION C3	**CUSTOMER CONTRACTS**
Appropriate Facilitator Background	Community Trainer with experience in community water projects
Introduction	This session focuses on supporting a community water project to prepare and use customer contracts. *This session is more applicable to water supply schemes.*
Objective	Water Project has developed a workable customer contract and Codes of Practice which safeguards the interests of the customer and the project to ensure sustainability of the project
Outputs	1. Project has developed a Customer Application Form, Customer Contract and Codes of Practice 2. Plan of Action for Way Forward for Implementation of Customer Contract & Codes of Practice
Timing	Session should take approximately 1- 2 hours
Target Group	Management Committee Members plus community leaders
Appropriate Venue	Classroom, meeting hall or open space where participants can clearly hear and participate in the discussions and where distractions are minimised.
Methodology	- Information sharing through a Question and Answer approach
Materials	- Flip Charts - Flash Cards - Pens
Session Guide	
Supporting Information	This session on the customer contract may be more appropriate for projects where the customers have individual connections. However the Application Form and Codes of Practice are relevant to many projects.
Step 1: Introduction	Facilitator should open up the discussion by asking participants to identify some of the typical complaints about the project. **Typical Complaints within a Water Project** • Poor water quality; • Unreliable water supply; • Inaccurate water meter; • Unfair disconnection; • Lack of transparency and accountability in project accounts, staff recruitment, procurement; • Corruption by project officials; • Unfair or costly charges; • Unfair allocation of water; • Wastage of water; • Equipment remains broken for a long time; • Kiosk or pump attendant is absent or unreliable; For each issue, facilitator should write it on a flash card and provide it to a participant and ask the participant to ensure that this issue is adequately covered during the subsequent discussions on customer contracts and

	codes of practice.
Step 2: Application Form	Review the existing Customer Application Form using the sample provided in Attachment 1. The application form is the point at which the customer provides information on himself/herself to the project. The application form therefore needs to be comprehensive without being complicated.
Step 3: Preparation of a customer Contract	Customer contract forms the basis of the relationship between the customer and the water project. It captures what customers should do and what the project should do. Review the existing customer contract with respect to the sample provided in Attachment 2. Discuss each component and draw up contract that is fair and practical
Step 4: Codes of Practice	The Codes of Practice provide details on how the project will operate and provide a good service. Review the existing Codes of Practice or use sample provided in Attachment 3 to direct a discussion on each item. Ensure Codes of Practice are fair, understandable, and practical.
Step 5: Plan of Action	Draw up a Plan of Action that deals with: • How customers will be offered a chance to inspect the proposed customer contract, application form and Codes of Practice; • How customers will be asked to sign new application form and the timeframe; • What happens to customers who do not sign the new customer contract?
Review	• What is the purpose of the customer contract? • What are the issues in the contract that are likely to be contentious? • Are there any of the complaints identified in Step I that have not been addressed? If so, what needs to be done? • How will the committee deal with the consultation process?
Session Attachments	1. Sample Application Form 2. Sample Customer Contract 3. Sample Codes of Practice

Attachment 1: Sample Application Form

APPLICATION FOR WATER SUPPLY FROM _____ WATER PROJECT

CUSTOMER DETAILS

APPLICANT'S NAME:

_____

ID. NO.: _____ PIN._____

POSTAL ADDRESS: _____ POSTAL CODE:_____ TOWN: _____

E-MAIL ADDRESS: _____TEL NO:_____

PLOT

NO_____HOUSE_____SECTION_____STREET_____

NAME OF EMPLOYER _____STAFF NO. _____

EMPLOYER'S ADDRESS_____CODE: _____TEL NO: _____

TYPE OF PREMISES/ SUPPLY:

Commercial (> 5 household served by one connection, industries) ☐

Medium Commercial (2 – 5 household served by one connection, hotel) ☐

Private residence (1 residence served by one connection) ☐

TICK WHERE APPROPRIATE- LANDLORD ☐ TENANT ☐

CUSTOMER'S OBLIGATION

I agree to abide by the Terms and Conditions specified in the Customer Contract and hold myself / ourselves responsible for payments of all Deposits, Water Use, Meter Rent, and Standing Charges until such a time as the agreement is terminated in accordance with the terms of the Customer Contract.

APPLICANT'S SIGNATURE:_____DATE_____

NB: Please make sure that 3 copies of each of the following items are submitted together with your application form:

1. Personal Identification (Identity Card/Passport)
2. PIN (Optional)
3. Proof of Property Ownership (Land Title/Sale Agreement/Allotment Letter/Tenancy Agreement)

FOR OFFICIAL USE ONLY

Existing distribution line diameter _____mm. Required service line diameter ----------mm

Length of service ----------Pipe materials ----------Class----------

Applicant has been informed to provide materials and I confirm that the correct materials for connection have been purchased.

WATER SUPERINTENDENT: Signature----------Date----------

COMMERCIAL DIVISION

Supply Cluster _____Zone No. _____

Category: **Residential / M-Commercial/ Commercial** _____ A/C No: _____

Applicant has paid Application fee-: Yes/No Receipt No. _____

Date_____

Connection fee Kshs: _____ Receipt No._____ _____

Date_____

Deposit Kshs _____ Receipt No. _____

Date_____

Meter fees: _____ Receipt No. _____

Date_____

Connection Card prepared by: _____Signature _____

Date_____

ACCOUNTANT (W&S DEPT): Signature _____ Date_____

APPLICATION APPROVED ON BEHALF OF _____ Water Project

GENERAL MANAGER _____ DATE_____

WATER RETICULATION UNIT

Service Line installation Certified by _____ ____Signature _____ Date ____

Meter Box Location Certified by _____ Signature _____ Date _____

BILLING UNIT

Meter No. _____ Initial Reading _____ Make _____

Installed by _____ Signature _____Date _____

COMPUTER AND RECORDS

New Account Encoding by _____ Signature _____

Date _____

Verified by _____ Signature _____

Date _____

Attachment 2: Terms and Conditions governing the provision of water services for the WUA

1. **Citation:** These terms and conditions shall, together with the application for services and any codes of practice communicated to the Customer constitute the Customer Service Contract between the Water Service Provider (WSP) and the Customer. This contract supersedes any previous contract.

   The Water Service Provider is the _____ **Water Project,** hereinafter referred to as the **WSP**

2. **Customer care:** All customer inquiries may be made to the WSP at the following address:

   Postal Address: _____
   Telephone Contact: _____
   Email Contact: _____
   Physical Address: _____

3. **Customer tariff:** All fees charged by the WSP shall be displayed on the WSP's notice board and at all service centres. Customer tariff for WSP is provided in Schedule A.

4. **Code of practice:** The WSP is required by law to establish codes of practice with regard to customer complaints, leakage control, service disconnections, entry into private property and any other relevant operational procedures. Such Codes of Practice shall be binding on the customer and WSP. The Codes of Practice shall be displayed at the WSP's notice board and a copy deposited with the customer care desk for customer reference. The Code of Practice is provided in Schedule B.

5. **WSP Responsibility:** The WSP is responsible for all the water supply facilities and infrastructure up to and including the water meter. Thereafter the responsibility and risk passes to the customer.

6. **WSP Employees**: All WSP employees are required to identify themselves to customers using their WSP identification cards. Customers must satisfy themselves that they are dealing with bona fide WSP employees or agents.

7. **Billing Dates**: The WSP shall at the end of each month deliver a bill for all services rendered to the customer. The billing dates are provided in Schedule A.

8. **Payment**: All bills shall be paid to the WSP by payment into the WSP Bank Accounts (details available from WSP Offices) and submission of the deposit slips to the WSP Offices or any other place or method as may be communicated to the Customer from time to time. A late payment penalty fee shall be applied to any bill that is not paid in full by the due date. Payment details are provided in Schedule A.

9. **Bouncing cheques**: Wilfully writing a cheque without sufficient funds is an offence. Whereas WSP will normally give a customer an opportunity to make good the cheque within 14 days, a bounced cheque will attract a penalty of Ksh. _____/- being bank charges and other cheque redemption costs incurred by the WSP.

10. **New accounts:** The following are the requirements for new customers:
    i. Fill in the requisite application form;
    ii. Sign the customer contract;
    iii. Pay a refundable deposit;
    iv. Pay applicable installation charges.

11. **Processing of applications for new accounts:** Applications for a water connection will, as a general rule, be processed on a first-come-first-served basis and where possible, within 14 days. The WSP reserves the right to reject any application for reasons to be stated thereon.

12. **Deposits**: A deposit is required for all new customers before service can be initiated as indicated in the customer tariff. Details are provided in Schedule A.

13. **Installation of services and works:** All installations and works related to water services up to the customer meter, whether or not funded by the customer, shall be carried out by WSP employees. Instances of tampering with the piping and or meter by the customer will be treated as an illegal activity and will result in disconnection, penalties, re-connection costs and the payment of additional deposits.

14. **Water Meters**: All connections must be metered. Water meters will be installed, read, and, if required, disconnected, by the WSP employees. If the meter is stolen or damaged, the customer shall be held liable for the costs of a replacement meter to be procured and installed by WSP and the associated installation charges.

15. **Access to meters:** It shall be the responsibility of the customer to ensure that WSP employees and or agents have access to the meter. Where access is denied and or obstructed WSP will bill the customer according to a reasonable estimate of consumption. Where this estimate is disputed the customer shall be liable for the costs of reading the meter and adjusting the meter reading.

16. **Repair or adjustment of water meters:** It is unlawful for anyone other than WSP employees to repair or adjust a meter. A customer may request to have his or her meter inspected and if faulty WSP shall repair and or replace it free of charge. However if the meter is found to be in order the customer will be billed with the full costs of the inspection. Meter inspection fees is provided in schedule A

17. **Tampering with water meters:** It is an offence for anyone to tamper with a water meter. Should WSP staff notice any tampering with a meter WSP will disconnect services immediately and report the customer for prosecution. In addition, the customer shall be required to pay the applicable penalty prior to any reconnection of services.

18. **Leak Detector and Detection**: Whereas WSP will endeavour to do its best in monitoring the distribution mains, WSP encourages all customers to report any leaks and bursts as soon as possible to enable WSP to carry out the necessary repairs.

19. **Disconnection and Shut-Offs:** A customer's service may be disconnected or temporarily shut-off as follows:
    a. Where a customer is terminating services e.g. when moving to a new location he/she should inform WSP to avoid continued billing on that account.

b. Where a customer is going away e.g. for long vacations he/she may request WSP to shut off the service subject to a service charge to defray costs attributable thereto and recoverable through the bill.
c. Where there has been non-payment of a bill on the due date WSP shall disconnect services subject to reconnection upon payment of the outstanding bill(s), the applicable reconnection fee, and an additional deposit.
d. Where WSP has been denied access and or obstructed from reading and servicing a water meter on 3 continuous occasions and there is reasonable cause to suspect a deliberate attempt to avoid the reading of actual consumption, WSP may, with notice to the customer, disconnect services subject to reconnection upon giving access to meter and payment of the applicable reconnection fee.
e. Where customer is found to have tampered with the piping and or meter, whether in his/her compound or elsewhere;
f. Where customer is found to have carried out illegal activities, violated the terms of the customer contract, or has an illegal connection;
g. Where the customer carries out activities anywhere within the supply area which can adversely affect the operations of the system and or the supply to other customers.

20. **Re-connection:** A customer who has been disconnected for non-payment may be reconnected upon the payment of the outstanding bill and a reconnection fee. However, if the disconnection is due to activities other than non-payment, reconnections will only be made once the penalty, reconnection fee and or any additional charges and deposits as determined by WSP have been paid in full and after signing an agreement to abide by the terms and conditions for supply. Reconnection fee is provided in Schedule A.

21. **Service Fees**: WSP will include in a customer's bill a service charge to defray costs that are attributable directly to any request by a customer that is outside the normal operations of WSP e.g. when a customer requests for inspection of a meter which is found to be in good working order. WSP will as far as possible endeavour to sufficiently describe such fees on the bill for the customer to know the service to which they relate.

22. **Service interruption:** Except in the case of emergencies and unforeseen circumstances WSP will, at all times, endeavour to publish notices of any expected service interruptions.

23. **Rationing:** WSP may ration the supply of water in times of shortage or due to maintenance activities. In cases where water rationing can be foreseen, WSP shall publish the rationing program at least 5 days before the commencement of rationing in such media as WSP may deem fit in the circumstances.

24. **Transparency and accountability**: WSP is committed to being transparent and accountable in its operations. In this regard WSP will endeavour to publish on its notice board the following information:
    i. Applicable water and sewerage tariffs/charges
    ii. Applicable service fees
    iii. Findings of any customer surveys carried within the company's service area
    iv. Copy of the annual report submitted to the Water Services Board or equivalent
    v. Financial reports
    vi. Any amendments/additions to these terms and conditions
    vii. Any other information that may be necessary to the customer

25. **Corruption:** WSP is committed to eradicating corruption in all its operations. In this regard customers are encouraged to report any corrupt practices to: _____ Water Services Board at the following address:

    _____

    All reports will be professionally investigated and handled in strict confidence.

26. **Customer complaints:** In accordance to Customer Complaints Procedures issued by the Water Services Regulatory Board, the company's is required to settle any disputes and/or complaints from customers amicably through negotiations. Any customer who is dissatisfied with the decision of WSP in any disputed matter has a right to refer that matter to _____Water Services Board for resolution, failing which he/she can appeal to the Water Services Regulatory Board and the Water Appeals Board respectively.

27. **Termination:** This customer contract may be terminated at any time by either party as follows:
    i. By the customer where he/she has (subject to the payment of accrued liabilities) expressly terminated the contract and demanded the refund of his/her deposit hereinabove mentioned.
    ii. By WSP where the customer's account has remained dormant without payment for a period equivalent to the value of his/her deposit. In such an event, unless otherwise agreed, the deposit may be utilized to cover the unpaid debt.
    iii. By WSP where the customer has indicated his/her unwillingness to comply with the company's terms and conditions of service. In such an event, WSP will refund the customer's deposit subject to the payment of any accrued liabilities.
    iv. By WSP where services are disconnected for non-payment. In such an event the customer may renew the contract by paying the reconnection fee or request for the refund of his/her deposit subject to the payment of any accrued liabilities.

    For the avoidance of doubt, WSP shall always have the right to hold the deposit under lien until full payment of accrued liabilities provided that where a contract is terminated but the customer, after demand and notice of intention to utilize the deposit, refuses, fails and/or neglects to pay the accrued liabilities, WSP may apply the same towards the payment of the debt without prejudice to the right to recovering the balance thereof, if any, otherwise any amount in excess of the debt shall be paid to the consumer forthwith.

28. **Prohibitions:** No consumer shall:
    i. Use or permit the use of any water supplied by WSP in any other manner other than the user specified in the application for services.
    ii. Convey or permit to be conveyed outside his/her premises any water supplied by WSP by any means whatsoever for resale except with prior express consent of WSP.

29. **Customer contract:** These terms and conditions shall, together with the application for services and the codes of practice constitute the customer service contract.

30. **Commencement:** These terms and conditions shall come into effect immediately WSP approves the application for service by the customer and the customer has completed an application form. Every customer shall be deemed to have notice of these terms and conditions of service and accepted the same at the time of applying for the service.

31. **Amendments:** WSP may at any time amend and/or add the terms and conditions set out herein provided that no amendment shall come into force except with prior notice of at least 3 months.

32. **Notices:** Wherever a notice is required to be given by the WSP under these terms it shall be effective if the same is set out in the water bill or a letter to the customer or published on the notice board or other media, as WSP deems fit under the circumstances.

33. **Assignment:** This customer service contract is assignable to _____ Water Services Board or its nominee.

_____ WATER PROJECT

SCHEDULE A – TARIFFS AND FEES

Date:

1. **Fees**

	Residential	**Medium Commercial**	**Commercial**
New Accounts			
Application Fee			
Connection Fee			
Deposit			
Meter Fee			
Sub-Total			
Reconnection			
Penalty			
Miscellaneous Fees			
Inspection of Meters			
Bouncing Cheques			

2. **Tariff**
   2.1. Standing Fee = Ksh ____/- per connection per month
   2.2. Water Use as shown in the table below

Lower Bound (m3/month)	**Upper Bound (m3/month)**	**Tariff (Ksh/m3)**	**Comments**
0	5.00		Minimum Charge Ksh _____/- per month for water use
5.01	10.00		
10.01	15.00		
15.01	20.00		
Great than 20.01			

3. **Billing Dates**

Item No.	**Item**	**Deadline**
1	Meter Reading Period	
2	Bill Disbursement Period	
3	Bill Payment Period	

4. **Payment**

Payment of bills should be made by one of the following methods:

Means of Payment	Account Details

Signature of Chairman: _____Date: _____

Attachment 3: Sample Water Project Codes of Practice

_____ WATER SERVICE PROVIDER (WSP)

SCHEDULE B - CODES OF PRACTICE

Date: _____

The following Codes of Practice have been established to encourage an efficient and high quality service to the Customers. The aim of establishing the Codes of Practice is to give customers a clear guide regarding the services and to explain the procedures for complaint handling and dispute resolution in the event of a problem.

1. CUSTOMER COMPLAINTS

1.1. Making a Complaint

The WSP customer care phone line is active 24 hours a day, 7 days a week. The number is _____ or by email _____ and is printed each month on the customer bills.

WSP offices are open from 8.00am to 5pm Monday to Friday, and from 8.00am to 1.00pm on Saturdays excluding public holidays. WSP offices are located at _____.

Customers can contact WSP in the event of loss of water, low pressure, poor water quality, error on bills, damage to piping, leaks, or other issues related to the water service.

When a complaint or problem is reported, the following information should be provided by the person making the report:

- Name of person making compliant or report;
- Location including plot number relevant to complaint or problem;
- Nature of complaint and problem.

A compliant or problem can be reported by phone or in writing and an official compliant form is available from the WSP office.

1.2. Handling complaints

When a compliant or problem is reported, WSP will take the following action:

- Register the complaint or problem;
- Track the response provided to the person reporting the complaint.

Complaints/problems will be handled as follows:

- The WSP manager will decide on the course of action to be taken which will include:
  - Initiate immediate response (as may the case for reported bursts or leaks);
  - Investigate the matter and report back to the person making the complaint;
  - Investigate the matter and refer the matter to other parties for consultation and decisions.

1.3. Training for staff

WSP staff will be trained on how to handle a complaint or report of a problem. Training will provide staff with:

- Knowledge of the Company's work and procedures;
- Skills to speak or write responses to customers;
- Customer service priorities;
- Know who has the authority to investigate and respond to complaints.

1.4. Response time for Complaints

WSP will endeavour to reply to written complaints, and when necessary to telephone or make personal visits to the person associated with the complaint, within five working days or if detailed investigations are needed, then within 20 working days.

1.5. Referring Complaints to a higher Level

If the customer is dissatisfied with the initial response by WSP, or with the way WSP has dealt with the complaint, then the customer may refer the matter to one of the supervisors who include:

- Directors of WSP;
- _____ Water Services Board

1.6. Auditing the complaints procedure

All complaints are recorded and regularly reviewed by the management and the Board of Directors to see if:

- Changes to procedures are needed;
- Replies have been made promptly, politely and comprehensively.

1.7. The WSP Commitment to Customers

WSP has committed to meeting professional Standards of Service that cover:

- Making and keeping appointments
- Answering questions about bills
- Installing water meters at customer's request
- Responding to written complaints
- Giving notice when supply is interrupted
- Restoring supply after interruption
- Customer Care
- Water Quality

2. METER INSPECTION

Water meters are approved for accuracy and tested by the manufacturers before leaving the factory. If the customer believes the meter to be inaccurate, the customer can request WSP to test it. The test is carried out to standards and is carried out by WSP staff and if need be, by an independent body. The customer will be given the results of the test.

If the test shows the meter is accurate the customer will have to pay all costs associated with undertaking the test.

If the test shows the meter is not accurate then WSP will assume that the meter has been faulty at the time of the last reading (unless it is proved otherwise). In this event:

- Consumption will be based on previous readings and the water bill will be estimated;
- WSP will pay for the meter test;
- A replacement meter will be provided by WSP.

If there are no previous readings consumption will be based on subsequent readings.

3. SERVICE CONNECTIONS

3.1. Cost of Installation

All customers have the right to request/apply for the installation of a new connection. This is subject to payment of the set membership fees, dependent on customer category and filling a water supply application form at the office. WSP may refuse the request only on the grounds that installation is impractical or unreasonably expensive.

The customer will meet the cost of the connection and will provide all the fittings (of a standard approved by WSP) required to make the connection from the project's main pipe line to the meter. WSP will provide a list of materials required for the connection, after a site visit.

3.2. Guaranteed Standards

If a customer requests for the installation of a water connection, WSP will survey the property and install the connection within 14 working days of the request/application, subject to receiving acceptance of survey within a reasonable timescale, and all the required materials being made available.

This guarantee does not cover situations where the delay is caused by the customer (i.e. no access provided to property or lack of materials).

3.3. Meter Location

WSP staff will visit the site to determine the feasibility and location for a meter. WSP will take account of the customer's wishes where reasonably practicable, and of any special needs. The meter will be installed inside the property, near to the boundary of the property.

Once WSP has installed the connection, the customer will be asked to sign information on the application form, which will include information on the meter size and number, initial meter reading, fittings used, and date of connection.

If the customer wishes to have the meter installed outside the property, then the customer is responsible for any additional charges and security of the meter.

4. SERVICE DISCONNECTION/ INTERUPTION

WSP is committed to providing a constant supply of water. However, unexpected events (e.g. lack of raw water, lack of power, pipe bursts) or maintenance of the system may cause interruptions to supply.

If WSP plans to interrupt the supply for more than 12 hours to do essential work WSP will attempt to provide notice 5 days prior to the disruption of service.

Customers will not normally be notified of brief interruptions to service (usually of less than 6 hours duration). Brief interruptions may be caused by minor repair work or connections/disconnections along the service line.

Any customer whose connection or meter is due for service or repair will be informed prior to the commencement of the work.

5. LEAKAGE CONTROL

5.1. Responsibility of repairing leaks

Customers are responsible for all repairs and maintenance to the piping and fittings after the meter. Failure to repair pipes or fittings does not absolve the customer from the costs associated with defective piping and fitting.

If the customer disregards a request by WSP to replace or repair a pipe under his/her responsibility, thereby allowing water to run to waste, WSP may, on providing notice to the customer take necessary remedial work to the extent possible and charge the customer for costs associated with the remedial work or, if necessary, turn off the water supply.

5.2. Checking for leaks

Damp patches in or outside the property may be indications of leaking pipes.

Customers are advised to periodically check for leaks. This can be done by adopting the following procedure:

- Turn off all taps
- Read the meter
- Do not use any water for 6 to 12 hours (e.g. overnight, or whilst you are out for the day)
- Read the meter again and ascertain whether any water has been used.

- If it has, then investigations are needed to determine where the leak may be. Bathroom and kitchen fittings should be inspected very closely for leaks.

6. ENTRY IN PRIVATE PROPERTY

6.1. Powers of Entry

The duly delegated representative of WSP (referred to here as "the inspector") shall have the right of entry into premises for which proposals for the installation of plumbing systems have been submitted to WSP, or in which plumbing has already been installed. Such entry shall be made at a reasonable hour and upon presentation of WSP identification documents.

WSP may request to enter customer property for the following reasons:

- to read meters;
- to make sure the Water Regulations are being met;
- to carry out necessary work;
- to take water quality samples.

Any member of WSP staff authorized to enter customer property will:

- Wear a WSP uniform and,
- Present a valid identity card.

The customer is encouraged to call the office telephone number to confirm the identity and mission of the WSP staff person.

6.2. Rights of access

WSP may need to lay pipes across private land. This will only be done with a way leave signed by the land owner, as long as the land owner is available to sign the way leave and the consent of the land owner is not unfairly or unreasonably denied.

In the event that WSP has to lay pipes across private land, WSP will undertake the excavations with due care to the features on the private land and will make good the land to the original condition as far as practically possible.

7. SUPPORTING CUSTOMERS WITH SPECIAL NEEDS

WSP makes a commitment to supporting customers with special needs due to age, disability, language or educational background. WSP will endeavour to provide support to the customer in relation to the water supply. These services include:

- Reading and explaining the water bill even if there is no problem;
- Translating the bill or other information into another language;
- Making special arrangements for delivering the bill which may include sending the bill to a friend or relative;
- Helping to read the water meter when necessary or supporting investigations for leaks;
- Enabling disabled people to access the offices.

8. WATER SUPPLY

8.1. Water Treatment

WSP uses chemical and sand filtration to remove turbidity and impurities in the water and then purifies the water with the application of chlorine.

8.2. Water Quality

The quality of the water WSP supplies for domestic purposes is controlled by regulations issued by the Ministry of Water and Irrigation. The regulations cover the chemical and bacteriological quality of the water and its appearance, smell and taste. It is a requirement that the quality of the water supplied must comply with the Regulations.

8.3. Water Testing

In order to demonstrate that the water quality meets the required standards, WSP must test samples of water at regular intervals in a manner set down in the Regulations and keep records of the results of these tests.

8.4. Water Quality Concerns

If a customer has a concern or complaint about the quality of the water, he/she is encouraged to report the matter to WSP immediately on Telephone Number _____

If the complaint indicates an unexpected change in the water quality, then WSP will take water samples and make the results of the tests known. The time scale for this is dependent on the analysis undertaken.

If WSP believes there is a significant threat to public health associated with the water quality, for whatever reason, it will inform all customers immediately by SMS or through announcements in the local area.

8.5. Quantity of Water

WSP is committed to providing customers with enough water for normal domestic purposes, which are:

- drinking water
- washing
- cooking
- sanitation
- watering garden
- cleaning

It may be necessary during periods of drought to restrict the use of hosepipe or garden sprinklers.

8.6. Pressure and flow

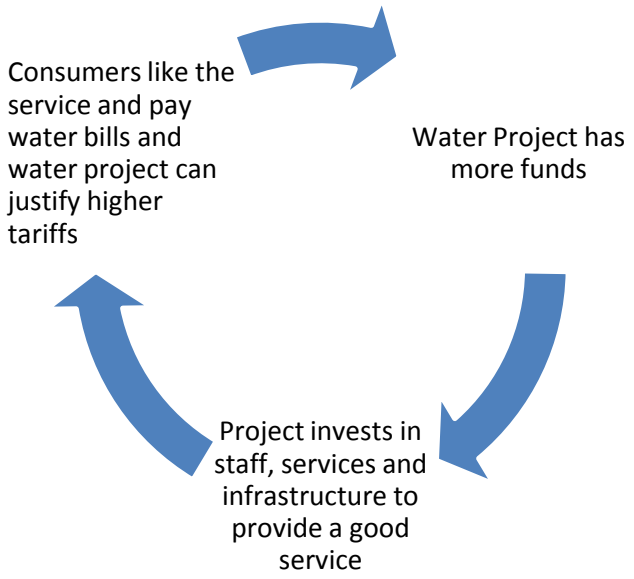
WSP is committed to providing a minimum static water pressure of 10 meters at the stop tap at the boundary to the customer property.

A number of factors affect the pressure and flow rates. These factors include:
- The height of the property relative to the reservoirs;
- The length and condition of the service pipe;
- The quantity of water being used at any one particular time.

Customers are encouraged to install sufficient on-site storage to improve reliability of supply within their premises.

Cases of low water pressure should be reported as this may indicate problems in the service line, illegal connections or tampering with the service line or requirements for upgrading of the system.

Where low pressure is noted, WSP will endeavour to providing a plan to upgrade the system to ensure adequate water pressure.

MODULE C	**LEGAL AFFAIRS**
SESSION C4	**CONTRACTS FOR MAINTENANCE AND OR MANAGEMENT SERVICES**
Appropriate Facilitator Background	Community trainer with experience in supporting community water projects in the preparation of maintenance or service contracts
Introduction	This session is aimed at helping the water project to decide whether it would benefit from establishing a proper contract for services that it uses on a regular basis.
Objective	1. Water project will have identified what services should be placed on contract 2. Have a Plan of Action for introducing the service contracts
Outputs	Plan of Action
Timing	1 – 2 hours
Target Group	WUA Committee members
Appropriate Venue	A place where participants can clearly hear and participate in the discussions and where distractions are minimised
Methodology	Discussions, questions and answers
Materials	• Flip charts • Pens
Session Guide	
Supporting Information	**Virtuous Cycle of Financial Resources** 
Step 1: Discussion on the Virtuous Cycle of Financial Resources	**Explanation of the Virtuous Cycle of Financial Resources** Discuss the advantages of the virtuous project cycle where the project has sufficient funds to afford proper maintenance and thereby provides better quality and more efficient services, which means that consumers are happy to pay which improves the revenue to the project. Discuss the dilemma of a project that has insufficient funds to maintain the

	system which reduces the quality of services, which means that customers do not want to pay, which reduces revenue, etc. Ask participants to identify issues that can prevent the WUA from getting onto the virtuous cycle of financial resources. **Factors that prevent a project from realising a virtuous financial position** • High unaccounted for water; • Corruption; • Poor financial controls; • Bad debts from customers who refuse to pay; • Poor allocation of funds; • Inefficient use of financial resources; and • Unreasonably low tariffs. **Will a better service actually cost more?** A common myth is that running a water project like a commercial business means that the cost of water will increase. One of the advantages of proper billing, revenue collection and business analysis is that the water project can spread the cost of the water supply across all consumers; reductions in unaccounted for water (losses) means that project operates more efficiently; the net result is that if the cost of water does go up, it should be accompanied with a better service. **Question: How to move a project onto the virtuous cycle of financial resources?** Let the participants discuss and identify options for their water project. Document answers on a flip chart. The first step is awareness that business as usual will not solve the problem of lack of financial resources.
Step 2: Introduction of Topic	One of the options to improve the quality of services is to change the way in which the project undertakes its operations. Out-sourcing certain aspects of the project operations may be an option to improve the quality of services and project financial position. The facilitator should initiate the discussion by asking participants to review their project and identify the services that are routinely used by the project. The answers should be written down on flash cards and grouped into the following categories: 1. Operator Services 2. Maintenance Services 3. Financing Services 4. Commercial Services The following sessions elaborate on each of these different categories.

	A distinction should be made between services that are out-sourced and those tasks that are handled by project staff (internal resources).
Step 3: Operator Services	Operator Services may include: 1. Operator for a Water Kiosk; 2. Operator for Pumping Plant; 3. Operator to manage the entire project. Discuss the advantages and disadvantages of an operator contract. Advantages include: • Management committee reduces its workload by contracting someone to undertake certain activities; • Performance is controlled through a performance based contract and performance based payments; • Committee takes on role of oversight (i.e. safeguarding the interests of the consumers/members) and drops the role of being the operator itself. Disadvantages include: • Terms of engagement should be well structured in contract otherwise contractual disputes may arise.
Step 4: Maintenance Services	Maintenance services may include: • Routine maintenance of pumping equipment (e.g. handpumps, gensets); • Water quality testing The concept is that if an activity has to be undertaken on a regular basis, then an efficient arrangement can be established whereby the arrangements for the activity are discussed and agreed and the activity can proceed without reference to the management committee each time. In addition, the service provider can then plan for and implement the activity in an efficient way. For example: A community has 20 handpumps. At any one time there are two handpumps that are not working. For each non-functioning handpump, the following sequence of events takes place: • Water user calls chairman to report pump breakdown • Chairman calls pump mechanic and discusses terms; • Pump mechanic goes to pump and assesses repair; • Pump mechanic meets with chairman to discuss repair requirements; • Chairman goes to bank and draws petty cash to pay for spares; • Mechanic goes to store to purchase spares and makes repair; • Chairman goes to bank to draw funds to pay pump mechanic. Facilitator should ask the participants what could be done to make the system work more efficiently. Options include: 1. Pre-emptive maintenance;

<table>
<tr><td></td><td>2. Service contract;
3. Payments on quarterly or monthly basis.

One of the advantages of a service contract arrangement is that the water project can spend time and effort initially on sourcing a reliable and high quality service provider and then lock that service provider into providing services to the project. This provides more consistent high quality services to the project.

Discuss the options for out-sourcing maintenance services within the project.</td></tr>
<tr><td>Step 5: Financial Services</td><td>Many projects are familiar with the need to hire an External Auditor as this is required under the WUA constitution. However, a broader range of financial services can be considered. For example:
• Accountancy services;
• Periodic internal audits.

The advantage of this arrangement is that a project can hire in expertise on a regular basis without incurring the risks associated with not having these services or the cost of recruiting full time staff.</td></tr>
<tr><td>Step 6: Commercial Services</td><td>Commercial services refer to a range of services that include:
• Billing;
• Revenue collection;
• Business planning and analysis, covering:
o Production trends;
o Customer trends;
o Unaccounted for water;
o Collection efficiency;
o Operating ratios;
o Complaints.

A water project that has not analysed its financial requirements and established a tariff based on cost recovery, is likely to provide poor services.</td></tr>
<tr><td>Step 7: Plan of Action</td><td>Draw up a Community Action Plan (CAP) that deals with:
• Which services could or should be out-sourced?
• What specialised knowledge, if any, is needed to draw up a contract for the required services?
• What steps are required to put the plan into action

<table>
<tr><th>SERVICE</th><th>IN-HOUSE/OUT-SOURCES</th><th>TASKS</th><th>RESOURCES REQUIRED</th></tr>
<tr><td>e.g. Billing</td><td>Out-source</td><td>1. Make TOR
2. Procure Billing service provider
3. Negotiate contract</td><td>Lawyer to assist in preparation of contract</td></tr>
</table>
</td></tr>
</table>

			4. Supervise performance	
	e.g. Operations	In-house	1. Recruit staff 2. Staff contracts 3. Train staff	1. Lawyer for staff contracts 2. Trainer for operational tasks
Review	• What are the advantages and disadvantages of out-sourcing services?			
Session Attachments	None			

MODULE D
HUMAN RESOURCE MANAGEMENT

Overview

This module provides support to water projects in addressing the human resource requirements for their projects**.**

MODULE D	**HUMAN RESOURCE MANAGEMENT**
SESSION D1	**IDENTIFYING HUMAN RESOURCE REQUIREMENTS**
Appropriate Facilitator Background	Community trainer with experience in participatory methodologies and human resource management skills.
Introduction	This session focuses on the identification of staff to meet the needs of the project
Objective	Identification of staff requirements for community water projects
Outputs	Staff recruitment plan
Timing	Session should take approximately 1 – 2 hours
Target Group	Committee and Community Leaders/Resource Persons
Appropriate Venue	A place where participants can clearly hear and participate in the discussions and where distractions are minimised.
Methodology	Group discussion
Materials	-Flip Charts -Masking tape/blue tack -Flash Cards -Felt pens -Project Constitution
Session Guide	
Notes to facilitator **The facilitator should not be limited in the choice of materials**	Within the context of the water sector reforms, there is a need to help community water projects to clearly define the roles played by the management committee members and the roles required for operation and maintenance, to improve performance and avoid a conflict of interest. The facilitator should help the community to distinguish between management and operational tasks. Operational tasks should be undertaken by project staff or an external person hired to undertake specific tasks.
Step 1: Identification and Analysis of Tasks	The facilitator should commence by dividing the participants into the following groups: • Management Committee • Record keeping • Procurement Committee • Financial Management • Operations and Maintenance • Customer relations • Hygiene and sanitation For each group, participants should identify the tasks (10 – 15 tasks per group) that are required to be undertaken and write them on a flash card.
Step 2: Identification of Positions to undertake Tasks	The facilitator should now swap the flash cards between the groups. Now ask each group to identify the title/position of the person who **SHOULD** undertake the task (NOT who is currently undertaking the task)
Step 3: Compile Staffing Requirements	**In plenary** Review the tasks and the title/position of the person who should be undertaking the task. Reorganise all the tasks that fall under the same title. The result is a list of tasks under each position/title

<table>
<tr><td></td><td>Essentially the list of tasks is the starting point of the Job Description for each Title/Position.</td></tr>
<tr><td>Step 4: Requirements for each Position</td><td>Review the list of positions within the project

Note: the ELECTED positions should have a job description in the Constitution

We will now focus on the RECRUITED positions.

For each position, define the level of training, skill competence, experience, age, and character requirements needed to undertake the tasks that have been identified for this position.</td></tr>
<tr><td>Step 5: Staffing Levels</td><td>Consider each position and its tasks and decide:
1. Are the tasks better done through a Performance/Output Based Contract or with salaried staff?
2. Are the tasks sufficient for a full-time or part time job? If part-time, then estimate what percentage of time is required to undertake the tasks that were identified.
3. How many personnel are required to undertake the tasks that have been identified for that position?</td></tr>
<tr><td>Step 6: Staffing Plan</td><td>A staffing plan pulls together the information identified in the previous steps.

<table>
<tr><td>Position</td><td>Tasks / Job Description</td><td>Skills and competence requirements</td><td>Full-Time/ Part Time or Contracted</td><td>Number</td></tr>
<tr><td></td><td></td><td></td><td></td><td></td></tr>
<tr><td></td><td></td><td></td><td></td><td></td></tr>
<tr><td></td><td></td><td></td><td></td><td></td></tr>
<tr><td></td><td></td><td></td><td></td><td></td></tr>
</table>
Note:

(1) Projects that do not have a staffing plan will often say that they cannot afford the staff that are required. However, a project that intends to provide a good reliable service should develop a staffing plan, identify the budget required (put this in the annual budget), and set tariffs accordingly (see Tariff Setting in Financial Management Module) so that the project can deliver a reliable service.
(2) Two or more part time positions may be filled by one person. It depends on how time consuming the tasks are</td></tr>
<tr><td>Step 7: Staff Recruitment Plan</td><td>Facilitator should ask the participants to identify which is the most urgent position to fill and then discuss and develop the plan to recruit for the position

Staff recruitment, like any procurement, requires a proper plan with details if the project is to get the right person for the job.</td></tr>
</table>

Steps for Staff Recruitment

1. Preparation of Job Description (see sample JD for Project Manager)
2. Preparation of Notice to publicize the position, stating requirements for candidates, deadline for submission. The project may also notify the local government water office and other agencies to help it recruit experienced staff of high integrity.
3. Plan for where and how to publicize the position
4. Preparation of objective criteria and questions on which to score candidates during interview process. This should focus on the type of tasks that the position involves. The interview may include written and practical sessions.
5. Management Committee should identify appropriate members of the interview panel in order to avoid conflict of interest
6. An interview process where the interview panel score each candidate on how they perform during the interview.
7. Interview panel reports to Management Committee
8. Notification of the outcome to successful and non-successful candidates.

Draw up Recruitment Plan based on the sample provided below:

Task	**Who**	**By When**
Prepare JD		
Prepare Notice		
Advertise		
Prepare for Interviews		
Conduct Interviews		
Evaluate Candidates		
Prepare Minutes of Recruitment Process & forward to Management Committee		
Notify candidates		

Review	1. What is the work of the Management Committee in the recruitment process? 2. What sort of staff does the project require?
Session Attachments	Attachment 1: Sample Job Description for a Water Project Manager

Attachment 1: SAMPLE JOB DESCRIPTION FOR WATER PROJECT MANAGER

The Project Manager reports to the Chairman of the Water Project or, if the Chairman is not present, to the Vice-Chairman.

Operations

(1) Uphold the Codes of Practice of the Project
(2) Ensure water project is fully operational
(3) Prepare and adhere to an Operation and Maintenance Schedule. The O & M Schedule shall be visible within the Manager's Office
(4) Periods of no-service should be recorded in the Operations Record, providing an explanation as to why the system is not operational;
(5) Ensure that 15 free chlorine water quality samples are taken within the distribution system in each month. Maintain a record of where the sampling took place and the results;
(6) Maintain a record of all other water quality tests related to the water project
(7) Ensure all meters are read by _____ day of each month
(8) Prepare customer bills and ensure bills are delivered by _____ day of each month
(9) Disconnect consumers for non-payment is accordance with the Codes of Practice
(10) Maintain an up-to-date record of all supplies available to the project;
(11) Provide a forecast of the need for supplies

Human Resource Management

(1) Supervise all staff ensuring that staff have:
    a. Contracts
    b. Records
    c. Workplans
    d. Performance targets
(2) Develop a work plan for all staff ensuring that operations continue smoothly when staff are away on leave;
(3) Reassign duties as may be required when staff are unexpectedly absent

Procurement

(1) Support the Management Committee in procurement of supplies by preparing a list of materials required.
(2) Assist in obtaining quotations/bids for supplies

Customer Management

(1) Respect the Customer Contract
(2) Handle applications for service from customers
(3) Handle any complaints from customers, maintaining a record of complaints and action taken;
(4) Maintain a record of customers connected and disconnected

Financial Management

(1) Maintain proper set of accounts which shall be audited at least once per year
(2) Issue receipts for all payments to the project;
(3) Issue invoices or bills for all monies due to the project;
(4) Ensure bank statements are reconciled each month;
(5) Prepare an annual budget for the project operations

Records

(1) Records of all licenses and permits
(2) Record of all land agreements
(3) Asset register

Business Plan Development

(1) Prepare a Business Plan to support the project in setting appropriate tariffs

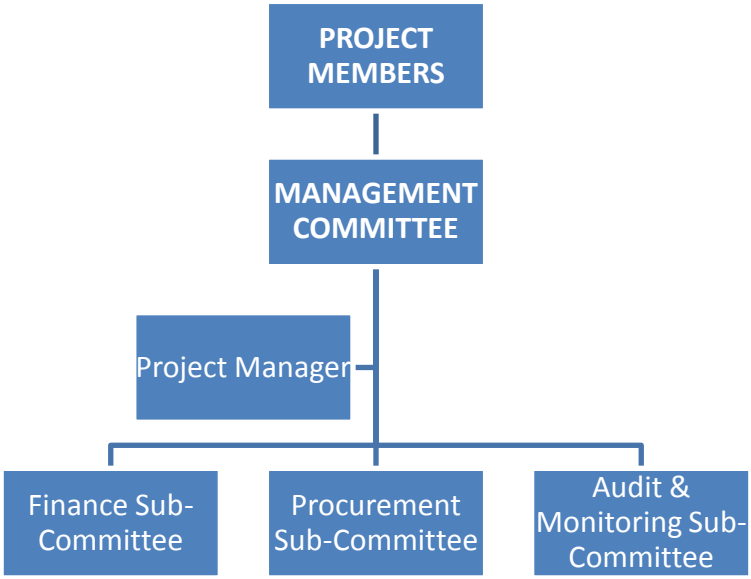
Reporting

(1) Prepare and present to the Management Committee a Monthly Report which provides the following information:
    a. Water produced
    b. Water metered
    c. Non-Revenue Water (%)
    d. Water quality results
    e. Change in customers;
    f. Revenue to the project;
    g. Operational Expenses
    h. Asset development expenses
    i. Cash position
    j. Debt aging
(2) Prepare an Annual Project Report for the AGM
(3) Prepare and present specific reports for the management committee as may be required

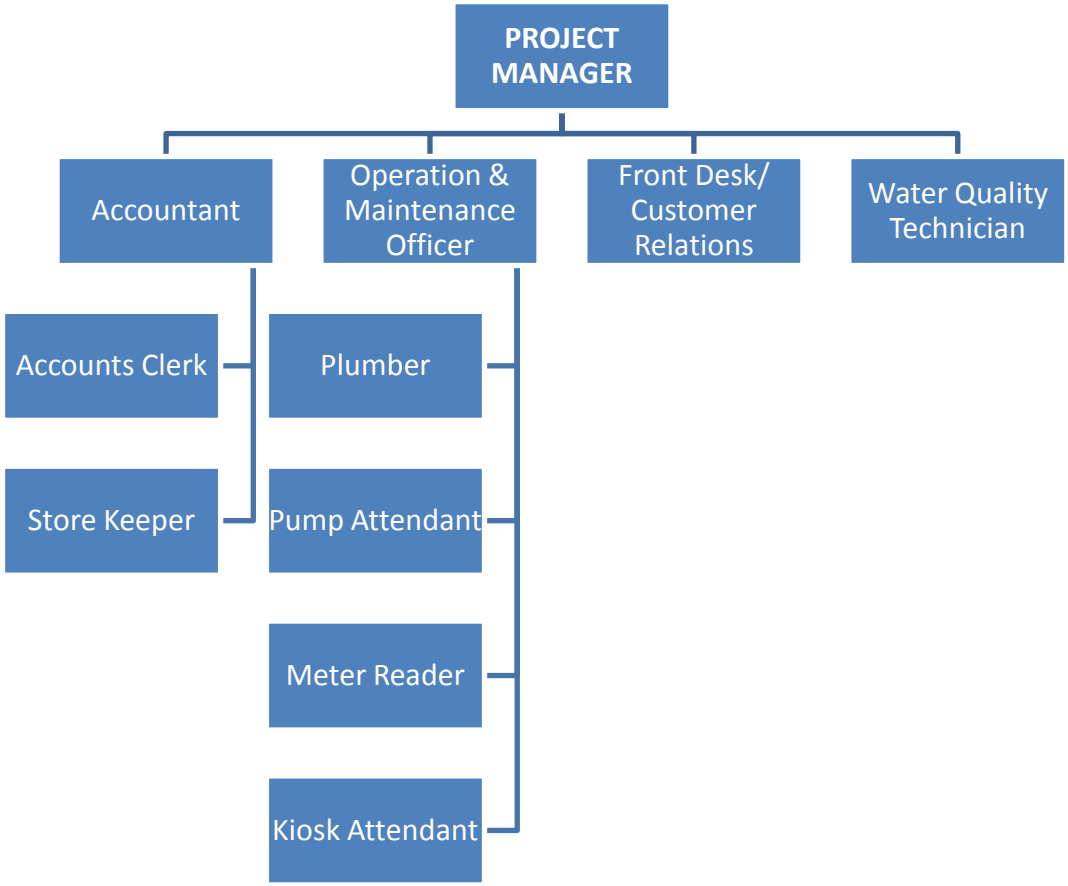
MODULE D	**HUMAN RESOURCE MANAGEMENT**
SESSION D2	**STAFF MANAGEMENT**
Appropriate Facilitator Background	Community trainer with experience in participatory methodologies and human resource management skills.
Introduction	This session focuses on key aspects of staff management.
Objective	Project has proper records and arrangements for managing and developing the staff.
Outputs	Staff Management and Development Plan
Timing	Session should take approximately 2.5 hours
Target Group	Committee and Community Leaders/Resource Persons
Appropriate Venue	A place where participants can clearly hear and participate in the discussions and where distractions are minimised.
Methodology	Information sharing through a Question and Answer approach
Materials	-Flip Charts, Masking tape/blue tack, Flash Cards, Felt pens
Session Guide	
Step 1: Clarifying Lines of Communication	The facilitator should ask participants to draw out an organisation chart (See attachment 1 attached). The issue is to make sure the lines of reporting are clear – who reports to who
Step 2: Terms of Service	In order to manage staff, the project must have Terms of Service for the staff (see attachment 2). Facilitator can go through the outline and capture what the project wants to include in its Terms of Service.
Step 3: Staff Contracts	Does the project already have staff contracts? If so, review the staff contracts based on the sample provided in attachment 3.
Step 4: Staff Records	The facilitator should ask participants what sort of records are currently being used or should be used to help manage staff. The following should be considered and if there do not exist then they should be prepared and files opened. **Records for each Staff member** 1. Contract 2. Correspondence 3. Leave application forms 4. Timesheets 5. Receipt of Equipment 6. Track of capacity development 7. Sign-out Form at end of Employment
Review	1. Has the project developed a staff management and development plan? 2. Has the project developed an Organisational Chart? 3. Does the project have a Plan of Action to prepare proper contracts for all the staff
Session Attachments	Attachment 1:Sample Organisational Chart Attachment 2:Outline of Staff Terms of Service Attachment 3: Sample Staff Contract

Attachment 1: SAMPLE ORGANISATIONAL CHART

MANAGEMENT COMMITTEE



OPERATIONAL STAFF (MEDIUM SIZE PROJECT)



Attachment 2: OUTLINE OF STAFF TERMS OF SERVICE

PERSONNEL

(1) Procedure for New Employees
    a. Probationary period
    b. Appointment process
(2) Job Descriptions
(3) Working Hours
(4) Job Grades and Salary Ranges
(5) How is a staff member promoted
(6) Performance Assessment and Capacity Development

REMUNERATION AND BENEFITS

(1) Salary
(2) Medical
(3) Housing
(4) Pension
(5) Travel
(6) Salary and Benefits Review Process
(7) Overtime
(8) Other allowances

LEAVE

(1) Normal Leave
(2) Sick Leave
(3) Compassionate Leave
(4) Maternity & Paternity Leave

PERSONNEL ADMINISTRATION

(1) Staff conduct
(2) Ethics
(3) Care of Property
(4) Politics
(5) Conflict of Interest
(6) Safety
(7) Discipline
(8) Grievances

TERMINATION OF SERVICES

(1) Termination
(2) Dismissal
(3) Departure Procedures
(4) Termination Benefits

FINANCICAL PROCEDURES

(1) Rates for Allowances
(2) Requesting and surrendering imprests
(3) Procedure for salary advances
(4) Claim forms and procedures

Attachment 3: Outline of Contract of Employment

Employer: (Name and address of Employer)

Employee: (Name and address of Employee & ID number)

Date: _____

Position: (Name of Position)

Reporting to: (Position that staff member reports to)

Period of Employment: From _____ to _____

General Terms of Employment: Terms of Service for XXX Water Project dated XXXX

Payments

(1) Salary: _____ per month
(2) Housing: _____ per month
(3) Medical: _____
(4) Travel: _____ per year
(5) Other: _____

Job Description:

(1) Outline of tasks, duties, performance that is required
(2)
(3)
(4)

Signatures:

Signature of Employer		Signature of Employee	
Name of Employer		Name of Employee	
Date		Date	

MODULE E
FINANCIAL MANAGEMENT

Overview

This module addresses the needs of the water project to raise revenue through fair and affordable tariffs, to handle revenue in a manner that follows proper accounting practices and to utilize funds according to transparent and accountable procedures.

MODULE E	**FINANCIAL MANAGEMENT**
SESSION E1	**PREPARING AN ANNUAL BUDGET**
Appropriate Facilitator Background	The facilitator (facilitation team) should be individuals with backgrounds in finance and tariff setting
Introduction	Preparation of an annual operating budget is the first step an organization must take to ensure that there is an accountable and transparent financial management system in place and that the WUA operates on a financial sustainable basis. There are various reasons why a budget is important: 1. An annual budget, prepared by the finance committee, is submitted to the management committee and subsequently to the membership for approval. 2. Preparation of an annual budget requires information regarding expected income and expenditure to run the water project, and requires planning for capital costs. 3. Expenditure should be kept within the approved budget according to each budget line. A budget helps to enhance transparency and accountability, quality of works, service provision and efficiency and effectiveness.
Objective	By the end of the session participants should be able to: 1. Explain the importance of an annual budget; 2. Prepare an annual budget and keep it up to date; 3. Evaluate the financial performance of the WUA.
Outputs	• Raised awareness on the value of budgets; • Ability to prepare an annual budget as demonstrated by drafting a sample annual budget for an organization.
Timing	2 hours
Target Group	WUA committee, and local leaders
Appropriate Venue	A place within the community where discussions can be held with minimal distractions
Methodology	• Demonstration/observation • Illustrations in practice • Group work • Short presentations/question and answer • Practical exercise on budgeting
Materials	- WUA books of accounts - Illustrations; - Flip Charts and marker pens; - Pens (different colours), note books; - Sample WUA budget statements; - WUA constitution
Session Guide	
Supporting Information	**Terminology**

	Term / **Definition** Budget — A summary of the expected income and expenditure associated with a particular activity. Fixed cost — These are costs that are not related to how much water the WUA produces Recurrent cost — These are costs that are dependent to how much water the WUA produces. Variable cost — Same as recurrent cost Operating Cost — Costs incurred in the operation of the WUA Revenue — Income to the WUA Capital cost — Cost incurred for something that has a life span that extends over several years Operating Balance — Revenue less operating costs (fixed and recurrent costs) Operating ratio — Revenue divided by operating costs. Capital replacement — Describes a situation in which the revenues are sufficient to cover costs of replacing the assets A budget has two major components – revenue (income), and expenditure – fixed costs and recurrent costs: **a) Revenues** consists of: • Money expected to come in during the year from joint venture payments, workshop incomes, tree seedlings sales, payments of the water bills, and any other revenues. **b) Costs** consist of: • All expenses/items that the WUA will need to spend money on during the year in order to carry out its normal business. • These include cost of fuel for the pump, cost of spare parts, workman's fees, office rent, committee allowances, unexpected breakdowns, etc.
Step 1: Visioning and Financial Sustainability	Discuss the **project vision** in terms of the water service and its financial sustainability. 1. Ask participants what they think the project should provide in the way of a service in terms of: i. Water quantity – how much water does each household expect from the project (this figure should be reasonable, based on the source and infrastructure, not a wild guess); ii. Water quality – treated water, raw water, etc iii. Reliability – high reliability means that the project should have extra financial, material and staff reserves 2. Discuss the link between the quality of the service and the cost of the service; 3. Ask participants whether the project should be self-reliant on funds from revenues. Should revenues cover operational costs (**partial cost recovery**) only or also capital replacement costs (**full cost recovery**)? Discuss the

	meaning of these terms. 4. If the project members think that the vision is to provide very cheap or free unlimited water, then further discussion is required before any discussion on tariffs; 5. What is the vision of the project in terms of its financial sustainability? Discuss the fact that a vision is something that you strive to achieve – it may not be realised immediately but decision making should be directed towards realising this vision. **Financial sustainability means that the project can cover its operational and capital replacement costs**
Step 2: Importance of an annual budget	One of the tools to reach financial sustainability is the development of a budget. 1. Ask participants what they understand by the term „budget'. Probe for household level budgets, CDF budgets, constituency bursary 2. Help the participants to discuss the importance of these budgeting processes – what is the advantage of having a budget? 3. How often do you budget at HH level? 4. Who should participate in the budgeting process? 5. What do you do if the HH budget indicates that the costs exceed the income? - Prioritise the costs [Facilitate thorough discussions to enhance understanding]
Step 3: Worked Example of Annual Budget	**Group work:** Let participants form groups of 5-6 persons and discuss and prepare a draft annual budget using the example below. The worked example is presented in Attachment 1 with a graph showing changes in income and expenditure. **Discussion questions based on worked example** 1. What are the implications of the fact that the project starts the year with Ksh 150,000/- in the bank and ends with Ksh 20,000/-. 2. Does the WUA have sufficient funds to purchase the new pump in June? If not, what are its options? 3. What does the operating balance and net surplus indicate in terms of the ability of the project to cover operating costs and to cover capital costs? 4. What happens to the budget when the project has finished paying off the loan?

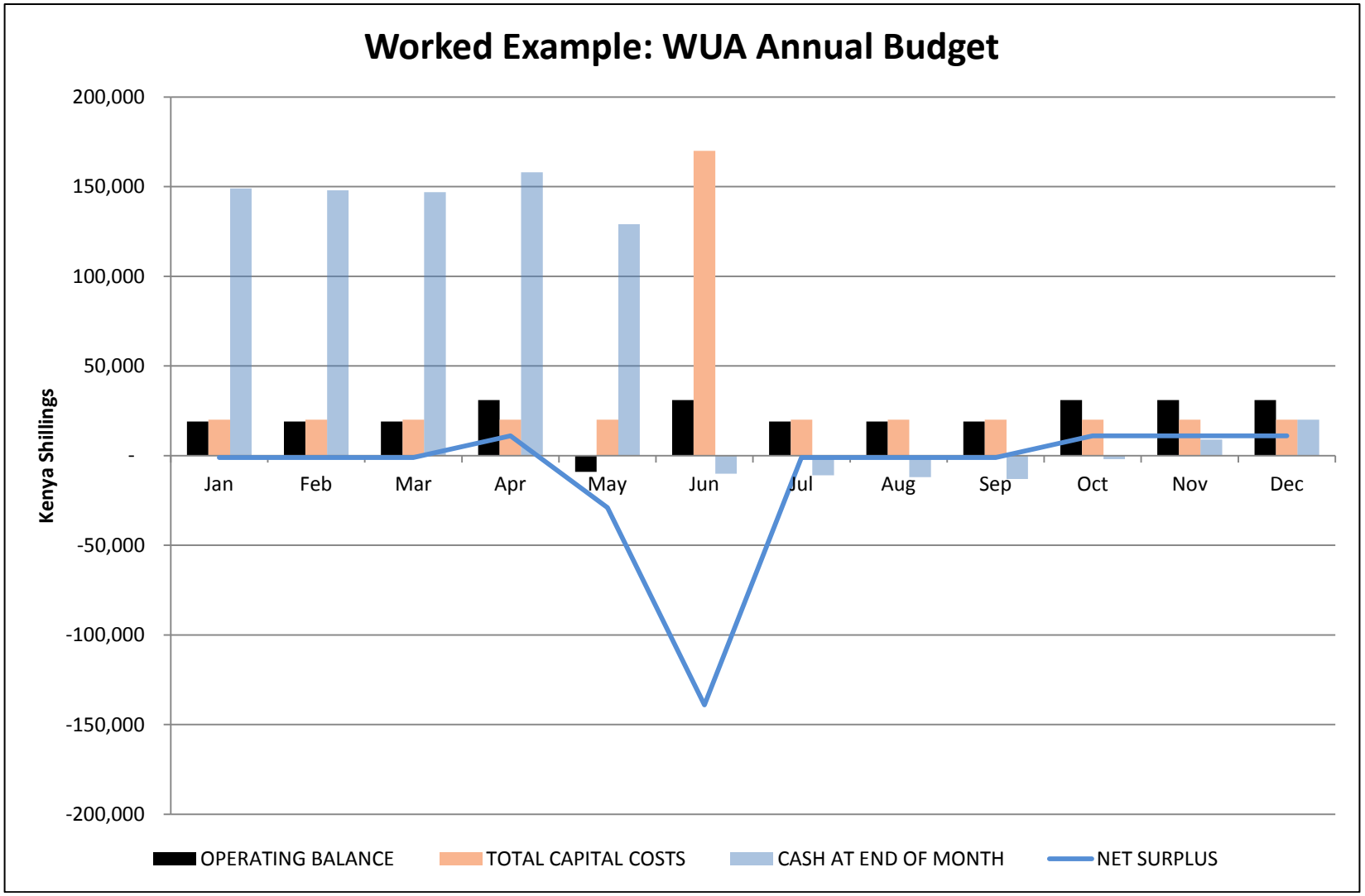
	Example: Preparation of a WUA Budget 1. WUA sells water to 200 individual household connections. Each household pays Ksh 500/- per month. 2. 250 households collect water in jerry cans on a daily basis – average daily consumption is 4 jerry cans per household sold at Ksh 5 per jerry can; 3. WUA has a tree nursery which sells on average 20 seedlings per day at Ksh 10.00 per seedling every month 4. WUA connects on average 2 households on private connections per month at an initial cost of Ksh 5,000/- per connection 5. The organization has 5 employees who are paid a total of 50,000 shillings per month. 6. The organization pays Ksh 5,000/- subscription every year to the WRUA for catchment management activities. 7. The organization plans to buy a new water pump in the month of June at a cost of Ksh 225,000/-. 8. The organization spends Ksh 2,000 per month renting an office and water kiosks 9. WUA spends on average Ksh 10,000/- per month on committee allowances 10. The organization spends Ksh 5,000 shillings per month on stationery, airtime, fuel, and other administration costs; 11. WUA pays 15,000/- per month on electricity costs; 12. WUA pays 40,000/- in May for the auditor; 13. WUA uses on average 5,000/- per month on casuals and spares for repair work. 14. WUA took a loan for a pump house and pays Ksh 20,000/- per month on principle and Ksh 4,000/- on interest charges. 15. WUA started the year with 225,000/- in the bank account carried forward from the previous year.
Step 4: Preparation of WUA's own annual budget	Repeat the exercise with the revenue and costs from the WUA itself using the form in Attachment 2. The facilitator should assist the WUA to draw up the appropriate form using the form in Attachment 2. This should be modified depending on the type of technology and whether revenue and costs are likely to fluctuate during the year. This means the groups will need details from the books of accounts. If the project is new and does not have any books of accounts, then the participants should estimate actual costs. Facilitator can reflect with participants on the quality of the books of accounts for the purposes of providing information on WUA income and expenses. One group should present its draft WUA budget, explaining how it has

	estimated the figures.
	
	Allow discussion so that each item is agreed as the participants move through the budget lines.
	
	Once the budget has been prepared, the facilitator should initiate a discussion on the implications of the budget by asking the following questions:
	
	• Is the revenue sufficient to meet the expected operating expenses in every month?
	• Is the revenue sufficient to meet the expected capital costs?
	
	• If no:
	  o What will happen to the project if revenue is less than expenditures?
	  o What can WUA do to raise revenue or reduce expenditures so that revenue is sufficient to cover expenses?
	• If yes:
	  o What is done with the surplus?
	  o Should the WUA be planning for improvements to the water project?
	  o How robust is the surplus – revenue may fluctuate during the year due to rains?
	• For existing projects, does the budget reflect the experience of the project – either with a surplus or deficit?
	• What happens if there is a breakdown and the project cannot sell any water?

Step 5: Dissemination, ratification and use of the budget	Once a budget has been prepared, what action is required? Prepare a plan of action, using the questions as a guide. 1. Are the WUA members entitled to see the budget? If so, what should be done to make the budget details available (e.g. placing budget on notice board); 2. How should the budget be approved by the management committee and members? 3. How should the expenditure be checked against the budget? 4. What should be done if the expenditure does not follow the budget? 5. What should be done if the revenue falls below expected amounts? 6. What time of year should the annual budget normal be developed? 7. What does the WUA constitution say about preparation and approval of an annual budget?
Review	• What happens if the WUA does not have any budget? • What is the final balance (profit/loss) of the annual budget we have created
Session Attachments	• Attachment 1: Worked Example Annual Budget • Attachment 2: Annual Budget Worksheet

Attachment 1: WORKED EXAMPLE OF ANNUAL BUDGET FOR WATER PROJECT

Description	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total	Avg
REVENUE														
Billed Amount Water Use	105,000	105,000	105,000	105,000	105,000	105,000	105,000	105,000	105,000	105,000	105,000	105,000	1,260,000	105,000
New Connection Fees	10,000	10,000	10,000	10,000	10,000	10,000	10,000	10,000	10,000	10,000	10,000	10,000	120,000	10,000
Other income	6,000	6,000	6,000	6,000	6,000	6,000	6,000	6,000	6,000	6,000	6,000	6,000	72,000	6,000
SUB-TOTAL	121,000	121,000	121,000	121,000	121,000	121,000	121,000	121,000	121,000	121,000	121,000	121,000	1,452,000	121,000
COSTS														
FIXED COSTS														
Repayment - Interest on Loan	4,000	4,000	4,000	4,000	4,000	4,000	4,000	4,000	4,000	4,000	4,000	4,000	48,000	4,000
Office rent	2,000	2,000	2,000	2,000	2,000	2,000	2,000	2,000	2,000	2,000	2,000	2,000	24,000	2,000
Salaries	50,000	50,000	50,000	50,000	50,000	50,000	50,000	50,000	50,000	50,000	50,000	50,000	600,000	50,000
Audit Fees					40,000								40,000	3,333
SUB-TOTAL	56,000	56,000	56,000	56,000	96,000	56,000	56,000	56,000	56,000	56,000	56,000	56,000	712,000	59,333
RECURRENT COSTS														
Electricity, Fuel & Chemicals	15,000	15,000	15,000	15,000	15,000	15,000	15,000	15,000	15,000	15,000	15,000	15,000	180,000	15,000
Spares and repairs	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	60,000	5,000
Office administration	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	60,000	5,000
Committee Costs	10,000	10,000	10,000	10,000	10,000	10,000	10,000	10,000	10,000	10,000	10,000	10,000	120,000	10,000
Bank & Govt charges	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	60,000	5,000
SUB-TOTAL	40,000	40,000	40,000	40,000	40,000	40,000	40,000	40,000	40,000	40,000	40,000	40,000	480,000	40,000
OPERATING BALANCE	**25,000**	**25,000**	**25,000**	**25,000**	**- 15,000**	**25,000**	**25,000**	**25,000**	**25,000**	**25,000**	**25,000**	**25,000**	**260,000**	**21,667**
CAPITAL COSTS														
Principle Loan Repayments	20,000	20,000	20,000	20,000	20,000	20,000	20,000	20,000	20,000	20,000	20,000	20,000	240,000	20,000
Asset Purchases						225,000							225,000	18,750
SUB-TOTAL	20,000	20,000	20,000	20,000	20,000	245,000	20,000	20,000	20,000	20,000	20,000	20,000	465,000	38,750
NET SURPLUS	**5,000**	**5,000**	**5,000**	**5,000**	**- 35,000**	**- 220,000**	**5,000**	**5,000**	**5,000**	**5,000**	**5,000**	**5,000**	**- 205,000**	**- 17,083**
CASH AT START OF MONTH	225,000	230,000	235,000	240,000	245,000	210,000	- 10,000	- 5,000	-	5,000	10,000	15,000		
CASH AT END OF MONTH	230,000	235,000	240,000	245,000	210,000	- 10,000	- 5,000	-	5,000	10,000	15,000	20,000		


Worked Example: WUA Annual Budget
200,000
150,000
100,000
50,000
-
-50,000
-100,000
-150,000
-200,000
Kenya Shillings
Jan
Feb
Mar
Apr
May
Jun
Jul
Aug
Sep
Oct
Nov
Dec
OPERATING BALANCE
TOTAL CAPITAL COSTS
CASH AT END OF MONTH
NET SURPLUS

Attachment 2: ANNUAL BUDGET WORKSHEET

Description	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total	Avg
REVENUE														
Other														
New Connection Fees														
Billed Amount Water Use														
SUB-TOTAL														
COSTS														
FIXED COSTS														
Repayment - Interest on Loan														
Office rent														
Salaries														
Audit Fees														
SUB-TOTAL														
RECURRENT COSTS														
Electricity, Fuel & Chemicals														
Spares and repairs														
Office administration														
Committee Costs														
Bank & Govt charges														
SUB-TOTAL														
OPERATING BALANCE														
CAPITAL COSTS														
Principle Loan Repayments														
Asset Purchases														
SUB-TOTAL														
NET SURPLUS														
CASH - BEG OF MONTH														
CASH - END OF MONTH														

MODULE E	**FINANCIAL MANAGEMENT**
SESSION E2	**SETTING TARIFFS**
Appropriate Facilitator Background	The facilitation team should be composed of individuals with training in water management such as government water officers with an understanding of WUA finances and tariff requirements.
Introduction	The purpose or this session is to establish the financial basis for sustainable operation, along with the considerations that go into setting a tariff structure. Without proper agreed tariffs, the community water project will not be sustainable as either the members will feel they are paying too much money or there will be no funds to pay for operation and maintenance. It is important that members fully appreciate the reasoning behind the tariffs and why it is important that all pay their bills.
Objective	By the end of the session, participants will be able to: 1. Explain the reasons for setting water tariffs 2. Identify stakeholders involved in water tariff setting 3. Know factors to be considered when setting a tariff 4. Agree the costs that they need to cover to sustain their water system. 5. Agree appropriate tariffs for their water system.
Outputs	• Tariff Plan
Timing	2 hour
Target Group	WUA Committee and Community Members, other stakeholders (e.g. water service boards, WSP)
Appropriate Venue	A place within the community where discussions can be held without distractions
Methodology	• Short presentation • Question and Answer • Discussions • Group exercise on tariff calculation
Materials	• Handout - calculating of tariff • Flip chart paper and marker pens • WASREB guidelines • Water Board guidelines • WUA by-laws

<table>
<tr><th>Session Guide</th><th></th></tr>
<tr><td>Supporting Information</td><td>

Commonly used Tariff Structures

1. **Flat rate per household** per month or per year. The advantage is that it is easy to implement. Tariff is unfair in that low consumers pay the same as high consumers.
2. **Flat rate per unit volume**. Water gathered from a water kiosk or standpipe is commonly sold at a single price for a uniform container (e.g. 20 litre jerry can). For metered connections, the tariff is fixed at a single rate for each cubic metre of water.
3. **Charge per unit of livestock.** This is frequently used in pastoral areas where livestock keeping is a predominant livelihood and livestock demand for water is significant. Tariff will vary according to the type of livestock. This is very difficult to control because the quantity of water consumed by a unit of livestock is variable.
4. **Block tariffs.** The tariff is different for different quantities of water. Typically the tariff increases as the total volume consumed per month increases as shown below:

Quantity of water consumed per month (m3)	Tariff Ksh/m^3
0 – 4.99	20
5.0 – 19.99	40
20 and above	60

The advantage of the block tariff is that it enables a low tariff to be charged for small consumers and higher rates to be charged to larger consumers (a pro-poor structure). This encourages consumers to reduce consumption and be more efficient.

</td></tr>
<tr><td>Step 1: What are revenues used for?</td><td>Review the discussion from Session 1: Preparation of an Annual Budget in terms of the vision of the project and the expenses that the project needs to cover.

Discuss and document on a flip chart the costs that need to be covered for the WUA to operate, prove the quality of service discussed in the visioning exercise.

Discuss the differences between technologies (e.g. diesel generator-powered systems) that require fuel and staff to operate versus simpler technologies (e.g. handpumps) that require periodic servicing and repairs and finally renewable energy based systems (e.g. solar powered systems) that require specialised repairs if they breakdown.

Discuss how the technology influences the attitude of the consumers in terms</td></tr>
</table>

	of paying for the water service. Many consumers and WUA committee members do not place enough emphasis on the need to raise money on a routine basis to cover periodic costs. **Important role of WUA Committee is to educate the community members**
Step 2: Basis for setting tariffs	Once the WUA members and committee members recognise the need to pay for the cost of operating and maintaining the water project, then the discussion can progress to how to set the tariff. Ask participants „What should be the basis for setting the tariffs?' Facilitate a discussion on whether the tariff should be set according to one of the following criteria and what are the consequences of each: 1. What people can afford; 2. What people are willing to pay; 3. What the project requires to cover the operating costs (partial cost recovery); 4. What the project requires to cover all operating costs and to replace the assets when they need replacement (full cost recovery); 5. The maximum the project can possibly charge; **Consumers are generally willing to pay fair prices for good water services** The facilitator should direct the discussion towards a consensus on an agreed basis for setting tariffs. Discuss what happens if people cannot afford to pay what is needed to operate and maintain the water project. • What happens to the infrastructure? • What happens to consumers if they lose the services provided by the water project? • Who suffers most?
Step 3: The need to regulate tariffs	The facilitator should explain why tariffs are regulated. The following points should be made: • Water is a basic human need and is a constitutional right; • The cost of building water points with safe and reliable water is expensive; • The net result is that there is usually only one water service provider in any given area – there is no competition between water services providers in the way that there is competition between two shops selling the same commodity. • This means that water service providers have a monopoly and could charge excessive tariffs. And since consumers do not have an alternative

	water supply they could be exploited. People in arid and semi-arid areas are more vulnerable to exploitation. • A balance has to be found between setting a tariff that covers the cost of operating the project and ensuring that consumers are not exploited. There are two ways to ensure that consumers are not exploited: 1. A WUA should be transparent about the costs of operating the project and how the tariffs have been established. This approach is reflected in the preparation and approval of the annual budget, and the submission of the financial and audit report to the AGM; 2. An independent government organisation is mandated to check that tariffs are justifiable. The organisation with this mandate is the Water Services Regulatory Board (WASREB). They set guidelines and use the Water Services Boards (WSBs) to make sure that these guidelines are implemented. The issue is that tariffs should be fair and justifiable with respect to meeting the genuine costs of operating and maintaining the project. Discuss the term: **‚Socially Responsible Commercialisation of Water Services'** Commercialisation of water services implies operating the water project on commercial principles i.e. with the intention of offering good quality service at an affordable price. This is NOT the same as being profit driven. WASREB is there to make sure that water service providers do not exploit the consumers.
Step 4: Discussion on setting tariffs	The main consideration in setting tariffs must be to ensure that revenue at least covers operational costs and from a public health/social perspective that each person can benefit from access to sufficient water to meet basic human needs. Reflect on whether it is wise and cheaper to set low tariffs that result in insufficient revenue to operate the project properly. For a water project to be financially self-reliant, the tariff should be set according to one of these two scenarios: ii) **Full cost recovery:-** The tariff is set to generate sufficient revenue to meet operational and capital replacement costs. iii) **Partial cost recovery**:- The tariff is set to generate sufficient revenue to meet operational costs only. The project has a risk that when capital costs are required to replace assets (equipment, pipes, tanks, etc) it does not have sufficient revenue to meet these costs.

	Many community managed water projects do not meet the minimum requirements of partial cost recovery. It is recognised that many projects need to change their tariffs to meet a partial cost recovery basis and then move gradually more towards full cost recovery. For community water schemes we will consider the tariff calculation that is based on cost recovery on operations and maintenance plus replacement of pumping equipment (e.g. hand-pump, genset) where the life expectancy is less than 10 years. Good tariff setting usually differentiates between: • Communal water point or kiosks • Individual private household connections • Connections to institutions (schools, health centres, church/mosque) • Connections to business premises/commercial enterprises/agricultural use • Animal watering ***Discuss the various options available for tariff setting (See supporting Information)***
Step 5: Practical Exercise on setting tariffs	The **objective in tariff setting** is to raise sufficient revenue to meet the operational (and possibly capital replacement) costs in a way that is: • Fair and equitable; • Affordable (takes into account people's ability to pay); • Justifiable (does not involve unreasonable profit or exaggerated costs); • Easy to administer and control. In groups of 5-6 persons discuss and calculate the tariffs for the water project using the **example provided in Attachment 1**. Discuss the results: • Which kind of tariff is easier to implement? • Is there sufficient surplus to support capital cost replacement? • What happens if the costs increased? • How should the tariff accommodate leaks? • What happens if 20% of the households do not pay their water bills?
Step 6: Setting Tariffs for WUA	Repeat the exercise in groups but this time focus on setting the tariffs for the participants' WUA. Based on the exercise the annual budget that was developed in *Session E1: Preparing an Annual Budget*. Note:

<table>
<tr><td></td><td>

Convert the annual costs to average monthly costs;
If the quantity of water consumed per kiosk or per household is not known, then make some reasonable assumptions.

Let each group present their draft WUA tariff plan
Let the group explain about how they arrived at the figures, what were the considerations? Why they think the tariffs would work for their project etc.

Facilitator should direct the discussion towards a consensus on the tariff plan.

Note the following challenges and ask participants to reflect on how these factors should be incorporated into the tariff plan:

1. Seasonality of water availability (for seasonal sources)
2. Seasonality of demand
3. Unaccounted for water (or Non-revenue water). This is water that is produced but does not appear in any consumer meter
4. Non-payment
5. Vulnerable groups who could be considered for exclusion from payments
</td></tr>
<tr><td>Step 7: Action Plan for Dissemination and Implementation of Tariff Plan</td><td>
The proposed Tariff Plan has to be explained to the management committee, the WUA membership and the consumers.

Make a Plan of Action that deals with:

Dissemination/explanation of the proposed Tariff Plan;
Approval of the Tariff Plan;
Implementation of the Tariff Plan;
Monitoring of the revenues to see whether the tariff plan has resulted in the revenues that are expected/required.

Plan of Action
<table>
<tr><th>Task</th><th>Who</th><th>By When</th></tr>
<tr><td></td><td></td><td></td></tr>
<tr><td></td><td></td><td></td></tr>
<tr><td></td><td></td><td></td></tr>
</table>
</td></tr>
<tr><td>Review</td><td>
1) Why is it important to pay for water?
2) What are examples of operational costs? What are examples of maintenance costs in a community water project?
3) How is the proposed tariff „pro-poor'?
</td></tr>
<tr><td>Session Attachments</td><td>
Attachment 1: Worked Example of Tariff Calculations
Attachment 2: Form to support Tariff Calculations
Attachment 3: Worked Example of Setting Tariffs for Handpump Supply
</td></tr>
</table>

Attachment 1: Tariff calculation based on Example

EXAMPLE OF A DIESEL POWERED BOREHOLE SUPPLY

A water project with a diesel powered generator has the following situation.

COSTS

- Office rent Ksh 1,500/- per month
- Fuel – Ksh 20,000/- per month
- Lubricants (oil, grease) Ksh 5,000/- per month
- Generator Spares: Oil, fuel, air filters Ksh 10,000/- per month
- Staff
    - Operator Ksh 8,000/- per month
    - Guard Ksh 5,000/- per month
    - Kiosk attendant Ksh 5,000/- per month
    - Service mechanic Ksh 5,000/- per month
    - Plumber Ksh 5,000/- per month
    - Clerk Ksh 5,000/- per month
- Materials for pipelines, kiosk and tank Ksh 5,000/- per month
- Committee allowances KSh 10,000/- per month
- Office administration Ksh 3,000/- per month
- Transport Ksh 5,000/- per month
- Bank charges & GOK fees Ksh 1,000/- per month
- Generator will wear out after 5 years and need replacement at a cost of Ksh 450,000/-.

WATER CONSUMPTION

- Water is supplied by individual connection to 100 households, where 30% consume 4 m^3/month, 50% consume 12 m^3/month and 20% consume 25 m^3/month
- Water is supplied to two schools each consuming 30 m^3/month
- 200 households get water from the water kiosk.
- There are approximately 6 people per household.
- It is estimated that the kiosk sells 600 x 20 litre jerry cans per day or 18,000 jerry cans per month
- Approximately 10 herds of camels of 15 animals water at the trough each day
- Approximately 25 herds of shoats of 40 animals water at the trough each day

TARIFF CALCULATION

Step 1: Establish monthly costs

ITEM	COSTS Ksh/month	COMMENT
FIXED COSTS		
Office rent	1,500	
Salaries	33,000	Summation of all salaries
Audit Fees		None specified
SUB-TOTAL	**34,500**	
RECURRENT COSTS		
Fuel & Lubricants	25,000	Fuel & lubricants
Spares and repairs	15,000	All spares for generator and pipeline, tank, kiosk
Office administration	3,000	
Committee Costs	10,000	
Transport	5,000	
Bank & Govt charges	1,000	
SUB-TOTAL	**59,000**	
TOTAL OPERATING COSTS	**93,500**	
CAPITAL REPLACEMENT COSTS		
New Generator	**7,500**	**Cost of new generator divided by 60 months (5 years)**
TOTAL COSTS	**101,000**	

Step 2: Establish Tariffs for Kiosk Sales, Schools and Livestock

i. Decide what the schools should be charged. We have assumed that the schools are not charged.
ii. Calculate the number of jerry cans per month (200 households x 6 persons per household x 30 days in a month divided by 10 litres per person per day divide by 20 litres = 18,000 jerry cans per month). Note: per capita consumption will depend on the distance between households and the water kiosk and the price. We have assumed 10 litres per person per day which is typical of ASAL areas.
iii. Decide the tariff for the kiosk water. We have opted for Ksh 2/- per jerry can.
iv. Decide on the tariff per herd of camels. We have opted for Ksh 500/- per camel herd per month.
v. Decide on the tariff per herd of shoats. We have opted for Ksh 500/- per shoat herd per month.
vi. The total revenue from the water kiosk, schools and livestock is estimated at Ksh 53, 500/- per month.

ITEM	QTY	UNIT	RATE Ksh/month	MONTHLY COST (Ksh)	COMMENT
School	2	Schools	0	-	Assume schools are not charged for water
Kiosk	18,000	jerry can/month	2	36,000	
Camels	10	herd	500	5,000	
Shoats	25	herd	500	12,500	
Total Revenue per month				**53,500**	

Step 3: Establish household tariff based on flat rate per household per month (Option 1)

i. Assume each household pays 500 per month

ITEM	QTY	RATE Ksh/month	MONTHLY COST (Ksh)	COMMENT
Household connections	100	500 per HH per month	50,000	

Step 4: Establish household tariff based on flat rate per cubic metre (Option 2)

i. Assume a flat rate of Ksh 50/- per m3.

ITEM	QTY M3/month	RATE Ksh/month	MONTHLY COST (Ksh)	COMMENT
30 HH x 4 m3/mnth	120	50	6,000	
50 HH x 8 m3/month	400	50	20,000	
20 HH x 25 m3/month	500	50	25000	
Total Monthly Revenue from HH connections			**51,000**	

Step 5: Establish household tariff based on block tariffs (Option 3)

i. Assume a tariff structure as shown below:

Monthly Consumption Band (m^3)	Ksh/m3
0 – 4.99	40
5.0 – 19.99	60
20 and above	80

ii. Calculate total monthly revenue as shown below

		Tariff Blocks Ksh/m^3				
No. of HHs	**Total Vol m3/month (Estimated)**	**Block 1**	**Block 2**	**Block 3**	**Monthly Bill/HH**	**Total Revenue m3/mnth**
		Ksh 40/m^3	**Ksh 60/m^3**	**Ksh 80/m^3**		
		Vol consumed per tariff block m3				
30	4	4			160	4,800
50	8	5	3		380	19,000
20	25	5	15	5	1,500	30,000
Total Revenue per month from household connections						**53,800**

Step 6: Analyse different options

i. Compile the total revenue and compare with the operating costs and the capital replacement costs.

	Sums (Ksh)		
	Option 1	**Option 2**	**Option 3**
	Flat rate per HH per month	**Flat rate per m3**	**Block Tariff**
Monthly Costs without capital replacement	93,500	93,500	93,500
Monthly Costs with capital replacement	101,000	101,000	101,000
Monthly Revenue (Kiosks, Livestock, Schools)	53,500	53,500	53,500
Monthly Revenue (Flat Rate per HH)	50,000	51,000	53800
Total Monthly Revenue	**103,500**	**104,500**	**107,300**
Monthly Surplus (Partial Cost Recovery)	10,000	11,000	13,800
Monthly Surplus (Full Cost Recovery)	**2,500**	**3,500**	**6,300**

Note: (i) All the tariff options meet the objective of having revenue greater than costs.
(ii) No provision has been made for revenue collection efficiency less that 100%

Step 7: Establish Proposed Tariff Plan

Final proposed tariff Plan is based on whichever options are selected. Here we opt for the block tariffs.

Water User	Water Tariff	Units
Schools	Free	
Shoats	500/-	Per herd per month
Camels	500/-	Per herd per month
Kiosk users	2/-	20 litre Jerry can
Households with individual connections	40/-	Per cubic metre up to a maximum of 5 m^3 per month
	60/-	Per cubic metre for volumes above 5m3 up to 20 m^3 per month
	80/-	Per cubic metre for volumes greater than 20 m^3 per month

Attachment 2: Sample tariff calculation template

Operational Costs Personnel	(a) Salaries (pump attendant/watchman/other): (b) Allowances (c) External technician (estimate - e.g. budget 1 day work/month on average):	Monthly Cost-Ksh (1) (2) (3)
Daily consumables	(d) Average consumption of diesel/oil/chemicals/ other consumables	(4)
Spare parts	(e) identify spares, cost and replacement period and calculate monthly average.	(5)
Small repair/ maintenance fund	(f) Small fund for minor unexpected repairs, repair leaks, replace taps, re-plastering cement on troughs/tap stands/ reservoir, repair fencing,	(6)
Replacement cost of pump and/or generator after 5 yrs	(g) Total investment cost/ 60 months	(7)
Other overheads	(h) Transport (to buy spares, attend meetings, transport materials) (i) Office costs (rent, telephone, stationary) (j) Bank/other charges	(8) (9) (10)
	Total (SUM 1-10)	(11)
Tariff 1	Flat rate per household (11)/total no. of households)	…… Ksh per HH per month
Tariff 2	Cost per jerry can Estimate # of jerry cans/day = ……. x 30 = # of jerry cans/month = …….. (11)/# of jerry cans/month = cost per jerry can	…… Kshs per Jerry can
Tariff 3	Ability to pay Estimate proportion of HHs who (i) cannot pay (ii) can only afford reduced rates (iii) can afford to pay (iv) large users who can pay more (v) institutions rate (vi) private connections. Through trial and error adjust rates until they match with operational costs	……

<table>
<tr>
<td>Tariff 4</td>
<td><u>Ability to pay – Block Tariffs</u>
Similar to Tariff Option 3, block tariffs are based on the principle that those who can least afford to pay for water can consume less.

The tariff structure charges a lower rate for small consumers, with increasing tariffs for higher consumers.

This option can only work in metered schemes.

Through trial and error adjust rates until they match with operational costs</td>
<td>
<table>
<tr><th>Water Consumed per month (m3)</th><th>Rate Ksh/m^3 /month</th></tr>
<tr><td>0 – 10</td><td></td></tr>
<tr><td>10 – 20</td><td></td></tr>
<tr><td>>20</td><td></td></tr>
</table>
</td>
</tr>
</table>

Attachment 3: Setting household tariffs for a hand pump water supply

Setting household tariffs for a hand pump water supply		
(1) Salary of water attendant (S): Ksh 6,000/month	=	Ksh 72,000/year
(2) Total Annual maintenance cost (M): Kshs 2,000/month (technician, mason, pump spares and materials)	=	Ksh 24,000/year
3) Current Replacement cost of pump:	=	Ksh 75,000/-
Estimated no. of yrs before replacement:	=	5
Approximate interest rate:	=	15% per year
Annuity (A)	=	Ksh 22,374/- (see note below)
No. of households: N	=	100
Annual Household tariff: H = (S+M+A)/N =Ksh (72,000+24,000+22,374)/100 = Ksh 1,184		
Cost per household/month: Ksh 99 ~ say Ksh 100/-		

Note: Annuity is the amount which needs to be saved each year to replace the pump/system. It is a function of the expected lifespan of equipment and the interest rate. It does not consider inflation but allows for devaluation which is typically more important in developing countries.

In this case our interest rate is 15%, number of payments is 5 (one per year), and the sum to be raised is Ksh 75,000/-. The annuity of Ksh 22,374/- is the amount that, if saved each year for 5 years earning interest of 15% will provide a sum of Ksh 75,000/-. (Note: You can use PMT mathematical function in MS Excel to obtain the correct result).

Inflation can be included in the calculation by estimating the inflation rate. Let us assume 12% per year. We would therefore need to raise Ksh 132,176 (75,000 x (1 + 0.12)^5) /- in the fifth year to replace the pump which means we would need to save Ksh 39,430/- per year to keep up with inflation. The tariff should be adjusted accordingly.

MODULE E	**FINANCIAL MANAGEMENT**
SESSION E3	**REVENUE COLLECTION**
Appropriate Facilitator Background	The facilitation team should be composed of individuals with understanding of revenue collection and social work.
Introduction	This session aims to support new water projects or existing projects with revenue collection problems by examining various issues associated with revenue collection.
Objective	By the end of the session participants should be able to: 1. Explain how bills are developed, distributed and collected 2. Discuss challenges involved in revenue collection (defaulters, illegal connections, burst pipes, etc) 3. Develop mitigation plans for defaulters
Outputs	Appreciation of challenges associated with revenue collection
Timing	1 hour
Target Group	Committee, community members, local leaders
Appropriate Venue	A place within the community where discussions can be held without unnecessary distractions.
Methodology	Short presentations, Question and Answer, Discussions, Practical exercise on meter reading
Materials	Illustrations, Flip Charts, Pens, books, Record book for daily collections for Kiosks, Water Meter, Meter Book
Session Guide	
Supporting Information	A **revenue collection** system must be: • **Accurate** – to minimise customer complaints; • **Convenient** for consumers and WUA – easy payment systems; • **Safe** – minimise risk to WUA staff, use safe cash handling systems • **Fair** – apply equally to all consumers • **Enforceable** – punitive measures against defaulters
Step 1: Design of monthly bills	1. What is the basis for a consumer's monthly bill? a. Flat rate or consumption based tariffs? 2. What information does a consumer need each month? a. Consider the design of the monthly bill i. Name – so consumer can confirm it is his/her bill ii. Water consumption iii. Tariffs (consumer can check the accuracy of the bill) iv. Other charges (e.g. membership fees, meter fees, etc) b. Monthly statement i. Documents payments received and any outstanding balances 3. How will monthly bills be generated? a. Schemes with metered connections with more than 100 households should consider a computerised billing system

	(See Attachment 1) for an example of a monthly bill. Note: Flat rate tariff systems often assume that households do not need a monthly statement or bill. The bill is important as it provides a reminder to pay the monthly bill and shows the statement.

Step 2: Data collection to prepare monthly bills	Flat rate systems may need to consider:
	
	• Which are the active connections this month? (Has anyone been disconnected for non-payment?).
	
	Metered systems need to consider:
	
	• Who will read the meters?
	• How will meter reader identify themselves?
	• Preparation of a form for meter reading/recording
	• Arrangements for access to compounds to read meters
	  o What should meter reader do if he/she cannot get access to the compound to read the meter?
	  o Safety of the meter reader from dogs and other hazards
	• Dates for meter reading.

Step 3: Distribution of Monthly Bills	1. How should consumers be given their bills? The objective is to make it easy, quick and guaranteed for consumers to get their bills.
	2. Options include:
	  a. Post (expensive)
	  b. Hand delivery
	  c. Collection from WUA office or other agreed place
	  d. Email
	  e. SMS
	3. Deadline for delivery of bills?

Step 4: Payment Options	The objective of the payment options should be:
	
	1. To make it easy for consumers to make payments;
	2. To make it safe for the WUA
	
	Note: A WUA or treasurer that collects cash is creating a security risk.
	
	Options to be discussed include:
	
	1. Payment at WUA office. WUA issues receipt.
	  a. Requires regular hours for WUA office to be open.
	2. Payment at a bank into WUA bank account and delivery of pay-in slip to WUA where a receipt is issued;
	3. Payment through mobile phone (M-PESA or ZAP).
	  a. System is easy to set up with mobile phone operator
	  b. Convenient for consumers and WUA
	  c. WUA issues receipt when WUA receives payment information from mobile phone operator.
	4. WUA sets up a collection agent – this could be a local shop, tea factory, etc where it is safe and convenient for WUA and consumers.

	Other issues to be discussed include: • Deadline for payment
Step 5: Action on Defaulters	What should the WUA do to consumers who have not paid by the due date? Points to consider: 1. Issue a written warning of disconnection; 2. Disconnect consumer Discuss the consequences of disconnecting defaulters: • Consumers plead with WUA management for reconnection – this takes time; • Less consumption (lower costs of water production) ; • Lower popularity of the elected WUA management committee members and officials. Discuss the following points • Importance of WUA to be able to disconnect defaulters otherwise WUA loses credibility as a proper manager of the scheme; • Establishing a disconnection policy, disseminating the policy and sticking to it – consumers want to be treated fairly. If a policy is followed then it is easier to show that everyone is treated equally.
Step 2: Develop a Risk Mitigation Plan	1. Brainstorm on the risks to the WUA revenue. Document risks on flip chart. Risks to consider include: • Defaulters, illegal connections, burst pipes, vandalism • Low water quantity/yields in dry spell • Identify causes of these challenges • Double receipt books and other corrupt practices • Discuss any other challenges that affect revenue base 2. For each risk, identify steps that can be taken to mitigate the risks. Steps to be considered include: • Written warnings to the culprits • Effective monitoring and evaluation mechanisms • Disconnections and penalties for reconnection • Customer contract • Project Codes of Practice • Improving customer care – complaints box • By-laws
Review	• What is the main risk to the WUA revenue? How has this risk been mitigated? • What happens to the water project if the revenue is less than required?
Session Attachments	Attachment 1: Example of a Monthly Water Bill

Attachment 1: Example of a Monthly Water Bill

Kiamumbi Water Project

P.O. Box 65516-00607 Kamiti
Tel: 0729 - 573889
Email: kiamumbi@ruralfocus.com

To: Leonard Ndung'u Mbugua
P.O BOX 65516-0607 KAMITI

Invoice No: A8902
Date: 30 Apr 2011
Account No: 0001
Isiolo Rd (Line KN)

Invoice

Balance from the previous bill of 28 Mar 2011	700
Payments during the period	
12 Apr 2011 : M-Pesa BH82HE386	700
Balance BF	0
Current bill of 30 Apr 2011	
Water Consumption 13m3	810
Current reading: 408, Previous reading: 395	
Standing charge	100
	910
Total to be paid:	**910**

This amount is due by 15 May 2011

Tariff	KSh/m3
1 - 10 m3	60
11 - 15 m3	70
16 - 20 m3	80
Above 20 m3	85
Minimum charge:	300

Dear Customer,

To pay your Monthly Water bill by Safaricom's M-Pesa Service; Kindly enter the Business Number- 542500, then Enter your Water Account Number, Enter Amount, your Pin, Confirm details then presss OK to Send.

Coop Bank Account Details: Kiamumbi Water Project, 01100280252100, Zimmerman Branch.

K-rep Bank Account Details: Kiamumbi Water Project, 036050000281, Kilimani Branch.

Note: For Bank payments, Please present original Bank Pay-in slips to KWP Office for receipting before the deadline. A reconnection fee of Kshs 1,000 shall be charged on disconnection and reconnection service.

For further enquiries please contact KWP Office, Thank you.

<table>
<tr><td>MODULE E</td><td>FINANCIAL MANAGEMENT</td></tr>
<tr><td>MODULE E4</td><td>PROCEDURES FOR HANDLING FUNDS</td></tr>
<tr><td>Appropriate Facilitator Background</td><td>The facilitation team should be composed of individuals with training in financial management.</td></tr>
<tr><td>Introduction</td><td>Handling funds properly is an important task within the WUA. The success or failure of the WUA may depend on whether the funds are handled accurately and transparently.

Although the actual financial recording is usually handled by the treasurer or accounts clerk, the committee members need to know the systems so that they can confirm that the proper systems are being followed.</td></tr>
<tr><td>Objective</td><td>By the end of the session, participants should be able to:
1. Confidently handle WUA funds, following proper accounting procedures</td></tr>
<tr><td>Outputs</td><td>• Proper financial accounting systems are set up (new projects) or reviewed (existing projects)</td></tr>
<tr><td>Timing</td><td>4 hours</td></tr>
<tr><td>Target Group</td><td>All members of the WUA management committee plus a number of community resource persons.</td></tr>
<tr><td>Appropriate Venue</td><td>A place within the community where discussions can be held without distractions.</td></tr>
<tr><td>Methodology</td><td>• Demonstration/Observation
• Illustration in practice
• Short presentation
• Practical exercise</td></tr>
<tr><td>Materials</td><td>- Illustrations
- Flip charts and marker pens, pens and notebooks
- Pens, note books and blank ruled sample receipt books, vouchers, invoices, cheque books, LPOs,
- WUA constitution</td></tr>
<tr><td>Session Guide</td><td></td></tr>
<tr><td>Supporting Information</td><td>a) Primary documents are records where initial information of transaction in a WUA is indicated. They provide evidence that a transaction has taken or took place.

<table>
<tr><th>Primary document</th><th>What it is used for</th></tr>
<tr><td>1) Receipts</td><td>Issued to buyer of goods</td></tr>
<tr><td>2) Payment vouchers</td><td>Signed by person paid</td></tr>
<tr><td>3) Petty Cash Vouchers</td><td>Signed by person paid where there is no receipt</td></tr>
<tr><td>4) Purchase order book</td><td>Issued to one from whom we intend to get goods</td></tr>
<tr><td>5) Invoice</td><td>Issued as demand for payment</td></tr>
<tr><td>6) Goods receipt Note</td><td>Issued by supplier to be signed by one receiving goods</td></tr>
</table>
</td></tr>
</table>

	7) Cheque — Issued to supplier of goods or services to be presented to the bank for payment. b) The recorded information is then transferred to the books of accounts, which are referred to as **secondary documents.** These include Cashbook and Ledger.
Step 1: Importance of Proper Record Keeping	Why should a WUA keep records? Points to consider include: o Planning purposes; o Stock and asset management; o To know WUA debtors/creditors; o To know cash position; o To be able to explain to the WUA membership the revenue and utilisation of the revenue; o To maintain credibility of consumers that tariffs are fair; o To be able to account for any donations to the WUA. **Corruption** thrives where there is: • **Confusion**; • **Ambiguity**; • **Incompetence**; • **Lack of oversight and monitoring;** • **No disclosure of information;** • **Lack of proper procedures;**
Step 2: Describing the different types of records	1. What type of records should a community organization keep and who should keep them? [List and discuss the types of records in one column of a table and show against each record who should keep it.] The object in this step is to help WUA committee members become familiar with the terminology and the look of each kind of record. 2. Ask different participants to explain the type of record, its purpose, who keeps the record, who signs it. **Members register:** This contains a list of members and their personal names among other details **Assets register:** This register maintains record of WUA assets. An asset is what an organization owns. **Invoice:** An invoice is issued by the supplier of goods or services showing their condition, quantity, and price demanding for payment. Another form of an invoice is a fee note. **Water bill:** Is a form of invoice indicating cost of water services rendered.

	Receipt Book is a document showing evidence that money paid into the WUA is received and records are kept. It is issued to the person paying in the money such as member paying for membership fees. **Payment Voucher** is a document showing evidence that money is paid OUT of the WUA. **Petty Cash Voucher** is a document showing money was paid OUT in cash. **Order book:** Order Book is used by a WUA to order for goods or services. It is also called local purchase order (LPO) by some organizations. **Delivery Note:** Delivery note is a document specifying that goods/services have been delivered. It is sent with the goods or services so the customer signs to say he has received the goods. **Cheque** is a promise issued to supplier of goods or services to be presented to the bank for payment. When ordering a cheque book, the organization provides the number of signatories who must sign the cheque before it can be honoured by the bank.
Step 3: Simulation and practical exercise on use of record documents in groups	Demonstrate an example by facilitator filling in primary documents: **Exercise:** Divide participants into groups of 3 and ask each group to provide records for the following transactions. Each group should have print outs of all the records (see Attachment 1): a) A member, Mr. Tom Otieno joins the WUA on 13/06/2011 and pays Ksh 500 membership fees to the WUA treasurer; b) Mutethya Women's Group wants to buy 15 goats from Mr. Mulwa for Ksh 2,000/- each and one wheelbarrow from Atul Shah suppliers for Ksh 3,500/-. c) Amani group orders 3 cans of orange paint from Kariuki hardware shop on 12/03/2011 which is delivered to them on 15/03/2011 d) Waumini Water and Sanitation Company pays two staff members – Paul Otiato and Margaret Rudya their salaries by cheque Facilitator should check to confirm that the correct records and documents are issued. Discuss how they decided which records to keep and which documents to be used.
Step 4: Secondary Documents and Bank reconciliation	Records from the primary documents discussed above are then transferred to the secondary documents. These include the ledger and cash book Facilitator to demonstrate how to transfer information from primary to secondary financial documents ensuring all primary documents are used: **Cash Book:** A cash book is a record of all cash or cheques received (in) and paid (out) in the transaction of business. The information recorded in the cashbook is from primary documents. Which primary documents would provide information for the cash book? Discuss. Receipts, incoming cheques for the receiving side;

payment vouchers, outgoing cheques for paid (out) side.

Date	Description	PV/R #	Receipt (Ksh)			Payment (Ksh)		
			Cash	Bank	Chq #	Cash	Bank	Chq #
1/9/05	Shares	RI	2,000					
3/9/05	Donation			200,000	00468			
6/9/05	Shares		8,000					
7/9/05	Materials					10,000		
8/9/05	Salaries						15,000	05642
	TOTALS		**10,000**	**200,000**		**10,000**	**15,000**	

Ledger: The ledger is a summary of all transactions in a business. It is a document of secondary entries. Final accounts are drafted from the accounts in the ledgers. When writing a ledger one should:

Identify the account then use the Rule of:

- Value Received "IN"
- Value Given "OUT"

Example of entries in the ledger is provided below:

Bahati Women Group bought materials worth Kshs.10, 000; entries in the ledger are therefore organized as:-

Cash Account

IN (Credit)	OUT (Debit)
	Materials Kshs.10, 000.

Material Account

IN (Credit)	OUT (Debit)
Cash Kshs.10, 000	

Step 5: Bank Reconciliation

Bank reconciliation (See sample Attachment):

A bank reconciliation is a very important procedure for a WUA as it is a way of checking that the books of accounts tally with what is in the bank and/or petty cash box.

A WUA that does not undertake bank reconciliation on a regular (monthly) basis is at risk.

Bank reconciliation is the process of harmonizing the balances of money at the bank and in petty cash against all recorded income and expenditures. Bank reconciliation is done by taking the current bank statement and checking all the

	entries – receipts and withdrawals - to see if all the cheques issued have been presented and cleared. At the same time it is also helpful to confirm if all the cheques issued to the organization have been cleared before making a decision to pay from the account. The Bank Reconciliation Statements is a tool to ensure that the accounts balance. Principally the question being asked is: • Does the money you started with (A) • Plus the additional money received (B) • Less the amount expended (C) • Less the amount you remain with (D) • Equal zero? In other words does (A+B = C+D) = 0 If it does NOT then there is a problem that needs to be found and/or explained. The Bank Reconciliation Statement should be made at the end of each month. In reviewing the Bank Reconciliation Statement the Chairman should: **1) Refer to the Bank Reconciliation Statement for the previous month**, to ensure that the figures in relation to the amounts present in the bank account and in the petty cash at the end of the month are the same as those found Carried Forward at the start of the month in question. **2) Refer to the Bank Account Statement, and 3 Column Cash Book,** to ensure that all funds received have been taken into consideration. **3) Refer to the VOUCHERS and the 3 Column Cash Book** to ensure that all transactions have been documented. **4) Physically count the money in the Petty Cash and review the Bank Statement** to ensure that the funds remaining at the end of the month are accurately reflected in the Bank Reconciliation Statement. When the Bank Reconciliation Statement does NOT Balance for whatever reason say a cheque has been signed but has yet to be cashed then the Chairman MUST ensure that the discrepancy is adequately explained. The Bank Reconciliation Statement Format allows for such explanations.
Review	• When should a bank reconciliation be undertaken?
Session Attachments	Attachment 1: Sample Financial Records

Attachment 1: Example of Financial Forms

Member's Register

M/No.	Name	Membership fee (Ksh)	Date of entry	Nominee Witness	Remarks
01	M. Wanjiru	300	6/6/2000	E. Kiarie	

Assets Register

Date	Supplier	Asset	Serial No.	Quantity	Unit Cost (Kshs)	Total (Kshs)	Registration No.
5/9/05	KJ Suppliers	Chairs		2	500	1000	-WG/Chair/1 -WG/Chair/2

Purchase Order

LOCAL PURCHASE ORDER

Date ……

Order No. 0456

From…….
…….

To……
……

Please supply the following goods / services and charge to our A/C
……
……
……
……
……
……
……
…

Quote the above Order No. On all invoices.

Sign…… Date ……

Payment Voucher

PAYMENT VOUCHER

Date.....

M/S…….

Description	**Kshs.**	**Cts**
Amount in words Shs ……..		

Prepared by …….. Date …….
Authorized by …….. Date ……..
Received by…… Date ……

Delivery Note

Delivery Note

Date……..

M/S……
…….

From order……
No…….

Please receive the under-mentioned goods/services in good condition.
…….
……..

Received in good condition by …… Date……
Signed by Customer's Agent

Cheque Leaf

Date: ……

Pay……..……..…….

Kshs……..

Amount in words Kshs..
……..……..……...Only

Signed: …..……..……

Cash Book

Date	Description	PV	Receipt (Ksh)			Payment (Ksh)		
		R #	Cash	Bank	Chq #	Cash	Bank	Chq #
1/9/05	Shares	R001	2,000					
3/9/05	Donation			200,000	00468			05642
6/9/05	Shares		8,000					
7/9/05	Materials					10,000		
	TOTALS		**10,000**	**200,000**		**10,000**	**-**	

Bank Reconciliation Statement

	Name of Water Project		
	Date		Sum (Ksh)
A	Funds brought forward/ Opening balances		
		Cash in Hand	
		Bank Accounts	
		Total monies brought forward	
B	Money Received		
C	Expenditure (as detailed in the monthly expenditure statement)		
D	Closing Balances/Money left		
		Cash in Hand	
		Bank Accounts	
		Total monies left	
E	Reconciliation Check		
	E = (A + B) – (C + D) = 0		
F	Differences between Bank Reconciliation and actual funds remaining		
		Cash in Hand	
		Bank Accounts	
	Explanation for differences between Bank Reconciliation and actual funds remaining		
	1.		
	2.		
	3.		
	4.		
	Statement by Accountant		
	I certify that the accounts for the Month _____ Year_____ as reflected in this bank reconciliation provides a true representation of the statement of funds used for purposes intended. Name: _____Signature:_____ Date: _____		
	Statement by Financial Sub-Committee		
	I certify that I have reviewed the accounts in detail for the Month _____ Year_____ as reflected in this bank reconciliation and that the funds have been used for purposes intended. Name: _____Signature:_____ Date: _____		
	Statement by Chairman		
	I certify that I have reviewed the accounts in detail for the Month _____ Year_____ as reflected in this bank reconciliation and that the funds have been used for purposes intended. Name: _____Signature:_____ Date: _____		

MODULE E	**FINANCIAL MANAGEMENT**
MODULE E5	**SETTING PROCUREMENT PROCEDURES**
Appropriate Facilitator Background	The facilitation team should be composed of individuals with training in water supply management such as government water officers with understanding of procurement rules
Introduction	The purpose of this session is to appreciate the need for procurement guidelines for any WUA. Procurement of goods and services is an important aspect of the life of any organization. Procurement rules ensure that organizations remain transparent and leaders are accountable to members.
Objective	By the end of the session, participants will be able to: 1. Discuss the role of procurement sub-committee 2. Develop terms of procurement of goods and services
Outputs	• WUA procurement procedures established
Timing	2 hours
Target Group	WUA committee members and community leaders
Appropriate Venue	A place within the community where discussions can be held without unnecessary distractions.
Methodology	• Short presentations • Question and Answer • Discussions • Demonstration/observation and Group exercise
Materials	• Sample Procurement documents
Session Guide	
Supporting Information	The term to procure means to buy or acquire goods or services. **Procurement Sub-Committee** The WUA procurement sub-committee should comprise at least three persons who should not be members of the monitoring or finance sub-committees to avoid conflict of interest. **Transparent and Accountable Procurement Processes** Procurement is a process which is vulnerable to collusion between the suppliers/contractors and those making the decision. The WUA should take steps to ensure that procurement is done in a way that results in the best value for money for the project and in a way that this is seen to be done. Essentially this means that procurement should be done competitively and publicly. Procurement processes include: • Establishing specifications for the materials/services required; • Public notices requesting for bids; • Clear criteria for evaluation of bids; • Public disclosure of the tender process and results.
Step 1: Importance of Procurement	1. Facilitator can ask participants what they understand by the term procurement. 2. Discuss scope of procurement process: covers goods and services.

	3. What is the purpose of procurement? 4. Discuss what can happen if procurement is not done properly? Weak procurement can result in: 1. Suspicion of corruption or favouritism which undermines credibility of WUA management committee; 2. Sub-standard partial goods or services because terms of reference for quantities or specifications were not properly prepared; 3. Generates conflicts within WUA or between WUA and others because proper procedures were not followed; 4. Over-inflated prices due to lack of proper competition; 5. Delays in getting something done or goods purchased
Step 2: Establishing procurement responsibilities	Every organization often has to set rules to guide the procurement processes for goods and services. Discuss the following points: 1. Who should set the rules and procedures for procurement? • Management committee with AGM approval. 2. Where should procurement rules be documented? • Procurement rules may be found in the WUA constitution or bylaws or in a separate document that has been approved by the AGM 3. Who should implement the procurement activities? • Procurement sub-committee; • Management committee. 4. Does WUA have a procurement sub-committee? • Does constitution allow for a procurement sub-committee? • Define membership of procurement sub-committee? • Define terms of reference for procurement sub-committee • Review terms of reference for management committee with respect to procurement activities.
Step 3: Undertaking a procurement process	Facilitator should divide participants in groups of five and provide them with the case studies provided in Attachments 1. Each group will be required to convert themselves into a procurement sub-committee for a WUA and simulate the discussions that would go on in procuring services and goods for their organization and present the winning bidder to the plenary. Facilitate the presentations and guide the ensuing discussions from the presentations.

	Review the following steps: 1. Specifying precisely what is needed; 2. Drawing up a notice; 3. Advertising; 4. Evaluation of bids; 5. Documenting procurement process; 6. Final selection; 7. Disclosure of results; 8. Handling complaints.
Step 4: Defining WUA procurement guidelines	With reference to Attachment 2, ask the participants to draw up Procurement Guidelines for their WUA.
Review	• What may happen to a WUA if procurement guidelines are not followed?
Session Attachments	Attachment 1: Case Studies for Procurement of Goods and Services Attachment 2: Sample Procurement Guidelines

Attachment 1: Case Studies on Procurement

Case Study for Procurement of Goods

Roro Water Users Association is a newly established association managing a water scheme that supplies water to 240 households in 15 villages. About 50 households have individual connections from the mains while the rest buy water in jerry can from the kiosks in the community. The scheme has 10 institutional connections that include 2 schools, a health centre, the chief's office and a toilet at the market.

The Roro WUA constitution does not say anything about procurement of goods and services as this was not anticipated when the WUA was formed two years ago. However, the organization has recently approached a donor to help them buy a gen-set to pump the water and the donor has agreed to provide these services but on condition that proper procurement procedures are followed in the purchase of the gen-set.

When the proposal was presented to a recent AGM it was decided through RORO/AGM/2011 Minute 5 that a procurement sub-committee should be established to carry forward the process and procure the asset for the organization. They elected five members of the association to form the procurement sub-committee and asked them to proceed with the process.

You are the members of this procurement sub-committee meeting for the first time to undertake the activity.

Show what steps you will take to proceed with the procurement process. All decisions should be documented in the form of minutes. Present the report to the members (Plenary).

Case Study for Procurement of Services

Kivulini Water Users Association has a membership of 150. The Association supplies water to 1,500 clients that include institutions. The Association has a monthly cash income of Ksh. 185,000 from water payments. It has 5 permanent staff members three of whom are kiosk attendants with one office administrator and one metre reader. The Association runs a bank account in the small town within the community where all the money is paid by the consumers who then submit deposit slips to the office.

It has recently come to the notice of the management committee that there is collusion between a bank clerk, and some consumers to defraud the Association of revenue. These consumers get a stamped bank slip without actually paying any money into the account and the revenues have dwindled leading to serious financial problems for the organization.

Your team has been asked by the management committee to develop terms of reference for an expert to help establish the problem and provide a report for the members' consideration. You are required to develop the TORs and choose one company from a list of 4 bidding for the job.
In your report you are required to provide the minutes of the meeting that made the decision and the process you followed to arrive at the organization to provide the services

Attachment 2: Sample Procurement Guidelines for a WUA

The WUA, through its constitution, by-laws or AGM may set up procurement rules that can be structured as follows:

a) Up to Ksh. 10,000 by direct purchase

In regard to items to be procured at any one time for which the total amount to be procured does not exceed Kshs. 10,000 procurement can be made through direct purchase on the checking of prices. Written quotations will not be required.

b) From Ksh. 10,001 to Ksh. 100,000

For all procurement of goods and/or services (including contractors) for the project, between a total of Kshs. 10,000 to a total Kshs. 100,000 a minimum of ***three written*** competitive offers will be required. The selection of the supplier will be made by the procurement sub-committee based on the quotations, taking into account price, quality, availability and timeliness of delivery

In each case the procedures followed must be documented and all quotations/bids collected and /or submitted must either:

- Be filed as supporting documents attached to the voucher reflecting the purchase, or
- Be filled separately with a reference made on the voucher as to the location (file name of the supporting documents)

c) For purchases over Ksh. 100,000

In regard to items to be procured at any one time for which the total amount to be procured exceeds Kshs. 100,000, the procurement sub-committee will:

- Prepare the list of items to be procured;
- Determine the closing date for the submission of quotations;
- Determine the list of suppliers/contractors to be invited to quote. The list shall be approved by the management committee prior to requesting quotations and shall be displayed on the WUA notice board;
- Send out requests for quotations ensuring a reasonable period of time for suppliers to prepare their quotations;
- Arrange the opening and evaluation of quotations;
- Evaluate and determine the preferred supplier/contractor.

In each case the procedures followed must be documented and all quotations/bids collected and /or submitted must either:

- Be filed as supporting documents attached to the voucher reflecting the purchase, or
- Be filled separately with a reference made on the voucher as to the location (file name/page of the supporting documents)

Procurement of services

The procurement of services will follow the same procedures for the procurement of goods. The supply contracts for the provision of skilled and unskilled labour shall follow the procedures as indicated above. Payments to any contractor for civil works within the scope of the project should be based on the agreed

and signed contract with the contractor. The contract with the contractor will be prepared and signed by the Chairman, Secretary and Treasurer.

In each case the procedures followed must be documented and all quotations/bids collected and /or submitted must either:

- Be filed as supporting documents attached to the voucher reflecting the purchase, or
- Be filled separately with a reference made on the voucher as to the location (file name of the supporting documents)

MODULE E	**FINANCIAL MANAGEMENT**
SESSION E6	**FINANCIAL CONTROLS**
Appropriate Facilitator Background	The facilitation team should be composed of individuals with training in financial management.
Introduction	This session is intended to be an **AWARENESS CREATION** session on the need to carry out regular monitoring so that the: • Books of accounts are properly kept and the actual cash in hand and in bank corresponds to what is described in the books; • Actual expenses do not exceed the amount budgeted; • Actual income corresponds to plans; • Actual cash can cover expected expenses
Objective	By the end of the session, participants should be able to: • Explain the elements of a financial report • Explain regularity of financial reports • Distinguish between different kinds of financial controls and reporting.
Outputs	Financial Control Plan
Timing	1 hour
Target Group	All members of management committee
Appropriate Venue	A place within the community where discussions can be held without distractions
Methodology	• Demonstration/Observation • Illustration in practice • Short presentation • Practical exercise
Materials	1. Illustrations 2. Flip charts and marker pens, pens and notebooks 3. Pens, note books 4. WUA constitution 5. WUA annual budget
Session Guide	
Supporting Information	**Tools for Financial Controls** • Approved Annual Budget; • Bank Reconciliation; • Financial Report; • Internal Audit Report; • External Audit Report; • Procurement Guidelines; • Procurement Report.
Step 1: Introduction to financial controls	Facilitator to make a presentation to introduce the topic. Financial controls are a set of procedures that assist the WUA and its members to have confidence that:

	• Funds are being spent in line with intended use and according to the approved budget; • That discrepancies in financial records are noticed early on and rectified; • That revenue is in line with expected amounts and any discrepancies are noticed and acted on; • That procurement activity follows the guidelines agreed by the WUA or as set out in the Constitution or bylaws.
Step 2: Role Play	Use the following role play to help illustrate the need for proper and regular financial controls. Undertake the role play involving the trainer, the village water committee chairman, the treasurer and community members. **Role Play on Need for Financial Controls** At a meeting with a community water committee a trainer is informed that a water project which manages 20 handpumps does not have sufficient funds to purchase the spares and pay the pump mechanic to fix the five handpumps that are not operational. The trainer is informed that the community members have been paying their fees and are not willing to contribute to the fund raiser that has been proposed by the committee to raise the required funds. The treasurer has been ill and proper records have not been kept for the last six months. The project recently purchased a motorbike for the pump mechanic which was not planned for in the annual budget and it is not known how much was spent on the motorbike. What information should the trainer ask for to investigate the problem? What should the project do to solve the problem? In moderating the role play, the facilitator should draw out the following points: 1. Is there an approved annual budget? 2. Does anyone check monthly income and expenditure against the approved budget? 3. What should the project do if the treasurer is unwell and cannot perform his/her duties? Why did the problem persist for six months? 4. What is the procedure for checking monthly income and expenditures against the bank accounts and petty cash box? (Monthly bank reconciliation) 5. Why was the motorbike purchased without being budgeted for and how should this be avoided in future? What systems does the project have to

	move funds from one budget line to another? 6. Why were the committee members not aware of how much the motorbike cost? 7. What has been the impact of the cash flow problem on water supply services within the community?
Step 3: Establishing a financial control plan	Using Attachment 1, ask the participants to identify the financial controls that would improve the accountability of the project. For each issue identify what should be done, how often and by whom. Important points to emphasise are that financial controls only work if: 1. There are agreed procedures that should be followed; 2. That there is a check or audit to ensure that the procedures are being followed; 3. That any discrepancies are addressed immediately
Step 4: Role of Audit Sub-Committee	Discuss whether the WUA has an audit sub-committee? • What is the membership of the audit sub-committee? • What are the Terms of Reference for the Audit Sub-committee? • How can the audit sub-committee ensure that financial controls are being followed?
Review	• Do participants feel that the Financial Control Plan would have prevented the situation as discussed in the role play? • Who has the responsibility to ensure that Financial Control Plan is adhered to?
Session Attachments	Attachment 1: Sample Financial Control Plan

Attachment 1: FINANCIAL CONTROL PLAN

Issue	Action Needed	By Who	When
Ensuring that monthly income and expenditures tally with money in bank and petty cash box	Monthly bank reconciliation	Accountant Chairman of Financial Sub-Committee	Monthly
Ensuring that all receipts, vouchers, accounts etc are being properly kept	Internal and External Audit	External Auditor Chairman of Audit Sub-Committee	Internal audits – quarterly External audits - annually
Ensuring that assets belonging to the project are properly recorded	Update Asset Register	Accountant Counterchecked by Chairman of Financial Sub-committee	Quarterly
Ensuring that expenditures are consistent with approved budget	Check expenditures against approved budget	Chairman of Audit Sub-Committee	Monthly or quarterly
Revenue is consistent with budget	Reconcile monthly revenue against budget	Accountant Chairman of Financial Sub-Committee	Monthly
Procurement is following approved guidelines	Procurement Audit Procurement notices placed in project office and public places	Chairman of Audit Sub-Committee	Quarterly
Members/consumers are informed of project accounts	The following documents should be presented at the AGM: • Annual budget • Financial Report • Auditor Report	Project Chairman	Annually
Audit queries are dealt with properly	Maintain record of Audit Queries and action taken	Accountant Chairman of Audit Sub-Committee	Quarterly

MODULE F
WATER MANAGEMENT OPTIONS

Overview

This module provides support to communities and water projects by addressing various issues related to improving system performance.

MODULE F	**WATER MANAGEMENT OPTIONS**
SESSION F1	**IMPLICATIONS OF THE WATER SECTOR REFORMS AND THE NEW CONSTITUTION**
Appropriate Facilitator Background	Community trainer with experience in community water projects or government water officer
Introduction	This session focuses on helping the participants to understand why the water sector reforms are ongoing, what the reforms mean to the individuals, the community and the water projects. The water sector reforms are an ongoing process and is the subject of ongoing debate on policy and legislative matters. The facilitator should ensure that any material presented is correct with respect to existing legislation.
Objective	Participants understand the key factors that have motivated the water sector reforms and understand how the policy direction has been translated into institutional and legislative changes which affect the community water project.
Outputs	Participants aware of implications of water sector reforms and link to the new constitution.
Timing	Session should take approximately 3 hours, with breaks in-between
Target Group	Community Members
Appropriate Venue	A place where participants can clearly hear and participate in the discussions and where distractions are minimised.
Methodology	- Presentation and discussion
Materials	- Flip Charts - Flash Cards - Pens
Session Guide	
Supporting Information	This session uses many acronyms for different institutions. The facilitator should proceed carefully to ensure the participants understand the different acronyms. It is helpful to write the acronyms on flash cards and place on the wall as a reminder. You can group the flash cards to help the participants distinguish MoWI, WSTF, WRMA, CAAC, WRUA from WSB, WSPs, and WASREB. **Key policy changes within Water Sector Reforms** 1. Separation of functions; 2. Decentralisation; 3. Commercialisation of services; 4. Stakeholder and private sector participation.
Step 1: Identification of Prevailing Problems in the	Ask participants to describe prevailing and persistent water resource and water supply problems in their area.

Water Sector	**Persistent problems that have motivated water sector reforms** 1. Degradation of water resources – decreasing dry season flows, deteriorating water quality; 2. Degradation of water catchments and riparian areas; 3. Poor reliability of water supplies; 4. Lack of financial resources; 5. Insufficient or inappropriate support; 6. Increasing incidence of water use conflicts; 7. High vulnerability to droughts and/or floods. Facilitator to summarise that the water sector reforms have been instituted to help address these issues through substantive changes in: • Policy; • Laws & regulations; • Institutions • Financing • Strategies The following sections look at the key shifts in policy under the reform process.
Step 2: Separation of Functions	**Separation of functions.** This has resulted in certain new institutions being created to handle different tasks. Facilitator should ask participants to name the new institutions and discuss their mandates (See Attachment 1 for details). Each institution should be written on a flash card and placed on the wall. Try to recreate the Institutional Triangle shown in the attachments. Be sure to distinguish between the different institutions e.g. WRMA, CAAC, WRUA from WSB, WSPs, and WASREB. *Facilitator should ask participants to name other stakeholder institutions – where are these within the sector?* Facilitator should ask questions to help participants understand the implications of the institutional changes for them: • *If you as an individual want to drill a borehole, which government department should you talk to and why?* (Answer: WRMA – to get an authorization to drill the borehole, NEMA – EIA license) • *If the community water project wants to expand its supply area by adding another pipeline and kiosk, which government office institution should go to?* (Answer: District Water Office/Water Service Board to discuss the project and possibly to prepare a proposal/application to the Water Services Trust Fund). • *Who is responsible for providing water services to the community members (Answer:* WSB is responsible for developing the infrastructure which is then given under license to a Water Service

	Provider to operate.) • *Does a community water project (CWP) need a license to operate?* (Answer: CWP requires a PERMIT to abstract the water resource. This is given by WRMA. CWP requires a service provision agreement or license from the WSB which sets out various conditions/targets that the CWP must meet to continue providing water services).
Step 3: Decentralisation	**Decentralization.** This means that each institution should develop systems so that decision making is devolved away from the head office in Nairobi to the counties, regions, or catchments. *Facilitator should ask participants:* • *To identify what is meant by decentralization*? • *How has the water sector adopted the policy of decentralization?* Examples: i. There are 8 Water Service Boards – but CWP will continue to deal with district or county water office for advice ii. WRMA has six regions and each region has the mandate to make decisions for its region. CWP will deal with sub-regional offices *Why is decentralization considered a good idea? (Answer: It means that each area can deal with their own problems and come up with their own solutions. Decentralization also means that services come closer to the people)*
Step 4: Water as an Economic and Social Good	**Water to be considered as an economic and social good**. This implies that although water comes free from the clouds, there are costs associated with managing and making the water available to consumers. Three key features are associated with treating water as a social and economic good: 1. **Commercialization of services**. This implies that water services should operate on commercial principles. *Facilitator: ask participants to describe what they think are commercial principles?* Answer: o Charges for providing a service o Revenues must exceed operating expenses o There should be a mechanism for capital replacement o Business should have proper books of accounts o Water business should run as a separate entity from other activities (this is why all the municipal water supplies have been handed over to companies (Water Service Providers or WSPs) owned by the municipal councils – so that the water service provision runs as a separate operation to all the other affairs of the council) **2. Protection for vulnerable groups so that, despite water charges, they are not denied access to water for basic needs** o Revenue from water business should not be used outside the water business (ring-fence revenue). This means that water cannot be charged at high tariffs to finance, say, a new road. o Block tariff structures – tariff structures that recognize different economic status within the consumer population **3. Economic value of water.** This implies that water allocation should

	recognize productive, domestic and environmental uses of water. There are costs associated with managing the water resources. The following consequences are noted: o WRMA charges water use charges for resource management; o Water charges means there will be less wastage; o „Polluter Pays' principle. If someone pollutes or degrades the water quality so others cannot use it or have extra costs to clean the water before they use it, then the polluter, if caught, can be made to pay for the clean-up of the resource.
Step 5: Stakeholder Participation	**Stakeholder Participation.** This means that private and community stakeholders should play a greater role in water services and water resource management. *Facilitator should ask participants to identify what is meant by stakeholders and what role should they be playing*. Answers include: • Community members should have a greater voice in deciding how government resources are spent on water services and water resource management (Example: CWP can apply for CDF financing); • Community members should have a greater voice in deciding what kind and quality of services they require (e.g. communities must be consulted before projects are designed or implemented); • Community members should have a greater voice in how water is allocated to competing water demands (through a WRUA – water resource users association – comment on permit applications); • Private companies should be used more in the water sector to increase professionalism, performance or output based services, and competition (e.g. Municipal services are now run under a publicly owned company, borehole drillers are from private sector).
Step 6: Implications for community water supplies and community water points	**A. Community Water Projects** **Criteria for license as a Water Service Provider** (Water Act Section 56) 1. Schemes who supply more than 20 households with water, or 2. Schemes who supply more than 25 m^3/day for domestic use, or; 3. Schemes who supply more than 100 m^3/day for any purpose The water sector reforms have been introduced to improve the water services. This applies to community water projects as well as government owned water schemes. The WUA needs to understand some of the key changes that the reforms require of them. These should be discussed in detail: *What does WUA have to do to be compliant with the water sector reforms?* 1. **Legal Registration**. A WUA should register as a legal entity (See Session C1:Legal Registration)

2. **Service Provision Agreement (SPA) or License**. A WUA needs to obtain a license from the Water Services Regulatory Board or enter into an agreement with the WSP. This arrangement provides the WUA with formal recognition that it is providing water services in particular area, but it also places various performance targets on the WUA to improve services. (See Session F3: Setting Performance Targets). These conditions will include:
   - Proper and open set of books of accounts;
   - Proper governance – elections, meetings, etc;
   - Ring fencing the project revenues;
   - Proper tariffs that reflect the operation and maintenance (and possibly even the capital recovery) costs;
   - Setting performance targets on hours of service, water quality, number of consumers, etc;
   - Reporting to the WSB or WSP.
3. **Separate Ownership and Operational Aspects**. This topic is discussed in more detail in Session F2 on Water Supply Management Options

Note: the term **Water Service Provider (WSP)** is typically used to describe a legally registered organisation that has a SPA or license to provide water services. A WUA can become a WSP.

B. Community Point Sources – e.g. handpump, pan, sand dam, rock catchment, shallow well

Community point sources are treated differently to schemes that supply multiple households with piped water. A community water point will serve multiple households but community members have to come to the water point. A community water point does NOT need a license, BUT….

- The WUA operating and managing the community water point **may** find benefits in being legally registered (i.e. not just registered as a Self Help Group);
- The community water point should have a water permit from WRMA (even if only a Category A permit);
- The WSB/DWO are setting up better systems to register community point sources so that basic information about the water points are known to the WSB who can monitor and provide support to the WUA to operate and maintain the water point.

C. Implications of not conforming with the Water Sector Reforms

Facilitator should provoke a discussion around the following question:

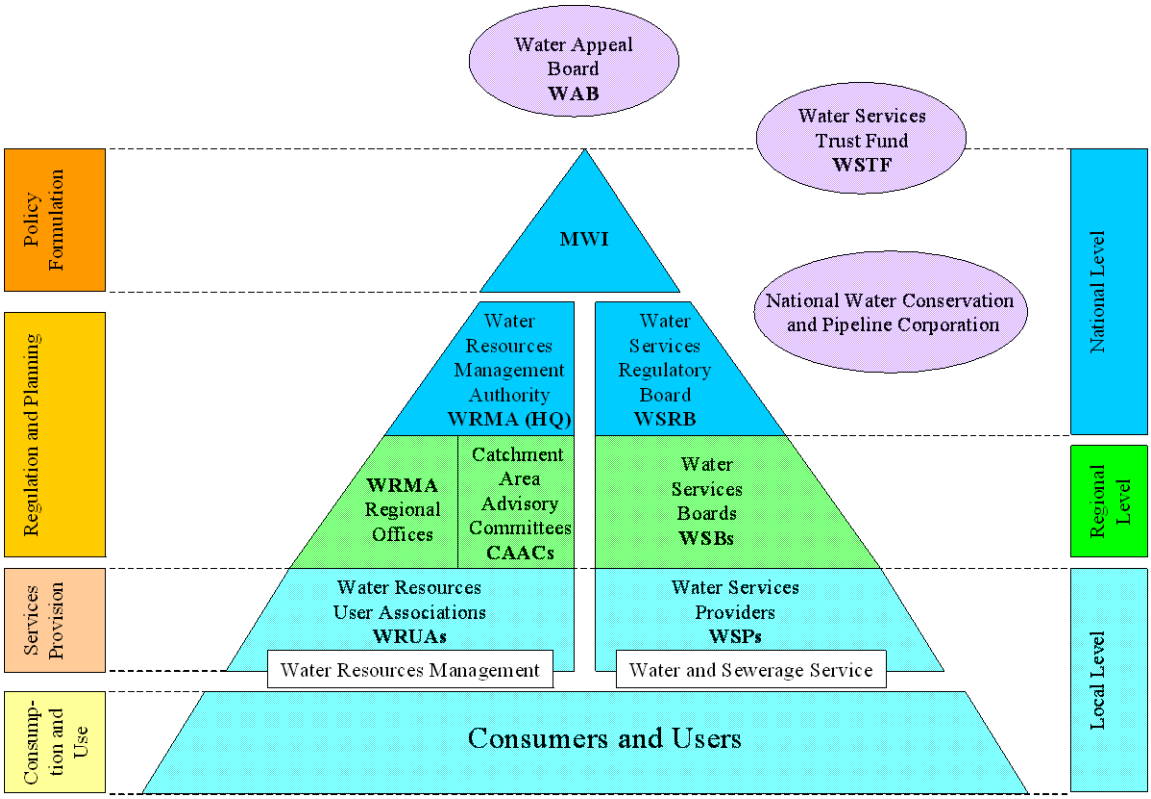
What are the implications to the community water project if it does not comply with the requirements under the water sector reforms?

Example: *WUA has no water permit – so what?*
WUA does not have an SPA – so what?

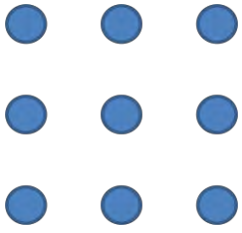
- Community does not play its role in articulating its needs to the

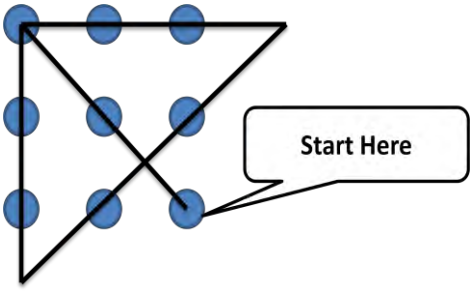
	WSB or WRMA • Community water project is not taken seriously by WSB because the services it provides are unacceptable; • Project misses out on possible support from WSB or WSTF; • A different water company or WSP is charged with the responsibility to manage the community water project; • Disruption to water services; • Community members fail to benefit from the water sector reforms.
Step 7: 2010 Constitution and Water Act 2002	**2010 Constitution** This session is intended to highlight a few key points only from the 2010 Constitution. The implications of the 2010 Constitution on water sector reforms are still being worked out. Key issues within the 2010 Constitution: 1. The mandate for water services is given to the County Government. This implies that County Governments will need to plan for the development and management of new and existing services within the provisions of the Water Act. 2. Water is a human right. The interpretation is that Kenyans have a right to water of sufficient quality, quantity and reliability which should be paid for through a tariff structure that recognises the needs of the water service provider to operate on a sustainable basis and the needs of vulnerable groups to be able to afford a water service. The interpretation is NOT that Kenyans have a right to free water. Any attempt at providing „free water' usually results in no water or a very poor service indeed. Note to facilitator: Discussion on „rights' should be managed carefully because the interpretation of the „right to water' can be different to different people. Discussion should also look at responsibilities that go with the right to water. *What are the responsibilities that go with the right to water?* • Using water efficiently without wastage; • Making sure everyone has fair access • Water for environment is safeguarded • Pay for water consumed
Review	This session has covered a lot of information with many acronyms. These acronyms may confuse participants so the review process should ensure that participants have understood the basic messages associated with the reforms. 1. Why were the water sector reforms started? 2. What do the reforms mean to you as an individual and you as a water project? 3. What is a Water Service Provider (WSP)? 4. What is the difference between a Water Permit and a License or SPA?
Session Attachments	Attachment 1: New Institutions under the Water Act and their mandates

Attachment1: New Institutions under the Water Sector Reforms.



Institution	Role
Ministry of Water and Irrigation (MWI)	To formulate policy and provide oversight within sector
Water Services Trust Fund (WSTF)	To finance water services to the underserved (pro-poor)
Water Appeal Board (WAB)	To hear and determine disputes
Water Services Regulatory Board (WASREB)	To regulate matters related to water services
Water Service Boards (WSB)	Regional body responsible for regulation and planning of water services
Water Service Providers (WSP)	To provide water services under license from the WSBs
Water Resources Management Authority (WRMA)	To plan, regulate and manage water resources
Catchment Area Advisory Committees (CAAC)	Regional body set up to advise WRMA on the management of water resources
Water Resource Users Associations (WRUA)	Local body set up by water users to enable communities and water users to participate in water resource management
National Water Conservation and Pipeline Corporation (NWCPC)	Development and management of state assets for bulk water supply

MODULE F	**WATER MANAGEMENT OPTIONS**
SESSION F2	**WATER SUPPLY MANAGEMENT OPTIONS**
Appropriate Facilitator Background	Community trainer with experience in community water projects or government water officer with experience in managing a water supply.
Introduction	This session focuses on helping communities consider and select management options that may be beneficial to the project to help improve water services. It requires thinking outside the box.
Objective	By the end of this session participants will be aware of different options for professionalizing the WUA operations.
Outputs	Participants will be aware that there are more management options available than currently being used
Timing	Session should take approximately 2 – 3 hours
Target Group	Community leaders, project committee members, community resource persons. The session can be addressed to community members but as some of the ideas are probably quite new to the community, it is probably better to start with a smaller group to enable detailed discussion and understanding.
Appropriate Venue	A place where participants can clearly hear and participate in the discussions and where distractions are minimised.
Methodology	- Presentation and discussion - Question & Answer
Materials	- Flip Charts - Flash Cards - Pens
Session Guide	
Notes to facilitator	The guiding principle for the facilitator should be to help the community members distinguish between the current operational set-up (with its vested interests) and alternative management options that are more likely to result in improved services. This requires a change in attitude of community members so that they see themselves as water supply customers who are entitled to a good and affordable water supply.
Step 1: Thinking Outside the Box	This is a warm-up exercise to demonstrate the need to think outside the box. 1. Draw the following shape  2. Ask the participants to connect all the dots using four straight lines without taking the pen off the paper: Give them 2 – 3 minutes 3. The result is a shape like this



Usually, it takes a while for the participants to recognize that you can only achieve the result if you draw the lines outside the box.

Step 2: What do consumers want?

This step is aimed at helping participants distinguish between (i) what the water project provides and (ii) what the consumers want.

1. Draw a table and list what consumers want with respect to their water supply

For Example:

What consumers want	Indicator	What consumers get at the moment
Enough water	At least 40 litres per person per day	
Access to water	Not more than 15 minutes fetching time from household	
Reliable service	At least 12 hours per day or 4 days per week	
Clean water	Passing KEBS drinking water standard	
Fair price	On average not more than Ksh. 600 per month per household	

The facilitator should emphasize the fact that CONSUMERS want a GOOD SERVICE.

Is there room for the current service to be improved? The issue to be discussed is HOW to improve the service provided.

Facilitator should pick an example from local setting of cases where consumer buys a service – what is the role of the consumer?

Example of Public Transport: An analogy can be made with someone who pays for a bus or taxi ride. What the consumer wants is to be transported comfortably, safely and at a fair price. The consumer is not concerned with who owns the bus or whether the bus has insurance – the police and

<table>
<tr><td></td><td>government should check whether the vehicle is insured and road worthy and the driver competent. The government has a role of regulation and enforcement.

Link analogy with the water services and the attitude of the consumers.</td></tr>
<tr><td>Step 3: Role of the Consumer and Project Member</td><td>Discuss the role of project members and consumers, contrasting the situation in a WUA with that of an urban WSP.

1. In a WUA, project members are also the consumers;
2. In an urban WSP, the majority of consumers do not own, invest or get involved in the management of the WSP, unless specifically.

The relationship between the consumer and the water supply management is very different between a community based water project and an urban WSP.

In helping the community project members to consider various management options, it is important to distinguish issues that derive from project ownership, versus those that derive from management and operational issues of the project.

The facilitator should lead a discussion to distinguish the role of the consumer and the role of the project member.

Draw up a table as follows and fill it in through discussion. After considering the roles, consider the benefits that each role provides to the individual, as shown in the table below.

<table>
<tr><th>ROLE OF A CONSUMER</th><th>ROLE OF A PROJECT MEMBER</th></tr>
<tr><td>Use water properly</td><td>Attend meetings like the AGM</td></tr>
<tr><td>Pay for water promptly</td><td>Elect committee members</td></tr>
<tr><td>Register a complaint if the service is inadequate or sub-standard or interrupted</td><td>Make sure the committee members do a good job</td></tr>
<tr><td>Do not steal the water</td><td></td></tr>
<tr><td>Do not damage the water pipes or pump</td><td></td></tr>
<tr><td>Report anyone who is stealing water or damaging the pipes or pumps</td><td>Report anyone who is stealing water or damaging the pipes or pumps</td></tr>
</table>

<table>
<tr><th>BENEFITS THAT COME FROM ROLE OF CONSUMER</th><th>BENEFITS THAT COME FROM ROLE OF PROJECT MEMBER</th></tr>
<tr><td>Water for domestic and productive uses</td><td>Satisfaction of knowing that project is being well managed</td></tr>
</table>
</td></tr>
</table>

	Prompt repairs	Prestige in the community if you are a committee member or project official
	Reliable service	
	Complaints are dealt with if the project managers are doing a good job.	

COSTS THAT COME FROM ROLE OF CONSUMER	**COSTS THAT COME FROM ROLE OF PROJECT MEMBER**
Pay for water consumed	Membership fees
	Time used up in meetings (AGM)
	Conflicts over elections
	Suspicion of embezzlement or favoritism (for committee members)
	Contribute labour or materials during construction or repairs

The facilitator should now lead the discussion by challenging participants to compare the BENEFITS from being a PROJECT MEMBER with the COSTS.

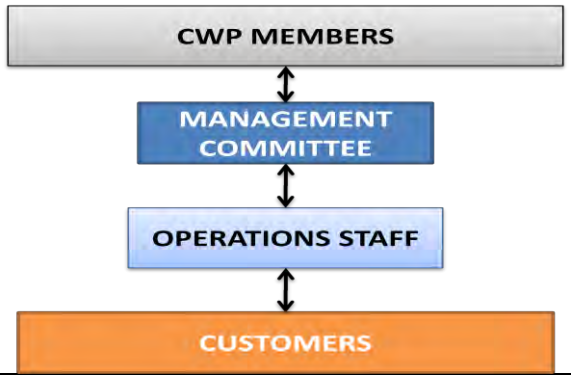
The issue is to help community members to recognize that there are costs and benefits associated with being a project member. This is different to a consumer who has a clear relationship between the costs (water use fees) and the benefits (water availability).

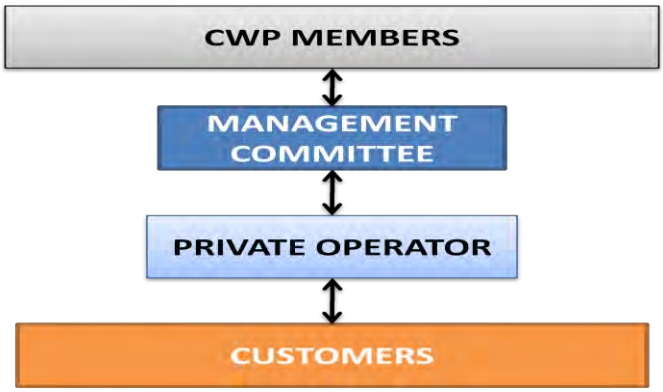
Step 4: Separating ownership and operational duties

Consider the community water project and the WUA that operates the infrastructure. We want to distinguish between duties that arise from being an OWNER of the infrastructure and those that relate to OPERATIONAL tasks.

Work with participants to identify the duties and who should undertake these duties.

OWNERSHIP DUTIES	**WHO SHOULD UNDERTAKE DUTY**
Obtain a water permit	
Obtain a license from WSB	
Keep an asset register	
Make sure assets are used properly and kept in good condition	
Appoint staff to operate and maintain the project or water point	
Report to shareholders or project members	
Make policies & bylaws for the project	

	<table><tr><th>OPERATOR DUTIES (Day to day operational tasks)</th><th>WHO SHOULD UNDERTAKE DUTY</th></tr><tr><td>Manage operational staff</td><td></td></tr><tr><td>Supply water</td><td></td></tr><tr><td>Receive applications for water services</td><td></td></tr><tr><td>Connect consumers</td><td></td></tr><tr><td>Issue bills</td><td></td></tr><tr><td>Receive payments & issue receipts</td><td></td></tr><tr><td>Check water quality</td><td></td></tr><tr><td>Maintain & repair system</td><td></td></tr><tr><td>Prepare reports for management committee</td><td></td></tr><tr><td>Ration water according to availability</td><td></td></tr></table> From this exercise, the facilitator should reflect on the concept of professionalizing the **operations** – this means getting people with the right training and skills to undertake the different **operational** tasks. *Ask participants to talk about whether the skills required are available within in the community? What are the gaps? How should these skill gaps be overcome?*
Step 5: Considering Different Management Options (OPTIONAL)	This is a basic introduction to different management options. Many of these options are unfamiliar to community water projects and so the focus is on presenting basic concepts, not on providing all the details. *Note to facilitator: This material is probably less applicable in pastoral areas with water sources where traditional governance systems prevail.* The basic issue is: *What arrangement of staff or support services is suitable for the project so that the project can deliver the best service possible?* We shall consider various options which are being promoted under the water sector reform process because they professionalise the provision of services: **1. CWP hires Operations Staff (Manager, plumber, etc)** 

	Arrangement: • Committee decides what staff is required; • Committee draws up terms of reference & terms of service; • Committee recruits and engages staff; • Operations staff should be headed by a project manager; • Committee has to provide oversight on performance of staff; • Consumers deal with manager and operations staff, not committee members. **2. CWP hires Private Operator or WSP**  • Committee draws up terms of reference for operator or lease arrangement for WSP; • Committee procures Private Operator or WSP; • Committee engages private operator or WSP on a **Performance Based Contract;** • Private Operator/WSP provides and manages all staff required to operate the project; • Committee provides oversight to check on performance of project. Facilitator should ask the participants what they consider as the benefits and disadvantages of the different options compared to their existing arrangements.
Step 6: Clustering Concept	One of the concerns identified is that small community water projects, because of scale, may not be able to identify, afford and retain the mix of skills required to keep their project operating properly. There has therefore been an interest in CLUSTERING PROJECTS so that the combined size of the projects will be able to attract and afford the skill mix required to run the projects properly. The CLUSTERING POLICY is not well defined so the discussion should focus on the following broad options: 1. A Technical Service Provider providing services to a cluster of projects. This makes the service cheaper to the individual projects. Technical services may include:

	a. Maintenance services (e.g. pump repair mechanic) b. Financial services (accounting, auditing, etc) c. Commercial Services (e.g. billing, business planning) The Technical service provider is engaged on performance based contract by numerous adjacent projects to provide services. There is no change in ownership or management arrangements. WUA has professionalized certain tasks ; 2. A single WSP/Private Operator runs a variety of projects in close proximity on the basis of a performance based contract. No change in ownership or management committee. WUA has professionalized daily WUA operations; 3. Water projects are clustered into one management committee that represents all the projects and makes decisions on how all the projects should be operated under the same terms and tariffs i.e. all the projects are lumped under one management committee. No change in ownership. Facilitator should invite participants to consider these options and openly discuss them. Are there components of their project that would operate better if the operational structure was changed along one of the lines suggested above?
Step 7: Developing a Plan of Action	It is not the intention of this module to direct the community water project to change their operational structure. The focus is to inform and empower the community so that they can make informed decisions. If the community is interested in different operational structures, then they may need to undertake further consultations with DWO or other parties and consider the type of contracts that are involved. The facilitator can help the community to draw up a Plan of Action to follow up on the discussions regarding different operational structures.
Review	1. What is the difference between a consumer and a project member? 2. Why should the management committee not be doing operational tasks? 3. Why should clustering of projects or services be considered?
Session Attachments	None

MODULE F	**WATER MANAGEMENT OPTIONS**
SESSION F3	**SETTING SYSTEM PERFORMANCE TARGETS AND A MONITORING PLAN**
Appropriate Facilitator Background	Community Trainer with experience in community water projects or government water officer
Introduction	This session focuses on helping a community to define performance targets for its water project or water points.
Objective	By the end of this session participants will have prepared a list of indicators, performance targets and a monitoring system for the project.
Outputs	A Performance Monitoring Plan
Timing	Session should take approximately 1 to 1½ hours
Target Group	Community leaders, WUA project committee members, community resource persons.
Appropriate Venue	A place where participants can clearly hear and participate in the discussions and where distractions are minimised.
Methodology	- Presentation and discussion
Materials	- Flip Charts - Flash Cards - Pens
Session Guide	
Notes to facilitator	The objective is to define a Performance Monitoring System that drives the project to provide the services that the consumers require.
Step 1: Defining Indicators	This step is aimed at setting the performance monitoring indicators. Facilitator should start by asking the participants how they want to monitor the water service. Discuss the concept of an **indicator** – it should be easy to measure and should not be ambiguous or subjective. Selecting indicators is not an easy task. The choice of indicator will depend on the kind of system. One needs to consider what the indicator actually measures. If the indicator cannot be measured easily then go back and try again. **Keep it simple**. Identify 3 – 4 indicators initially. Additional indicators can be added later. For example, you might select one indicator which shows whether the system is working (producing water) and another which is measuring whether water users are paying for the water in accordance with the agreed tariff and by-laws/customer contract. Examples of possible indicators are suggested below:

Indicator	**What it measures**
Number of days per month that the system is NOT working because of breakdowns	A low number of days indicates that breakdowns are fixed quickly, indicating that the operator is competent at fixing problems. This is a measure of system reliability.

	Number of individual connections or operational kiosks each month	Growth in the number of connections is an indicator of demand for the service
	Collection efficiency = monthly revenue/monthly billing	A high collection efficiency indicates that people are satisfied with the service
	Monthly revenue	This measures whether the revenue collection system is working and whether people are using the water
	Unaccounted for water % = 1 – (water from individual meters/total water produced)	Percentage of water produced that is not measured through the individual meters – it measures leakages, illegal connections, etc.
	Number of handpumps that are operational each month	Whether CWP is able to maintain or increase the number of operational handpumps.
Step 2: Establishing Targets	Facilitator should ask participants to set targets for each indicator. Points to consider: • Targets should be realistic; • Targets should reflect an improvement of the system towards a better service for the consumers; • Targets should be time bound.	
Step 3: Establishing a Performance Monitoring Plan	Facilitator should ask participants to consider how the project performance should be monitored. Create a form to capture the performance monitoring plan (see Attachment 1 for a sample format) 1. (FREQUENCY) How often should the system indicators be measured? (weekly, monthly, quarterly, annually) 2. (RECORD KEEPING) What records need to be kept so that the indicators can be measured or assessed without any difficulty? For example, a record (diary) of when a pump breaks and when it is fixed is required if you want to track how long the pump remained broken 3. (REPORT) What tool or form should be used to report on the indicators (Refer to Attachment 1); 4. (RESPONSIBILITY) Who should do the monitoring? (consider the audit & monitoring sub-committee members); 5. (SHARING RESULTS) What should be done with the data collected – how should the reporting be done? To customers, Committee or DWO? **6.** (ACTION) What should be done if the performance is not acceptable? What action should be taken?	
Review	1. Why is performance monitoring important? 2. Are the performance indicators measurable? Targets realistic? 3. What is likely to happen if nothing is done when the performance is below targets?	
Session Attachments	Attachment 1: Sample Performance Monitoring Tool	

Attachment 1: SAMPLE PERFORMANCE MONITORING TOOL FOR COMMUNITY WATER PROJECTS

Name of Water Project or Water Point: _____Date: _____

Name of Person filling form: _____Signature of Person filling form: _____

Aspect to be Monitored	**Indicator**	**Target**	**Frequency of Reporting**	**Current Measurement**	**How was measurement done**	**Comment**
Reliability	Number of days per month that system is NOT working because of breakdowns	Max. 5 days	Monthly		Project Diary showing when water stopped flowing and when it started again	
Access	Number of individual connections each month	250	Quarterly		Customer list	
Water sold	Monthly revenue	80,000/- per month	Monthly			
Consumer satisfaction	Number of complaints within one month	Maximum of 5			Complaints record book	
Project Financial Stability	Monthly surplus (revenues less expenses)	Not less than Ksh 5,000/- per month				

MODULE F	**WATER MANAGEMENT OPTIONS**
SESSION F4	**PREPARING FOR A DROUGHT**
Appropriate Facilitator Background	Community trainer with experience in community water projects, or drought extension officers
Introduction	This session focuses on helping a community to plan for a drought
Objective	By the end of this session participants will have prepared a contingency plan for their water supply system.
Outputs	A Drought Contingency Plan
Timing	Session should take approximately 2 hours
Target Group	Community leaders, project committee members, community resource persons.
Appropriate Venue	A place where participants can clearly hear and participate in the discussions and where distractions are minimised.
Methodology	- Story telling - Presentation and discussion
Materials	- Flip Charts - Flash Cards - Pens
Session Guide	
Supporting Information	Drought is cyclic in nature and is described as a slow on-set hazard. A drought contingency plan must have the following features: 1. Be realistic and based on past experience; 2. Must be developed in a participatory fashion that includes as many users of the water facility as possible and should be agreed upon by consensus; 3. The plan must be specific to action i.e. it must define the "*what, why, where, how, when and by whom*" questions; 4. It must have an estimated budget and resources required; 5. It must be linked to a source of resources (from revenue of water sales, community contributions and any "concrete" external sources of funds the WUA members may be able to plug into). These funds should be set aside to be used as a contingency fund and not as an O & M fund; The contingency plan is operationalized based on early warning information, whether from the Government EWS or traditional EWS indicators.
Step 1: The need for drought preparations	Introduce drought preparedness by telling the following story: Two young families are both expecting babies. One family continuously puts aside resources for maternity hospital bills and buys small items e.g. towels, nappies, etc. in preparation for the delivery of the baby. The expectant mother went to the pre-natal clinic every month to have herself checked.

<table>
<tr><td></td><td>
The other family went on with normal life with no pre-natal clinics and no setting aside of funds for the costs of the delivery of the baby. Unfortunately for this second family, there were complications with the delivery because the child was not sitting well in the womb. The doctors blamed this family for not attending pre-natal clinics. The complication would have been avoided but now it was necessary for the mother to be operated on to save both her life and that of the baby. The cost of operation was estimated at KSh. 60,000. The husband had to run around begging his brothers to assist with the medical costs.

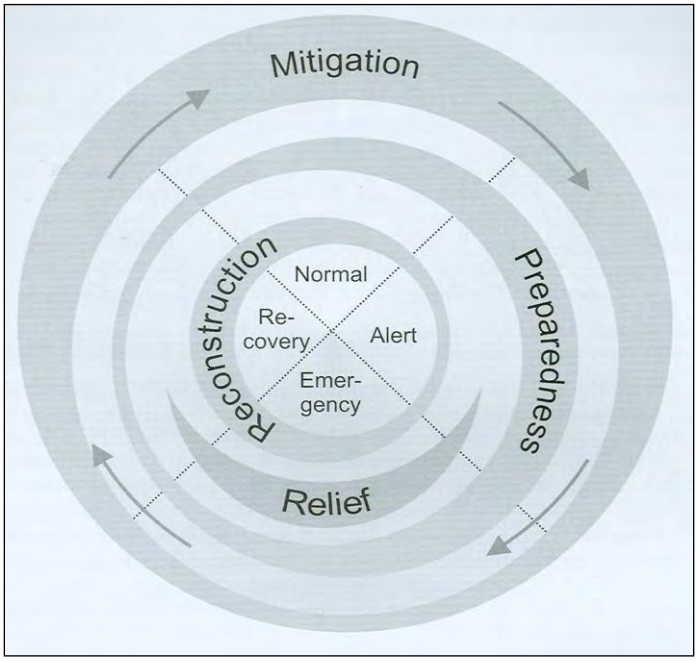
1. Get the participants to brainstorm on the situation of these two families and make suggestions on what was the best thing to do;
2. Get them to relate this situation to two WUAs, with one continuously preparing for drought and another not doing anything to prepare for it.
3. Let the participants in small groups think about the last drought that affected them and do a SWOT analysis of their level of preparedness for that drought with relation to their water supply system and availability and access to water during that drought. Get the groups to share their analysis.
</td></tr>
<tr><td>Step 2: What is a drought and why should we plan for it?</td><td>
This session is a discussion to draw out the distinction between drought, aridity and water scarcity.

Ask participants to talk about these terms and come up with their understanding of the terms

<table>
<tr><td>Aridity</td><td>This is a general feature of the climate. It indicates an area where the long term average rainfall is much less than the water demand of plants. The net result is a habitat consisting of plants and animals adapted to very dry conditions. Aridity also implies that surface water sources are unreliable because rainfall is low and unpredictable. Aridity is a state of chronic water deficit.</td></tr>
<tr><td>Water scarcity</td><td>General condition of lacking sufficient water for domestic or productive purposes. Features of water scarcity include long distances between water points.</td></tr>
<tr><td>Drought</td><td>Drought is a temporary situation in which water availability is less than normal</td></tr>
</table>

Ask participants: “why should we plan for a drought?” Document and discuss their responses. In addition, ask participants to explain traditional systems for planning for and coping with a drought. Answers may include:
• Minimize disruption of water supply
• Minimize disruptions to social life (e.g. disruptions to children going to school);
• Minimize economic losses;
• Prevent environmental degradation;

Traditional coping system may include:
• Migration to areas with more reliable water and pasture;
</td></tr>
</table>

	• Ensure sufficient water storage to get through a drought; • Use reliable water sources (e.g. boreholes); Drought is not just a feature that affects domestic water availability but also affects water for livestock, pasture availability and crops.
Step 3: Understanding droughts	The drought cycle management (DCM) provides the conceptual framework for planning and implementation of appropriate development and relief efforts in drought prone areas. At any given point in time, the situation on the ground can be described to be in one of the four different drought stages. Essentially DCM implies that droughts are a ‚normal' occurrence and should therefore be anticipated and appropriate preparations made for the drought periods. The DCM methodology aims to: 1) provide the right response at the right phase of the drought cycle; 2) build on community based knowledge in drought preparedness; 3) strengthen local resilience and 4) use Early Warning Systems (EWS) to trigger drought response before the situation becomes critical.  **Figure 1: Drought Cycle Management[1]** The diagram indicates that: • Drought management is a continuous process; • Activities are undertaken concurrently, not in a sequence of

[1] The thickness of the band represents the scale of interventions required as proposed by the Continuous Drought Management Approach

<table>
<tr><td></td><td>discrete steps;
• Activities for one drought stage may overlap with activities for a different drought stage.
• Activities expand and contract to suit the particular drought stage.

The challenge for communities and their partners is to identify the most appropriate intervention(s) or activity and to make the intervention within a timeframe that keeps the selected intervention(s) relevant to the particular stage of the drought cycle. There is the issue of WHAT to do and CAN IT BE DONE IN THE TIME AVAILABLE?

Given the difficulty to strictly differentiate the four phases, recent discussions of the DCM model emphasise the importance of applying flexibility in the selection of activities, in order to identify what is most appropriate for the situation on the ground.</td></tr>
<tr><td>Step 3: Contingency Planning</td><td>It is helpful to consider what activities should be done at the different stages of the drought cycle. Ask participants to identify activities that should be done.

<table>
<tr><th>Drought Stage</th><th>Activity</th></tr>
<tr><td rowspan="3">Mitigation/Normal</td><td>Train staff in O & M</td></tr>
<tr><td>Ensure bank balance is healthy</td></tr>
<tr><td>Conduct any major repairs that are required</td></tr>
<tr><td rowspan="13">Preparedness/alert</td><td>Stock pile spares & chemicals</td></tr>
<tr><td>Engage & train additional O & M to be able to handle extra demand for water.</td></tr>
<tr><td>Engage & train management committee on financial, governance and drought contingency planning.</td></tr>
<tr><td>Ensure bank balance is healthy</td></tr>
<tr><td>Ensure system is working properly, repair leaks</td></tr>
<tr><td>Prepare and disinfect additional tanks within community</td></tr>
<tr><td>Make contingency arrangements with water service providers and/or truckers for bringing water by bowser (check contract and logistic arrangements)</td></tr>
<tr><td>Check distance to and quality of alternative water sources</td></tr>
<tr><td>Provide additional storage</td></tr>
<tr><td>Consider water demand management options (e.g. move livestock away from water point, institute a drought ban on irrigation), notify public of impending water scarcity</td></tr>
<tr><td>Check and service standby equipment</td></tr>
<tr><td>Prepare alternative power arrangements for water supply systems that rely on mains power</td></tr>
<tr><td>Identify vulnerable groups in the community and make specific provision for water to these groups</td></tr>
<tr><td>Relief/emergency</td><td>Notify authorities of impending drought situation and coordinate responses which may include</td></tr>
</table>
</td></tr>
</table>

		setting up a specific task force to handle issues quickly.
		Consider exemptions or deferred payments for water
		Provide water services to distressed areas
		Ensure water availability to public institutions
		Keep public informed of water availability
		Engage alternative water sources and transport to make water available
	Reconstruction / recovery	Monitor water services to vulnerable groups and ensure supplies are reaching them
		Rehabilitate damage to infrastructure and equipment
		Relieve extra staff to go on leave or stand down
		Recoup deferred payments
Step 4: Early warning Systems	One of the problems with a slow onset disaster like a drought is knowing when the situation is changing from normal to the alert stage and then to the relief stage. This requires a monitoring plan. Ask participants to identify indicators and thresholds for those indictors that signify when the situation is changing. Indicators may include: • water availability in dams/pans and water points used by livestock • water availability in rainwater harvesting storage tanks at public institutions (e.g. schools and health facilities) • ability to pay for water • demand for water at reliable water points	
Step 5: Options for water supply during emergency periods	One of the problems in a drought is that the options for obtaining water becomes fewer and increasing pressure is placed on fewer reliable water sources (e.g. boreholes). Ask the participants to draw up a list of options for alternative water sources and rank the source according to criteria that may include: • cost; • water quality; • reliability of supply; • distance from source; • human and livestock population in need of water; • options for conveying water; • accessibility barriers (conflicts, ownership, etc)	
Step 6: Financing water supplies during a drought emergency	One of the problems in a drought is that consumers lose their ability to afford water services and yet their need for water is greater than normal. Droughts also force consumers to rely on more expensive water (e.g. borehole water) when they might normally rely on cheaper options (e.g. shallow wells, dams, etc). The facilitator should lead a discussion on what steps can be taken by the WUA to ensure that it has sufficient cash reserves to provide water services through a drought even if consumers are unable to pay. Options	

	include: • Deferred payments – a system whereby consumers are given credit by the WUA to obtain a limited amount of water on a regular basis at no or reduced cost on the understanding that the debits will need to be repaid; • Water supply can stock pile materials and inputs during the normal phase for use during the drought; • Get consumers to pay in kind – e.g. livestock or through labour (running a water kiosk) The single most important factor is to help the consumers understand that payment for water during normal times can help the water supply to run smoothly during a drought. If demand and revenue decreases during normal periods then the water supply has no ability to create cash reserves that it may need during a drought period. The water supply should also review their tariffs and revenue collection systems to ensure that during normal times it is able to generate sufficient cash reserves to be able to provide a reliable service during drought periods.
Review questions	1. What measures has the water project agreed to undertake to help reduce the impact of a drought on water services? 2. Why should consumers pay for water during normal times?
Session Attachments	None

MODULE G
ENVIRONMENTAL HEALTH AND SANITATION

MODULE G	ENVIRONMENTAL HEALTH AND SANITATION
Notes to facilitator	Behavioural change required for lasting improvements in hygiene and sanitation takes time and is a complex subject in itself. It is desirable to employ a full time specialist to lead in this area and advise on the most appropriate content and methods of training. Hygiene and sanitation are not fully covered in this Trainer's Manual because there are very elaborate hygiene and sanitation training guides already being applied and used in the water sector which are recognised and accepted. The facilitator is therefore advised to access these guides from the respective institutions i.e. Public Health & Sanitation (MOPH), Water Services Trust Fund (WSTF), Ministry of Water and Irrigation (MWI). These guides are also self-explanatory. The range of tools, techniques and resources, all of which are well documented, that can be used to address more specific hygiene and sanitation issues are: • Participatory Hygiene and Sanitation Transformation (PHAST) guide • Hygiene and Sanitation Guide Training manual -AMREF • Community Led Total Sanitation (CLTS) Handbook • Children's Hygiene and Sanitation Training/ Child to Child (CHAST/CTC) guide Including hygiene and sanitation training in WUA management training is meant to highlight its importance to the WUA and to stress that ***they*** are agents of change within the community they serve. **All participants need to be made aware of:** 1. The need to wash hands before eating; 2. Washing hands before preparation of food and after defecation; 3. How to safely dispose of faeces; 4. The risks of contamination of water during transport and storage; 5. Health risks associated with stagnant water around water points, particularly those that are shared with animals; 6. Safe disposal of solid and waste water and other possible contaminants.

MODULE G	**ENVIRONMENTAL HEALTH AND SANITATION**
SESSION G1	**ENVIRONMENTAL HEALTH AND SANITATION ISSUES**
Appropriate Facilitator Background	Community trainer with experience in participatory methodologies and knowledge on environmental health and sanitation.
Introduction	In facilitating comprehensive appraisal and analysis of environmental issues in relation to sanitation practices, solid waste management, and water sources, a transect walk in the community is necessary and effective.
Objective	To facilitate comprehensive appraisal and analysis of environmental issues in the community around water sources and also due to human activities at community level.
Outputs	• Defecation map including toilets, water sources/ water points, environmental issues, solid waste and drainage issues maps. • Community action plan
Timing	3-4 hours
Target Group	Community members , leaders, youth, Public Health Officers
Methodology	Transect walk mapping
Materials	-Felt Pen, flip chart, coloured powder, stones, etc
Session Guide	
Supporting Information	**Transect Walk** A transect walk involves walking with community members through the village from one side to the other, observing, asking questions, and listening. During a transect walk you could locate the areas of defecation, solid waste dumpsites, drainage and environmental issues around water sources.
Step 1: Transect Walk	• Divide the participants into groups. • Ask each group to draw a community map of the area or village. • Give each groups a transect route towards major water points • Ask the groups to use the community map to document all the observations. Mark all the general features along the transect route and on the community map **Group 1 can focus on open defecation** In this group; • Try to understand with the community what constitutes an „unhygienic' latrine. Visit latrines which are not covered or where the faeces are draining out in the open. • Ask questions such as household members use which areas for defecation, where do women go, and what happens during emergency defecation at night or during a high incidence of diarrhoea? • Invite a few volunteers to draw a quick outline boundary of the village using sticks, branches, and coloured powder to demarcate the boundary of the village. • Ask someone to indicate only a couple of important landmarks (such as a school, main road crossing, places of worship etc inside the boundary)

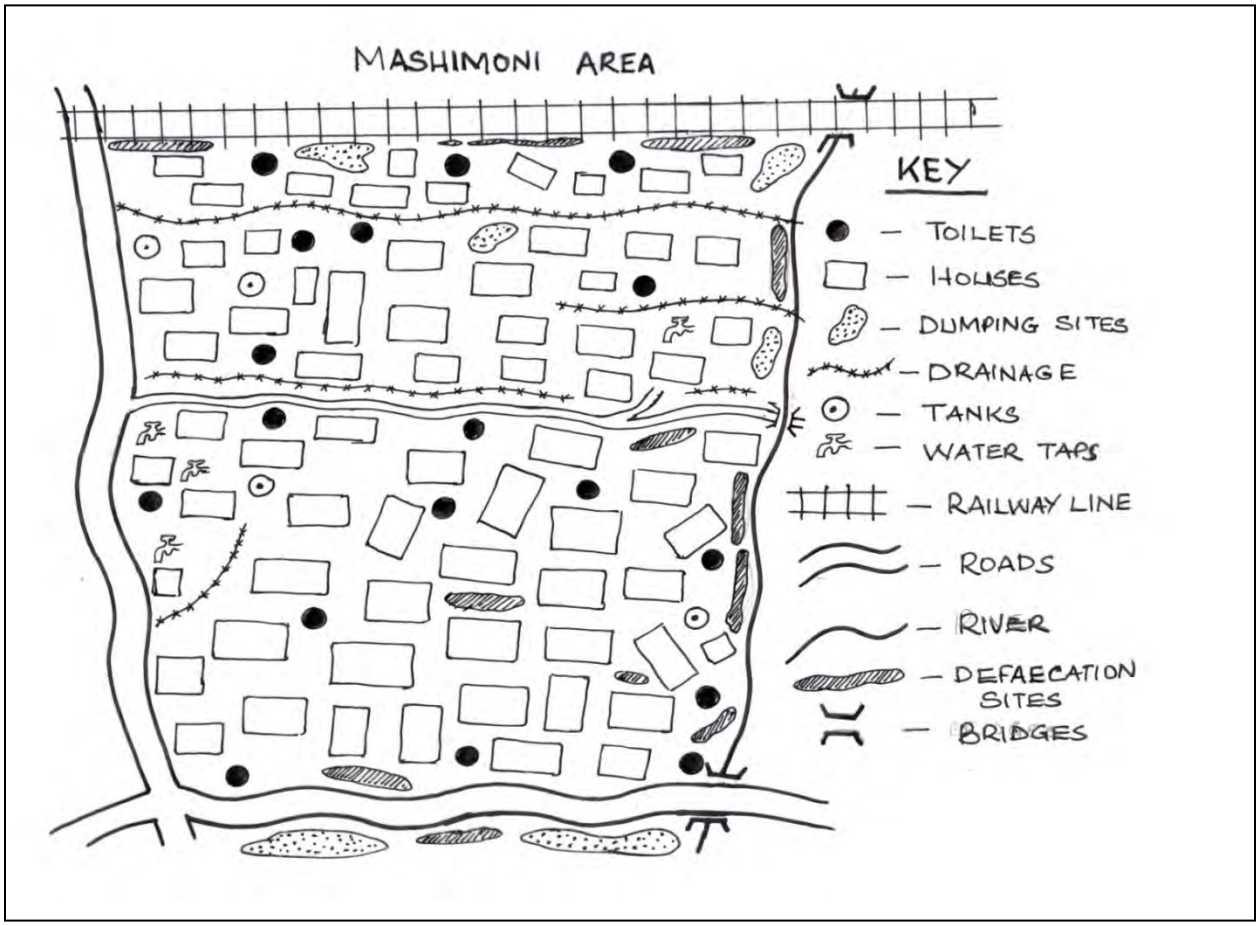
	• Identify a young boy or girl and ask him or her to step in and indicate his or her house hold • Allow time for this to be completed **Identifying the dirtiest neighbourhoods** • During the mapping exercise, ask the community to stand in small groups according to their respective neighbourhoods. • Ask them to discuss among themselves which is the dirtiest neighbourhood of their village, the second dirtiest neighbourhood and develop list of shame etc. • Collect and read out the papers, and let the group plot the dirtiest neighbourhoods on the map **Group 2 on water source protection** • Ask the group to visit key water sources and capture all health and environmental issues. • Ask them to plot issues observed on the transect map • Ask them to talk to everybody they meet on the way to the water points and water sources and try and get their opinion on environmental and health issues around the water point's i.e. litter around water point, stagnant water etc **With respect to water source protection;** • What do they feel about sharing the same water point with the animals? • What they think can be done to improve the situation? • How can they ensure that the water is not polluted by human beings and animals? The group should develop a transect walk map capturing all the details and then share it with all the group members. **Group 3 on solid waste management and drainage** • Ask the group to visit dumping areas along the transect route observing types of wastes dumped and the nature of drainage system. • Ask the groups to interview farmers, herders, shopkeepers, men and women, children on the transect route and ask the following questions; With respect to solid waste; • What type of waste is generated at household level? • How is it disposed? • Where is it disposed? • Ask to be shown disposal points. • Ask them what they can do to ensure proper disposal. With respect to drainage; • Ask whether drainage is a problem? • What are the problems? • Ask to be shown problem areas? • Ask what can be done to solve the issue? • Ask the group to plot all the details on the map
Step 2:	• All the groups should present the maps to plenary

<table>
<tr><td>Interviewing the maps</td><td>• Ask the plenary to raise questions regarding what is shown on the maps
• Make corrections or additions</td></tr>
<tr><td>Step 3: Developing a Plan of Action</td><td>Ask the groups to develop an action plan that addresses the issues reflected in the maps, using the sample shown here below;

A community action plan
<table>
<tr><th>Description of activity</th><th>Steps to be followed</th><th>Own Resources</th><th>Required resources from outside</th><th>Start & Finish date</th><th>Coordinator</th></tr>
<tr><td>Activity I: Planting trees around the water pan</td><td>Step 1: Inform the people of the intention
Step 2: Gather materials
Step 3: Hire skilled labour</td><td>Seeds, Poles etc</td><td>Chain links</td><td>August</td><td>Mariam & Ali</td></tr>
<tr><td>Activity II</td><td></td><td></td><td></td><td></td><td></td></tr>
<tr><td>Activity III</td><td></td><td></td><td></td><td></td><td></td></tr>
</table>
Conclusion
The maps show different aspects of sanitation, environmental issues around water points, and in regard to solid waste and drainage. The community action shows corrective measures to implement within the project area which should be implemented by the community itself for its own good.</td></tr>
<tr><td>Review</td><td>What do you think should also be plotted on the transect map?</td></tr>
<tr><td>Session Attachments</td><td>Attachment 1: Example of a Transect map</td></tr>
</table>

Attachment 1: Example of a Transect Map

Note: The map is a means to improve community understanding of the situation, not an end in itself.



MODULE G	**ENVIRONMENTAL HEALTH AND SANITATION**
SESSION G2	**WATER SOURCE PROTECTION**
Appropriate Facilitator Background	WRMA officer, NEMA officer or community trainer with experience in watershed management.
Introduction	There is a wide range of both chemical and microbial contaminants that may be found in drinking-water, some of which can have adverse health effects on consumers. The WUA can take some measures to ensure that water is safe for household consumption.
Objective	To expose the WUA and community member to water protection measures that would lead to good quality water.
Outputs	Action plan on ensuring provision of quality water to the community
Timing	1 hr
Target Group	WUA committee, community members
Appropriate venue	A place within the community where discussions can be held with minimal distractions
Methodology	Group discussions, short presentation
Materials	Flip chart, pens
Session Guide	
Supporting Information	**Water Resource Users Association (WRUA)** A WRUA is a voluntary organisation of water users and riparian owners who have associated with the purpose of participating in water resource management to: • Improve yields; • Protect catchment areas; • Minimise and manage water use conflicts; • Control water use; • Minimise water pollution; • Increase compliance to water regulations; **WRUA Development Cycle (WDC)** WDC is a financing framework established by WRMA and WSTF to support WRUAs to obtain technical and financial resources to implement their sub-catchment management plans.
Step 1: Water Quality at Source	• With reference to the information obtained from the transect walk, ask participants to describe the water quality at each of the water sources within the community and to identify the type of contaminants (garbage, feces, animal feces, chemicals, effluent from hotels, factories, etc).

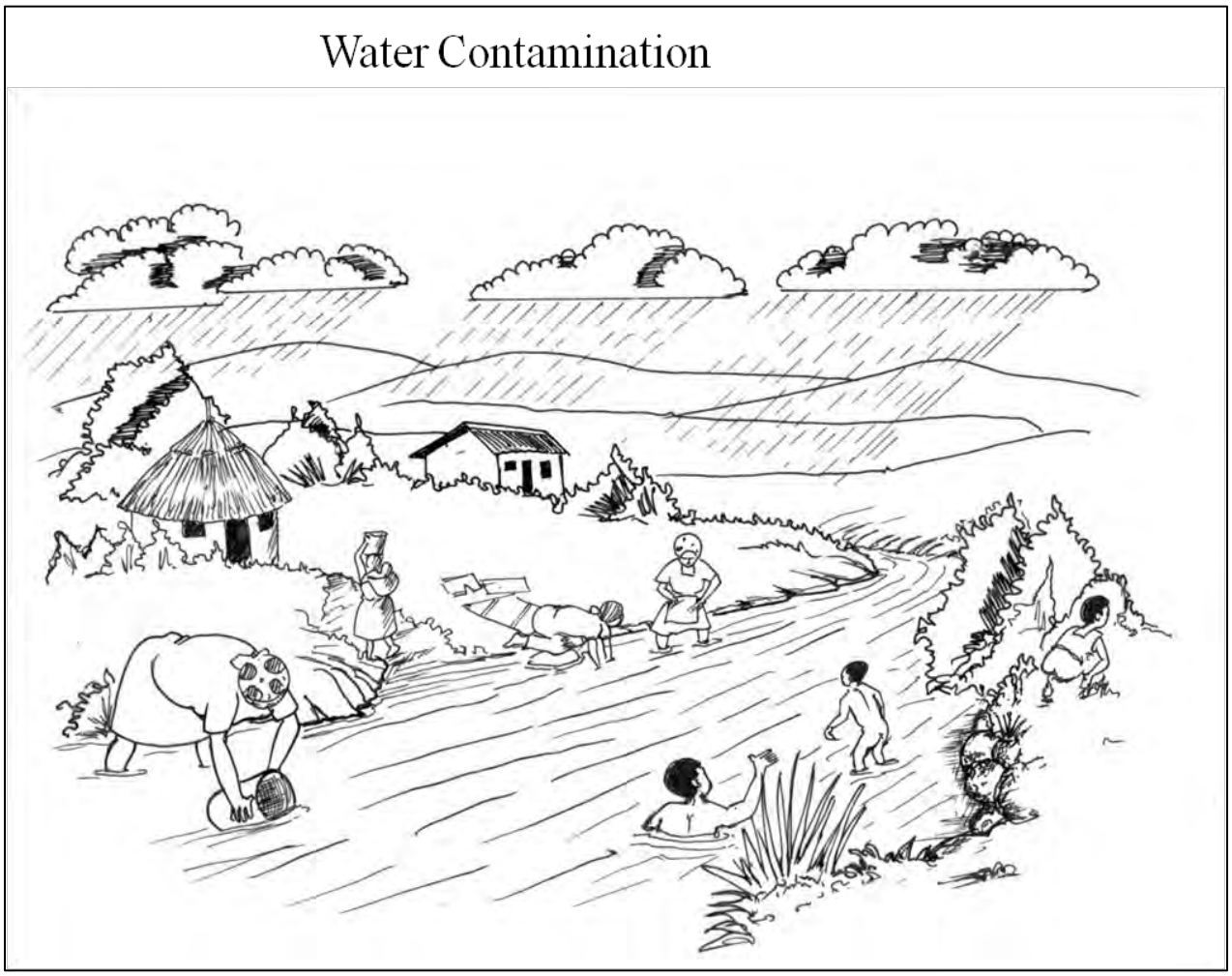
	<table><tr><th>Name of Water Source</th><th>Quality (Poor/Fair/Good)</th><th>Type of Contaminants</th></tr><tr><td></td><td></td><td></td></tr><tr><td></td><td></td><td></td></tr></table> • Ask participants to consider the consequences of poor water quality at the source on their lives. **Example of the effects of poor water quality** • Illness within community members (esp. typhoid, diarrhea, amoebiasis, gardia, etc); • High medical bills; • Increased funeral bills; • Loss of work; • Loss of time in school; • Higher cost of treating water; • Community members do not want to bathe in poor quality water.
Step 2: Activities causing contamination of water sources	• Ask participants to consider what activities are generating the contaminants; These may include: • Open defecation; • Dumping garbage; • Livestock or people entering water source; • Erosion; • Effluents from factories, hotels, housing; • Drainage from agricultural fields; • Laundry activities near water sources. • Divide the list of activities into two groups • Activities taking place within the community; • Activities taking place in other communities
Step 3: Barriers to contamination	• Ask participants to identify the pathways that enable the contaminants to get to the water sources; These may include: • Road ditches, stormwater drains; • Agricultural ditches, furrows or canals • Pipes from effluent treatment works; • Pipes from housing, factories, etc • Dirty containers; • Livestock in water; • River bank erosion.

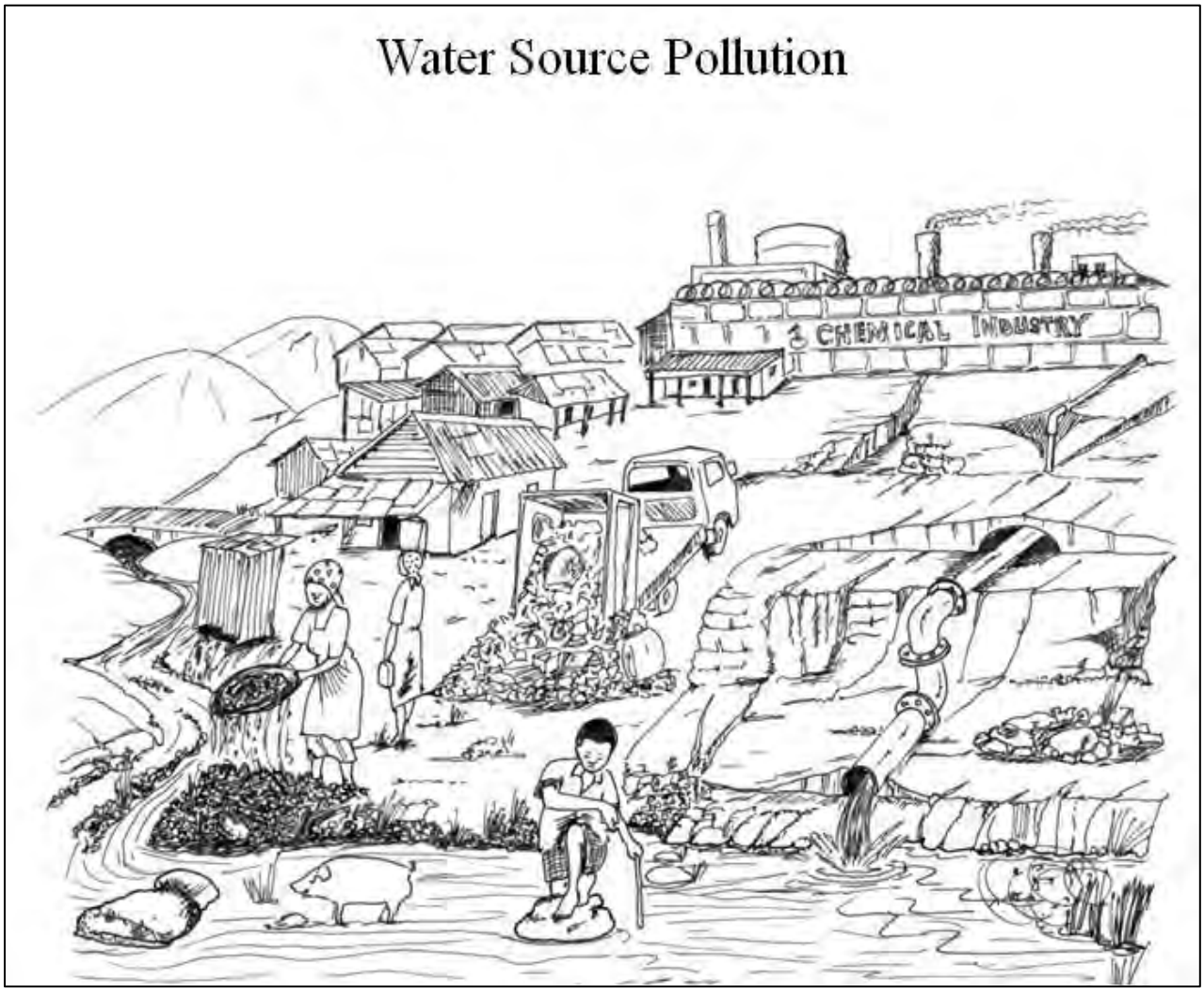
	• Ask participants to consider what measures can be done to prevent the contamination reaching the water sources (barriers). Answers may include:
	
	  • Selective water harvesting in relation to the location of defecation areas and latrines;
	  • Fencing off the water source (e.g. spring, river bank, etc) to prevent people or livestock getting to the water source;
	  • Increasing vegetation in riparian area so that runoff infiltrates rather than going directly into the water source;
	  • Moving latrines away from water sources;
	  • Directing effluent water into soak pits;
	  • Capping shallow wells and installing handpumps;
	  • Control of garbage into properly designated areas.

Step 4: Linking up with a WRUA	Where contaminants may be originating from outside the community, the WUA will need to link up with other upstream communities to deal with the protection of the water source.
	
	• Facilitator should introduce the concept of a Water Resource Users Association (WRUA);
	• Explain typical arrangement of membership of WRUA;
	• Refer to Session F1: Water Sector Reforms to reinforce the difference between WUA and WRUA;
	• Explain purpose of WDC - to support WRUAs to implement catchment conservation/water source protection measures.
	
	• Ask participants to discuss some of the potential benefits associated with linking up with a WRUA. Answers may include:
	
	  • Collective action on degradation of catchment and riparian areas;
	  • Access to resources for water source protection;
	  • Collective action on over-abstraction;
	  • Collective action to investigate and minimize pollution of water sources;
	  • Representation of WUA in regard to lobbing WRMA for support and government attention;
	  • Support in understanding water regulations and becoming compliant to water rules.

Review	Why should the WUA link up with other communities to protect the water sources?
Session Attachments	Attachment 1: Examples of how water is often contaminated by the communities who use it

Attachment 1: Examples of how water is often contaminated by the communities who use it




Water Source Pollution
CHEMICAL INDUSTRY

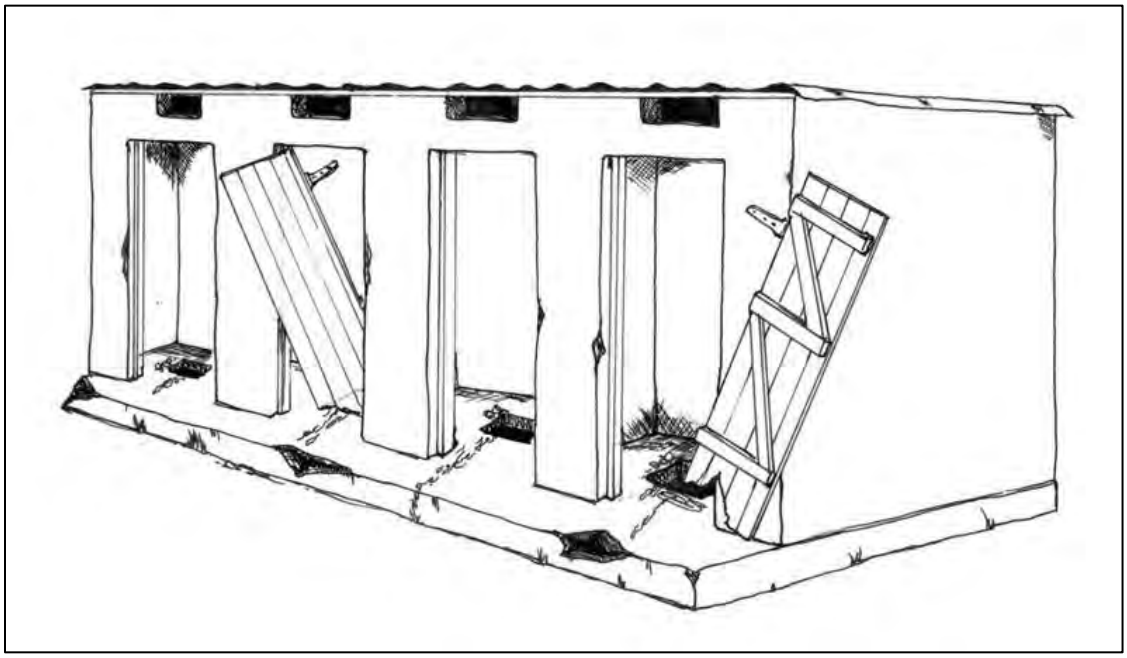
MODULE G	**ENVIRONMENTAL HEALTH AND SANITATION**
SESSION G3	**MANAGEMENT OF PUBLIC TOILETS**
Appropriate Facilitator Background	Community trainer with experience in participatory methodologies and knowledge of public sanitation.
Introduction	The aim of making toilets available to the public is to reduce open defecation by providing a pleasant, safe and affordable facility for public use. Maintaining good quality public latrines requires proper management.
Objective	To enable the participants to; • Understand how to ensure proper management of public toilets • Identify and analyse how diarrhoeal diseases can be spread through human practices. • Identify the actions that can be taken to block the disease transmission routes.
Outputs	• List of community requirements with respect to public toilet maintenance; • Local community disease transmission routes and barriers • Model of the preferred public toilets • Monitoring Plan
Timing	1 hour
Target Group	Community leaders, caretakers of public toilets, CBO members and committee members
Methodology	Group discussion and illustrations
Materials	Illustrations, felt pen, flip chart
Session Guide	
Supporting Information	**Factors related to sustainable management and utilisation of public toilets:** • Proper infrastructure; • Cleanliness; • Accessibility; • Privacy; • Cost; maintenance • Safety, especially for women and children; • Water supply; • Proper hand washing facilities.
Step 1: Good and Bad Public Toilets	• Ask participants to identify existing public toilets and map out their location on a community resource map. • Ask the participants to mention the best public toilets in their area. • Ask them why they are good. • Ask the participants to state who manages them. • What is the difference between the good ones and the bad ones? • What can be done to improve the bad ones? **Show a good model of a public toilet and a bad one (See attachment 1)**

	• Ask the participants to tell you what can be done to ensure proper management and services from PTs in their area. • List all the answers. **Explain the following:** **Key factors of successful public toilets are:** • Good cleaning system and materials that are easy to clean • Having equipment that is high tolerance against vandalism • Promotion of social acceptability of public toilets within a given area • Encouraging socially acceptable behaviour amongst users resulting in less waste, dirt and vandalism. • Having hand washing facilities within the facility; • Friendly designs for both men and women and people of different religious backgrounds; • Provision of gender and vulnerability friendly facilities i.e. mirrors, handrails, lighting, tables etc • Regulating running costs, user fee being friendly. • Social factors like training of cleaners or caretakers and societal attitude towards public toilets
Step 2: Management of Public Toilets	• Ask the participants to state what kind of services communities would expect from public toilets operators. • List all the ideas and discuss them extensively. • Ask the participants whether a WUA can manage a public toilet Depending on the answers make the following presentation on the management models for public latrines; ***1.*** **Delegated management of public toilets** Public toilets can be leased/rented by the WUA to a group from the community to run and manage; The group could be a youth or women CBO. Therefore the WUA will have to agree with the group on the following aspects; • Performance by the group; • Obligations of the group and those of the WUA; • Reward system, i.e. the fees, bonus etc ***2.*** **Direct management of public toilets by WUA** Points to be considered: • Recruitment of operational staff; • Incentive structure for staff; • Monitoring of facility and staff; • Revenue collection systems.
Step 3: Monitoring of Public Toilets	• Ask participants to identify 3 or 4 indicators that the WUA will use to monitor the use and management of the public toilets in its area.

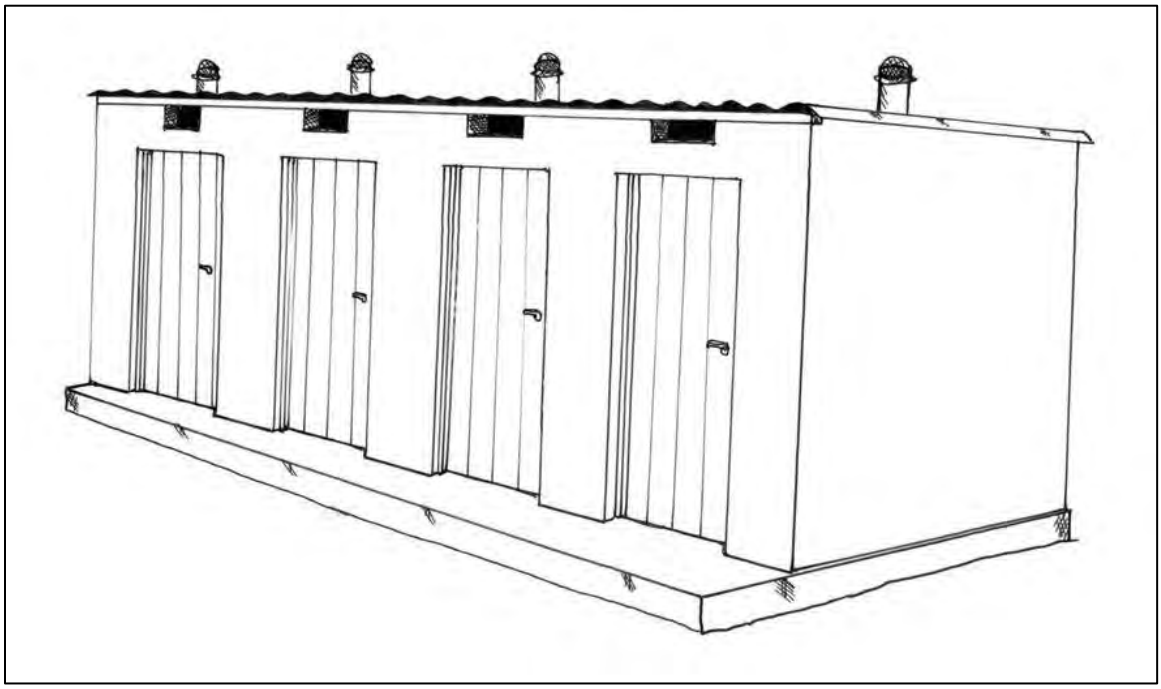
	• Ask participants to draw up a monitoring plan indicating: o What (refer to selected indicator). o Who should undertake the monitoring o Frequency (when) of monitoring; o Report to whom. **Optional indicators for monitoring use and management of public toilets:** • Number of men, women and children per month using public toilet; • Number of operational stalls that meet criteria (clean, working door, working vent pipe) during inspection; • Availability of water and soap for hand-washing for men and women during inspection; • Total revenue per month; • Number of inspections per month;
Review	What can the community do to ensure that public latrines are user friendly in their areas?
Session Attachments	Attachment 1: Examples of public toilets: bad and good

Attachment 1: Examples of public toilets: bad and good

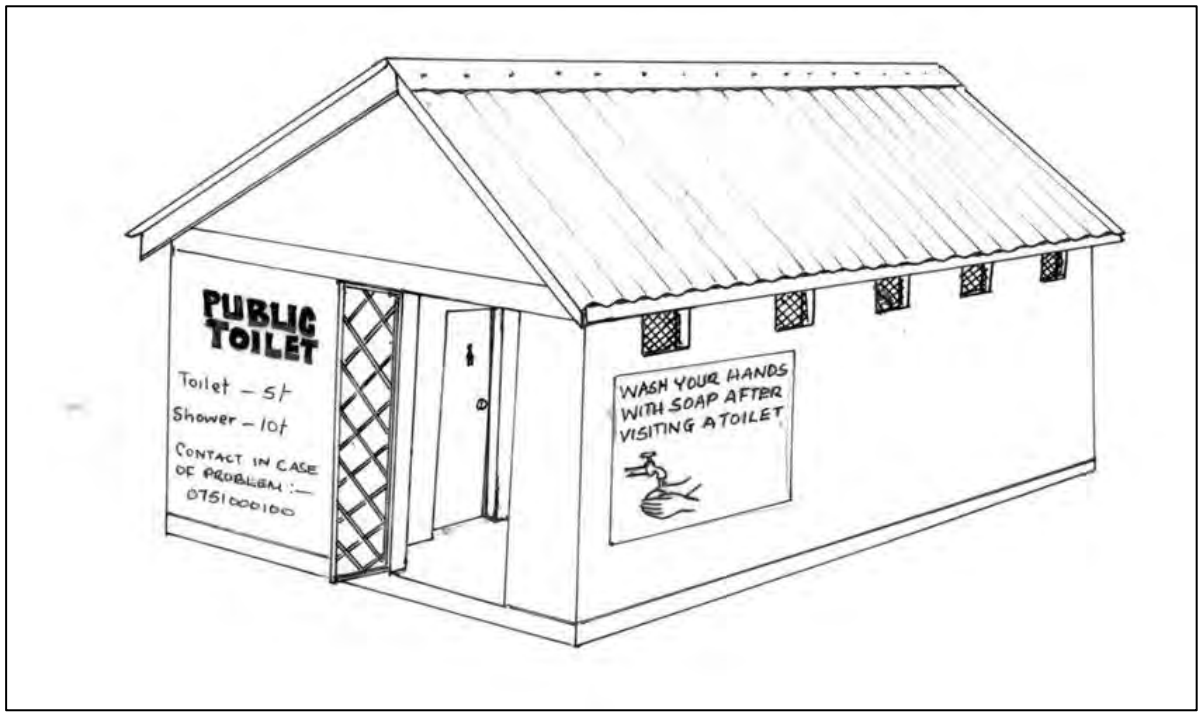
Example of a public toilet which is poorly constructed and maintained



Example of a VIP toilet which is properly constructed and maintained



Example of a public toilet which is properly constructed and maintained



MODULE G	**ENVIRONMENTAL HEALTH AND SANITATION**
SESSION G4	**WASTE MANAGEMENT**
Appropriate Facilitator	Community trainer with experience in participatory methodologies and knowledge of community based hygiene and sanitation.
Introduction	There are many types of solid and liquid waste generated at household level depending on the location and people's way of life, wealth and well being. The various types of waste can pollute the environment, and while some are reusable at household level or community level, the management and impact depends on the knowledge and practices at the household level.
Objective	To enable the participants to understand the importance of proper solid and liquid waste management at household level.
Output	Action plan on household solid and liquid waste management
Timing	1 hour
Target Group	WUA and community members and leaders.
Methodology	Group discussion
Materials	Illustration on types of waste bio-degradable and non bio-degradable
Session Guide	
Supporting information	**Solid Waste** Solid waste is a heterogeneous mixture of paper, plastic, cloth, metal, glass, organic matter, etc. generated from households, commercial establishments, and markets. The proportion of different constituents of waste varies from season to season and place to place, depending on the lifestyle, food habits, standards of living. **Hazardous Household Waste** Household waste products that contain corrosive, toxic, ignitable, or reactive ingredients are considered to be "household hazardous waste" or "HHW." Products that fall into this category include: • Paints; • Cleaning detergents; • Oils; • Batteries; • Pesticides; • Chemicals; • Fuels
Step 1: Discussion on Solid Waste Management	**Solid Waste Management** • Ask the participants to state the type of solid waste generated in their households, institutions in their area and markets. • Ask what happens to the waste. • Who is responsible for waste collection from shopping centres and markets if applicable? • How often is waste collected?

<table>
<tr><td></td><td>

- Where is the waste taken after collection?
- Are there any problems with the way the waste is disposed?
- What sorts of pests are likely if solid waste is not disposed of properly?
- What can be done to ensure that the waste is properly managed?

</td></tr>
<tr><td>Step 2: Identification of Hazardous Household Waste</td><td>

- Ask the participants to mention the types of hazardous waste generated by the house households in their community.
- Ask the participants to list them.

These contain potentially hazardous ingredients that require special care when disposing of them.

</td></tr>
<tr><td>Step 3: Improper methods of disposing hazardous waste</td><td>

Ask participants to identify improper techniques for hazardous waste disposal that are being used within the community.

Improper disposal of household hazardous wastes includes pouring them;

- down the drain,
- on the ground,
- into storm sewers,
- and in some cases putting them out with the trash.

The dangers of such disposal methods might not be immediately obvious, but improper disposal of these wastes can pollute the environment and pose a threat to human health.

- Ask participants to identify proper techniques for hazard waste disposal that can or are being used within the community.

These options include:

- Store hazardous wastes properly, out of reach of children, until safe transport and disposal can be undertaken;
- Take hazardous waste to municipal landfills.

Tips for Managing Hazardous Household Waste

- Use and store products containing hazardous substances carefully to prevent any accidents at home.
- Never store hazardous products in food containers; keep them in their original containers and never remove labels.
- Make sure corroding containers are handled with special care as they may cause skin damage.
- When leftovers remain, never mix HHW with other products.
- Remember to follow any instructions for use and disposal provided on product labels.

The facilitator can highlight the following:

Households can help in reducing waste generation through:

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</table>

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<tr><td></td><td>

- Reducing purchase of products that contain hazardous ingredients.
- Learning about the use of alternative methods or products without hazardous ingredients for some common household needs.
- Avoiding the potential risks associated with household hazardous wastes, it is important that people always monitor the use, storage, and disposal of products with potentially hazardous substances in their homes.

</td></tr>
<tr><td>Step 4: Reduction, Reuse, Recycling, and Disposal Options</td><td>

- Ask the participants to say how they can reduce, reuse, and recycle waste at generated at household level?

Incorporating the answers provided by the participants, highlight the following:

Separation of waste at the household greatly eases the problem of disposal. The table below indicates how different wastes can be disposed of: This can be done by separating:

<table>
<tr><th>Type of Waste</th><th>Disposal Option</th></tr>
<tr><td>Vegetable waste</td><td>Compost</td></tr>
<tr><td>Paper and cardboard</td><td>Burn</td></tr>
<tr><td>Bottles</td><td>Resell/return</td></tr>
<tr><td>Metal cans and metal objects</td><td>Crush and sell to scrap metal collectors</td></tr>
<tr><td>Plastics</td><td>Dispose of in garbage pit</td></tr>
</table>

.

</td></tr>
<tr><td>Step 5: Solid Waste Collection</td><td>

Solid waste collection options

- Is there a collection system of waste in place?
- Can the community manage its waste at household level?
- Ask the participants to develop individual action plans for reducing the waste generated at household level and also at community level.
- If a collective solid waste collection system is required, then plan for the following components:

1. Method of collection
2. Method of transport
3. Facility for processing and sorting waste
4. Facility for disposing of non-reusable waste
5. Payment for waste collection.

</td></tr>
<tr><td>Step 6: Disposal of Waste Water</td><td>

Ask participants to distinguish between ‚grey' water and ‚black' water.

Black water is sewerage from toilets and should be disposed of in a pit latrine, septic tank or into a municipal sewer system.

Grey water is water that has been used for bathing, laundry and kitchen activities. Grey water can generally be used for irrigation if:

- It does not contain fats and other food materials that could attract rodents and other pests;
- It does not contain bleach or other chemicals that could damage plant growth.

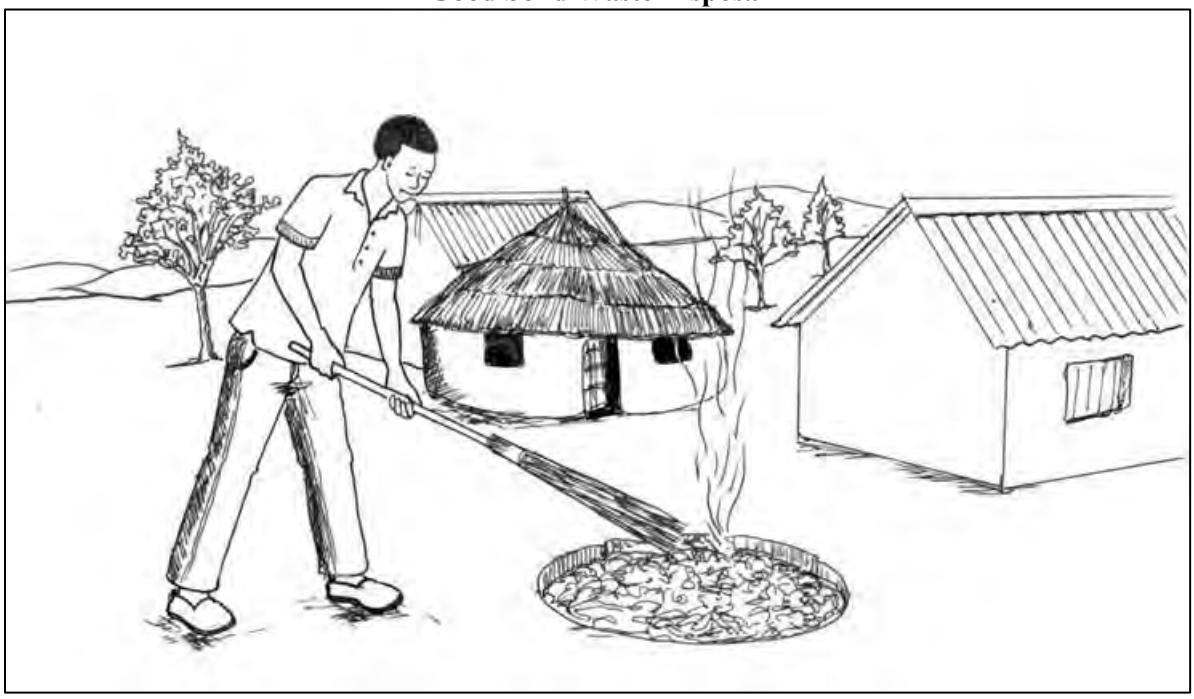
</td></tr>
</table>

	Grey water can be treated for reuse through use of a constructed wetland. Constructed wetlands are marshes built to treat contaminated water. They have four key components: • Soil and drainage materials (such as pipes and gravel) • Water • Plants (both above and below the water) • Micro-organisms Constructed wetlands purify the water that flows through them. NB: If grey water contains heavy amounts of food matter then it should be treated as black water. o Ask the participants how they dispose of waste water. o Ask them to state what the WUA can do to ensure waste water is disposed of properly. List all the answers, and encourage discussions.
Review	What should households do in order to manage all types of solid and liquid waste in an environmentally friendly manner?
Session Attachments	Attachment 1: Illustration on solid waste management Attachment 2: Illustration on liquid waste management

Attachment 1: Illustration on solid waste management

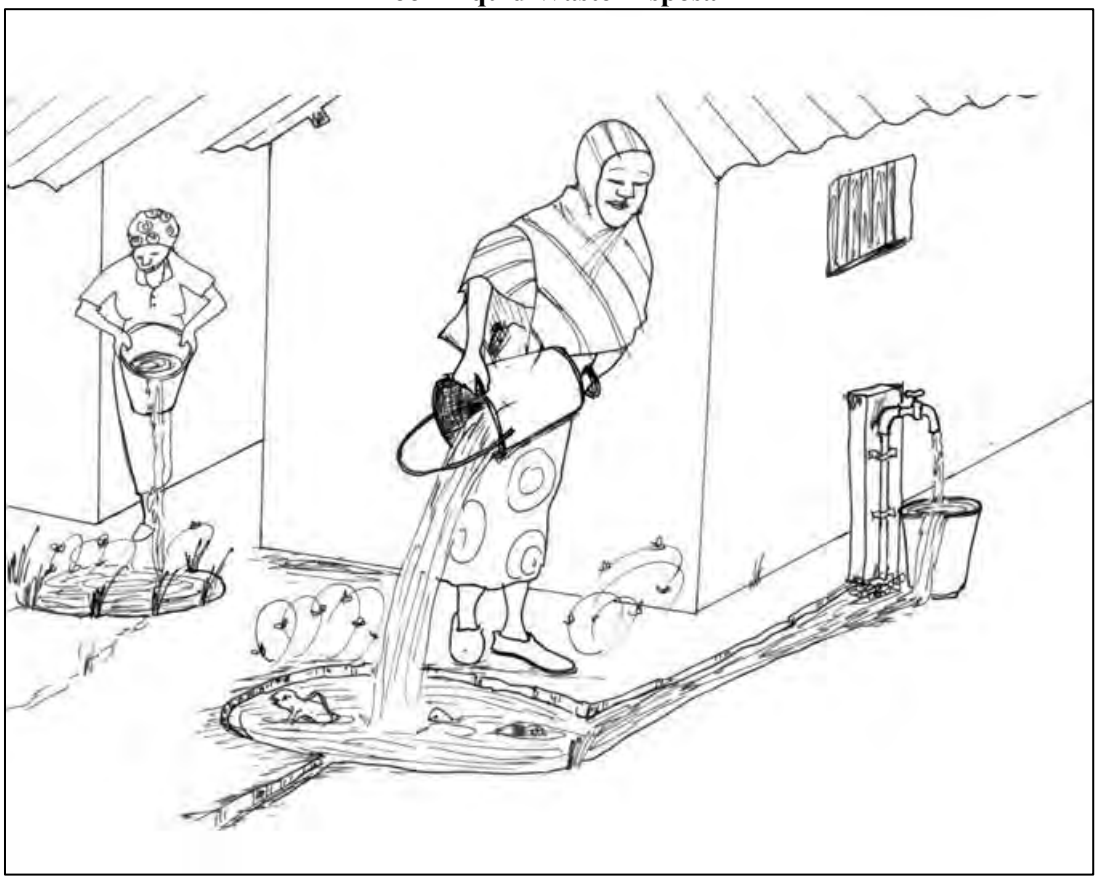
Poor Solid Waste Disposal

Good Solid Waste Disposal



Attachment 2: Illustration on liquid waste management

Poor Liquid Waste Disposal



MODULE H
OPERATION AND MAINTENANCE

NOTES TO FACILITATOR ON THE DESIGN OF AN OPERATION AND MAINTENANCE TRAINING PROGRAM

Each community water project has its own combination of technical components. The training modules presented below cover different components individually. It is therefore the responsibility of the Training Facilitator to prepare an operation and maintenance training program that is relevant to the community where training is to be undertaken. This can be done by identifying the different components of the water project and, using the materials presented below, prepare an appropriate training package for the particular community water project.

The first session „H1 – Design of an Operation and Maintenance Module' provides a template for how a training package may be put together.

MODULE H	**OPERATION AND MAINTENANCE**
SESSION H1	**DESIGN OF AN OPERATION AND MAINTENANCE MODULE**
Appropriate Facilitator Background	Community Trainer with experience in community water projects; Technician with the relevant practical and technical background
Introduction	Material presented below is a generic guide to facilitators regarding the preparation of a training session to address the operation and maintenance aspects of a community water project. Facilitator should refer to other sessions for materials specific to each type of technology.
Objectives	• Community members and committee members will have a better awareness of the proper O & M tasks and be able to link this with the cost of operating and maintaining their systems. • Operators or technical staff will be able to undertake the tasks specified in the Operation and Maintenance Schedule.
Outputs	An Operation and Maintenance Plan which includes: • An O & M Schedule; • List of Tools; • List of Suppliers with contact details; • Contact numbers for individuals and organisations that can provide technical assistance or services for maintenance tasks or in case of an unexpected breakdown.
Timing	Timing will vary according to each site. Adequate time should be provided for the different steps but typically one whole day will be required to cover the mapping exercise, site walk, discussions and practical demonstration of the maintenance tasks.
Target Group	• Community members for general discussions • Committee members require an understanding of the O & M requirements so that they can monitor and understand the cost implications of the O & M schedule • Operators and technical staff for detailed discussions and practical exercises to be undertaken on the water facilities in the community.
Appropriate Venue	A place where participants can clearly hear and participate in the discussions and where there is easy access to the different parts of the community water project.
Methodology	o Presentation and discussion o Site walks around the system components o Practical demonstrations and exercises
Materials	Flip Charts, Pens, Tools, O & M handbooks, Sample equipment
Session Guide	
Notes to facilitator	Facilitator should clarify any specific terminology, for example: • O&M = Operation and Maintenance • CAP = Community Action Plan 1. This session aims to identify and categorise the observed problems in a water project. This is applicable to existing water projects. For projects under construction or newly completed, the facilitator should orientate the session to the identification of potential problems. The facilitator could use various scenarios to stimulate discussion on possible problems. In this case the facilitator should use his or her experience to describe potential problems related to each part of the system and get participants to think about and propose their own solutions.

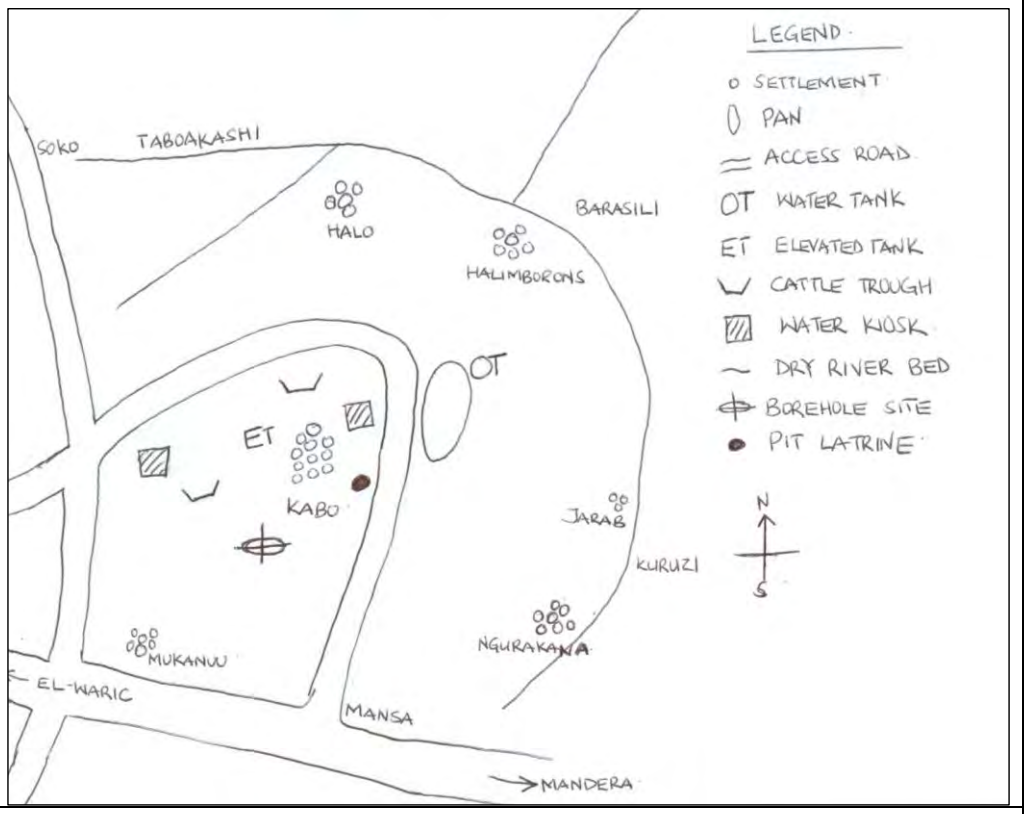
<table>
<tr><td>Step 1: Introduction</td><td>The facilitator should explain to the participants the different parts of the training schedule and who should participate in each session.

<table>
<tr><th>ACTIVITY</th><th>WHO SHOULD PARTICIPATE</th></tr>
<tr><td>General discussion on system components</td><td>Community, Committee members, operators</td></tr>
<tr><td>Site walk</td><td>Community members, committee members, operators</td></tr>
<tr><td>Discussions to draw up an Operation & Maintenance Schedule & discuss O & M issues</td><td>Committee members, operators</td></tr>
<tr><td>Demonstration & practical exercise on O & M</td><td>Selected committee members, operators</td></tr>
</table></td></tr>
<tr><td>Step 2: Mapping Water Supply System</td><td>This is intended to be a PRACTICAL session to gather information about the community and the specific components of the water project. It is important that the participants create their own map with minimal interference and suggestions (the map will be examined again at the end of the session).

The facilitator should guide participants on a MAPPING exercise to identify water supply infrastructure within the community and follow that with a SITE WALK to inspect the different components of the system or different water points.

<u>MAPPING EXERCISE</u>

1. Start by selecting a suitable area to sketch a map on the ground
2. Ask the group to use scrap materials to make a map of their project
3. Ask some members of the group to take other participants on a tour of the map, including the main landmarks, water infrastructure and other pertinent issues.
4. Based on the map and how people have described their community, initiate a discussion of issues on:
a. What sort of problems make the systems to be non-operational;
b. Which infrastructure is prone to problems;
5. Facilitator should capture the features of the map onto a flip chart for future reference, with specific reference to the infrastructure that is prone to operational and maintenance problems.</td></tr>
</table>

<table>
<tr><td></td><td>KABO RESOURCE MAP
 
</td></tr>
<tr><td>Step 3: Site Walk</td><td><u>SITE WALK</u>

Undertake site walk to inspect the different components of the system, making sure to visit the points that were identified in the mapping exercise to be prone to operational problems. At each component, review the purpose of the component, the current status, who is responsible for operating and/or maintaining it, and the operational and maintenance tasks that are undertaken at each site.

The purpose of the site walk is to confirm the problems already mentioned, to identify additional problems, and to discuss possible solutions. This information will be used in developing the operation and maintenance schedule.</td></tr>
<tr><td>Step 4: Identification of system components and common problems</td><td>Based on the mapping and site walk exercises, the facilitator should ask the participants to identify, and name the different parts of the system; explain the importance of each component. For each component, state the purpose and the common problems.

<table>
<tr><th>COMPONENT</th><th>PURPOSE</th><th>COMMON PROBLEMS</th></tr>
<tr><td></td><td></td><td></td></tr>
<tr><td></td><td></td><td></td></tr>
<tr><td></td><td></td><td></td></tr>
</table></td></tr>
<tr><td>Step 5: Identification of O & M problems</td><td>• Facilitator starts with a discussion about how the system as a whole performs with a few questions such as:
o If the system stops working, is it usually because the water resource has run out or is it because the equipment or infrastructure has failed?</td></tr>
</table>

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<tr><td></td><td>

When the system stops working, how long does it remain „not working'?

Refer to Session F3: Setting Performance Targets.
Facilitator should ask participants to name some of the problems that they associate with why the system does not work as well as it should.
Facilitator needs to categorise the problems into four groups:

Organisational issues
Water resource issues
Design and expansion of the project
Operation and maintenance issues

The intention is to focus on the operation and maintenance issues i.e. why the existing infrastructure is not working as well or as reliably as it should.
</td></tr>
<tr><td>Step 6: Developing an Operation & Maintenance Schedule</td><td>
An operation and maintenance schedule is based on the understanding that performance is measured by the quality of service being provided. Indicators of performance include:

Frequency of disruptions to supply
Length of disruptions to supply
Quality of water provided;
Cost of water production vs. payment charged and paid

Preventing a problem is also much cheaper than fixing a problem and it keeps the system working. If the objective of the system is to provide a reliable service, then it is unacceptable for the system to break down or stop working. It is better to stop the system briefly for routine maintenance than to wait until it breaks down.

The Operation & Maintenance Schedule provides information on WHAT has to be done, BY WHO, and WHEN. A supervisor can then check whether this is being done according to the agreed schedule.

A. Developing O & M Schedule

To develop an O & M schedule, the facilitator should go through each component of the system and discuss the tasks to be done, filling in the table as required.

<table>
<tr><th>TASK</th><th>RESPONSIBLE</th><th>HOW OFTEN</th></tr>
<tr><td></td><td></td><td></td></tr>
<tr><td></td><td></td><td></td></tr>
<tr><td></td><td></td><td></td></tr>
</table>
B. Developing Monitoring Tools

It is insufficient to develop the O & M Schedule without ensuring that the tasks are done. The easiest way to ensure that the tasks are done is to require the person responsible to sign off on a form when the task is done. This means that a form or forms should be designed to suit the O & M schedule – this will be scheme and component specific.

The example below provides an indication of a monitoring tool for routine monthly maintenance tasks
</td></tr>
</table>

	<table><tr><th>TASK</th><th>FREQ</th><th>Jan</th><th>Feb</th><th>Mar</th><th>Apr</th><th>May</th></tr><tr><td>Change Oil</td><td>Each Month</td><td></td><td></td><td></td><td></td><td></td></tr><tr><td>Patrol pipeline</td><td>Each Month</td><td></td><td></td><td></td><td></td><td></td></tr><tr><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr></table>
Step 7: Building O & M knowledge and skills	The above step has helped to prepare the O & M Schedule. Facilitator should review the O & M tasks and who is expected to undertake the task and prepare specific training exercises to ensure that each task is properly understood and can be undertaken by the person expected to undertake the task. Facilitator should adopt the following sequence of activities: 1. Demonstration of each O & M task. Discuss tools, materials, costs, any additional technical information or expertise required to undertake the task. 2. Allow each participant to undertake O & M task, explaining to the other participants what he/she is doing and why. 3. Review the ability of the trainees to undertake the tasks and repeat step 1 if required. 4. Review and amend O & M Schedule with trainees.
Step 8: Troubleshooting	One of the problems faced by the community is when unexpected problems occur. Trouble-shooting is a logical approach to identify the true cause of the problem and then to identify possible solutions. The facilitator should take the participants through an exercise of considering what sort of problems might occur, the possible causes and possible remedies. This can be helped by drawing up a table as shown below: <table><tr><th>Problem</th><th>Cause</th><th>Solution</th></tr><tr><td></td><td></td><td></td></tr><tr><td></td><td></td><td></td></tr></table>
Step 9: Inputs, Spares, Tools and Technical Assistance	The facilitator should lead a discussion around the following topics: **A. INPUTS FOR ROUTINE OPERATIONS** Depending on the scheme/technology, the project may require various supplies to operate properly. These may include: • Fuel; • Lubricants – oils & grease; • Chemicals; • Electricity; • Meters for new connections; • Fittings for new connections; • Filters, etc

The facilitator should discuss the arrangements required to ensure that sufficient supplies are stockpiled or what measures need to be done to ensure that the availability of the supplies is not interrupted. Issues include:

- Stores – adequacy, access into, safety, security;
- Stores Register;
- Requisition Forms;

B. SPARE PARTS AND MATERIALS

Discuss which spare parts are required for routine maintenance and to handle emergencies. Draw up a list of the spares that the project should have at all times. These may include:

- Filters for Oil, fuel & air
- Washers;
- Materials for pipeline repairs – glue, piping, fittings;
- Taps & tap washers;
- Spare locks;
- Replacement meters;
- Valves;
- Painting materials, solvents;
- Construction materials.

C. SUPPLY CHAIN

It is insufficient to consider what spares are required without considering where these spares are sourced. It is helpful to draw up the list of suppliers and to decide what minimum quantity of the spares/materials should be kept in the store. When this minimum amount is reached, then a requisition form should be prepared to start the process of procuring additional spares/materials.

Spare	Min. Required in store	Name & contact of Supplier 1	Name & contact of Supplier 2	Expected cost per unit on delivery

D. TOOLS

Discuss the tools required for every operator or maintenance staff. Draw up a list. Tools can be kept in the store or officially issued to staff members.

SAMPLE TOOL LIST

Tools	Purpose(s)
1. Tool box	Storing tools
2. Wooden float 3. Plastering trowel	Mortar/masonry work

	4. Masonry trowel 5. Spirit level 6. Mason hammer 7. Shovel		
	8. Steel brush 9. Die-stock 10. Joining compound 11. Pipe cutter 12. Chain wrenches 13. Pipe wrenches 14. Oil can	For G.I pipe work	
	15. Heating plate 16. Pocket-knife 17. File	For PVC pipe work	
	18. Measuring tape 19. Hacksaw 20. Pliers 21. Sisal	Multi-purpose tasks	

(See Attachment 1: Diagram for General Tools – Specific Tools may depend on system type/technology).

E. TECHNICAL ASSISTANCE AND SERVICES

Discuss who and how additional technical assistance should be obtained. This should be established, BEFORE THERE IS AN EMERGENCY. Technical assistance includes services that are sourced periodically or individual/offices that can be contacted in case of a system breakdown. Draw up a list similar to the one shown below.

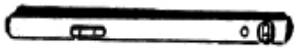
COMPONENT	Name of Technical Assistant	Contact Details	Back up Contact	Contact Details for Back-up
Pump Repair				
Generator repair				
Electrician				
Water Quality				
KPLC				
WRMA				
DWO				
WSB				
WSP				

Review Questions	1. Why is routine maintenance a good idea? 2. Which components are most likely to cause problems? 3. How does the O & M Schedule contribute to problem solving?
Session Attachments	Attachment 1: Essential tools for maintenance of a piped water system

Attachment 1: Essential tools for maintenance of a piped water system

Hacksaw

File



Spirit level

Measuring tape

Masonry trowel

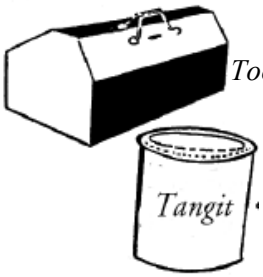
Steel float

Masonry hammer

Wooden float

Oil can

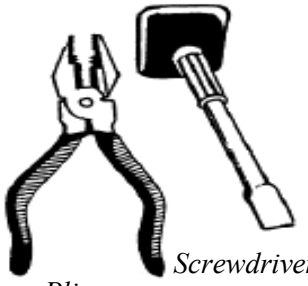
Knife



Tool box

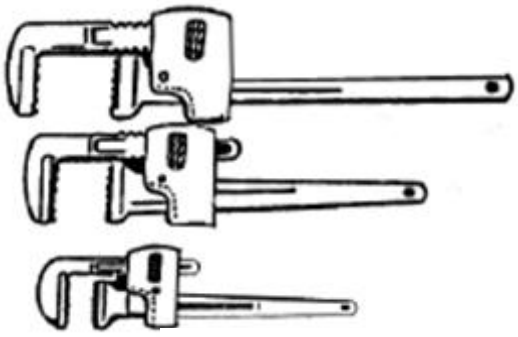
Joining compound

Sisal fibre

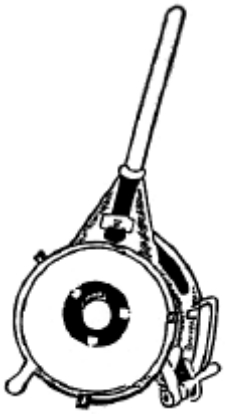


Pliers

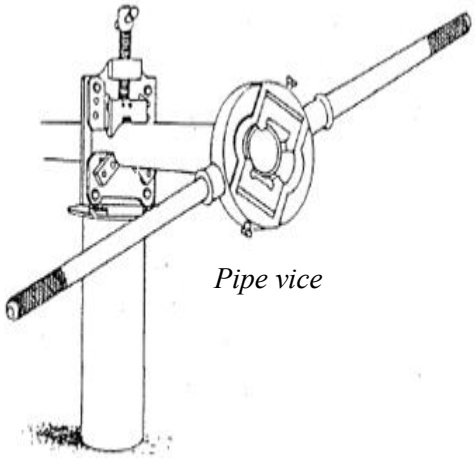
Screwdriver



Pipe wrenches



Die-stock

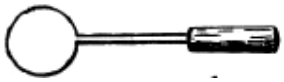


Pipe vice

Steel brush

Pipe cutter

Chain spanner



Heating plate

MODULE H	**OPERATION AND MAINTANANCE**
SESSION H2	**GENERIC COMPONENTS**
SESSION H2.1	***PIPELINE***
Appropriate Facilitator Background	Community Trainer with experience in community water projects Technician or plumber with the relevant practical technical background
Introduction	This session is focused on pipeline aspects only. It should be used in conjunction with Session H1.
Objective	At the end of the session, the participants will be able to: • Identify the main components of a pipeline • Describe the functions of the key components • Carry out pipeline maintenance
Outputs	An O & M Plan
Timing	Session should take approximately 2 hrs
Target Group	Operator and WUA committee members
Appropriate Venue	A place within the community where discussions can be held with minimal interference and where there is easy access to the pipeline for practical exercises.
Methodology	This is intended to be a **PRACTICAL** session. The components will be taught by demonstration on the system itself, not using drawings or description. The flip chart can be used to illustrate details if necessary. Reinforce the learning by allowing participants to handle components and describe their functions to each other.
Materials	• Valve key/wheel • Pipe wrench • Tools • Tap • Gate Valve • Non-return valve
Session Guide	
Step 1: System Identification	**1. Gravity or Pumped System** Using the diagrams in Attachment 1, discuss the basic arrangement of the system: • Is it a gravity or pumped system? • Note that many pumped systems also have a gravity component; • Which parts of the pipeline are under pressure? o How much pressure? Estimate if there are no pipeline profile drawings that show the pressure in different parts of the system • How is the pressure controlled? • What happens on a pumped scheme if there is a burst? How about on a gravity scheme? • Where are storage tanks positioned within a scheme?

2. Pipeline Components

Identify and demonstrate the functions of the different components:

Component	Function
Source	Where the water originates
Intake	The structure to abstract the water from the source
Pumping Main or Gravity Main Line	The pipeline that conveys water to the storage tank(s)
Distribution Lines	Pipeline branches from the Main Line or from the storage tank to the individual connections or water kiosks
Storage tanks	Installed to store water to supply peak demand
Break pressure tank	Decreases water pressure in pipeline – brings pressure to atmospheric pressure
Pipe supports	Support the pipeline above ground; limit damage to pipeline during floods
Pipe markers	mark the route of a buried pipeline
Control valves	Open or close pipeline
Air valves	release air from the high points in the pipeline
Washouts	Opened to clean out silt, sand and mud at low points in the pipeline
Meters	Master meter to measure abstraction Individual or kiosk meters to measure water consumed
Water Points	Water kiosks, tap stands, cattle troughs and house connections

3. Valves

Note: Many valves do not work properly. This is frequently due to improper use or selection of the valve.

Explain the differences between gate valves, non-return valves, washouts, air valves and stopcocks/ taps:

	Valves 1. Gate valves are designed to be fully open or fully closed; 2. Gate valves allow us to start or stop the flow of water in a pipe; 3. Gate valves should be opened or closed slowly to reduce the chance of hammer pressures; 4. Non return valves control flow so that it goes in one direction only; 5. Air valves are placed at high points along a pipeline to release trapped air; 6. Wash outs are placed at low points along a pipeline to drain the pipeline at a controlled point and to flush out any silt that has accumulated in the pipeline; 7. Stopcocks/Taps can be used like a gate valve or to regulate flow; 8. Taps are most appropriate at consumer points because they are designed to be open and closed many times a day.
Step 2: Specific Pipeline O & M tasks	Ask participants what problems might occur if maintenance of the pipeline is not carried out properly. Identify components that require maintenance. Typical maintenance tasks include: • Repair erosion around pipes and pipe supports • Repair leaking or damaged pipes • Repair damaged valve chambers • Check for blocked or leaking air valves once a month. • Open washout valves once a month to clear silt (more often during rains). Washout should be opened and left open for a sufficient length of time to get water flowing fast to flush all the silt. Check to see that all silt has been removed (look at colour of water). • Clear bush along pipeline route and keep pipe markers in good repair Explain the importance of regular pipeline patrols. Ask how these patrols could be made easier. A detailed session to demonstrate pipe repair may be necessary if the maintenance staff are not competent with the kind of repairs that are frequently needed. There are various ways of repairing pipe leakages, depending on kind of pipe and materials available. Allow operator/plumber to demonstrate repair technique: • Repair of PVC pipe by heating pipe end to make a socket (OK for low pressure pipes). • Repair of PVC pipes using a socket with rubber • Repair of PVC pipes using a glued socket • Repair of PE pipes using ready-made sockets

<table>
<tr><td></td><td>

- Repair of GI pipes involving threading pipe ends and inserting a union fitting and replacement pipe length.

Discuss tasks to be considered during the preparation of an O & M Schedule including:

- Patrolling pipeline route identifying leaks, illegal connections, exposed pipe, damage to pipe cover, pipe markers or pipe supports
- Opening washouts to clear out silt
- Checking air valves to ensure all air has been released
- Checking ball cocks, and main valves
- Reading master meter
- Reading individual or kiosk meters
- Checking that consumption is in accordance with agreed uses

</td></tr>
<tr><td>Step 3: Trouble Shooting</td><td>

Discuss the potential unexpected problems and what might be the cause.

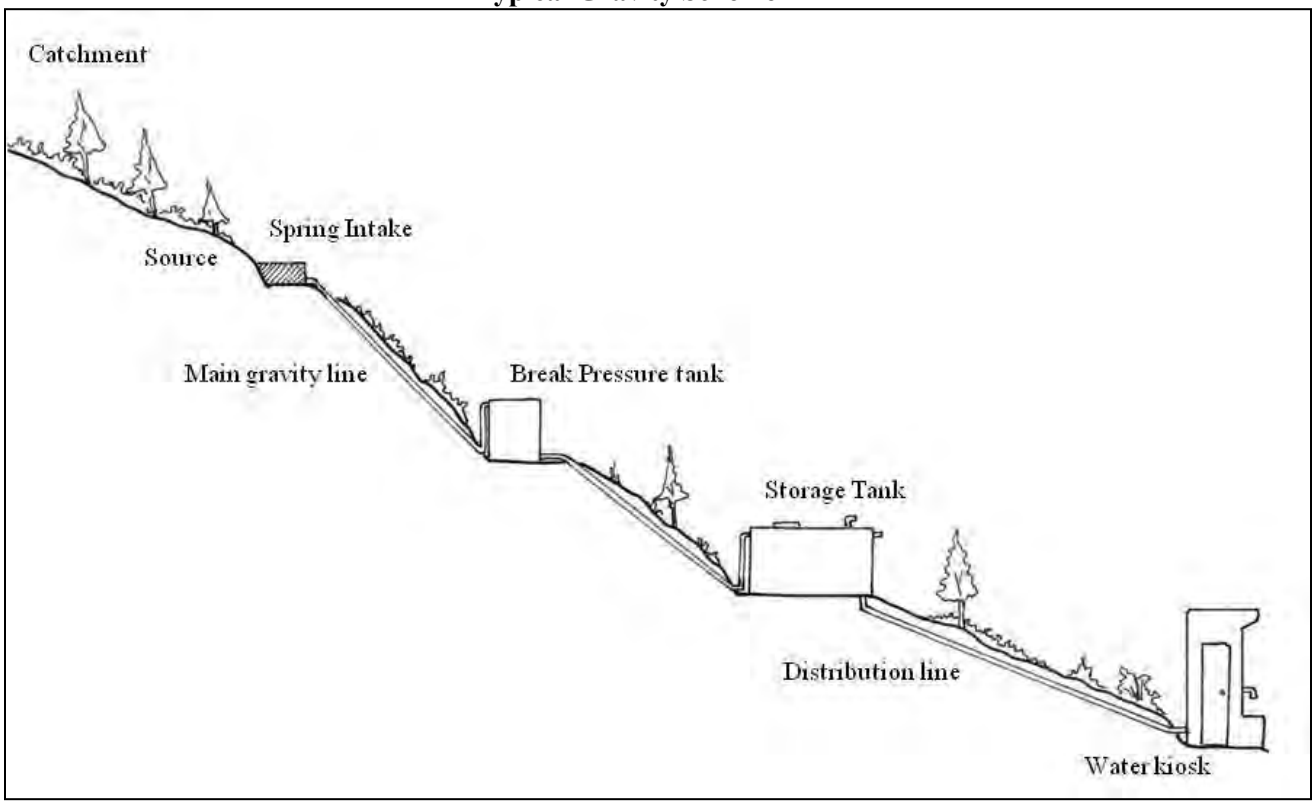
<table>
<tr><th>Problem</th><th>Probable cause</th><th>Possible solution</th></tr>
<tr><td>Numerous repeated breakages in pipeline</td><td>Pipeline laid too shallow and pipe exposed to traffic loading
Wrong class of pipe</td><td>Consider relocating or replacing pipeline (Consult with water engineer/qualified water technician/plumber)</td></tr>
<tr><td>No water in pipe</td><td>Breakage, burst
Blockage – Air lock
Closed valve
Source is dry
Design problem</td><td>Check pipeline carefully, starting at intake and check at various points whether water is reaching each point. (Consult with water engineer/qualified water technician)</td></tr>
<tr><td>Poor water quality</td><td>Polluted raw water
Burst that has introduced pollutants/sediments
Faulty Treatment</td><td>Investigate problem and identify suitable solution.
Carry out a water quality test if appropriate.</td></tr>
<tr><td>Low pressure</td><td>High friction losses from deposition in pipes, constrictions in pipe, bursts, low abstraction, excessive consumption</td><td>Identify whether a maintenance solution will resolve low pressure, this may include water rationing, or the problem is related to a design issue. (Consult with water engineer/qualified water technician)</td></tr>
</table>

</td></tr>
</table>

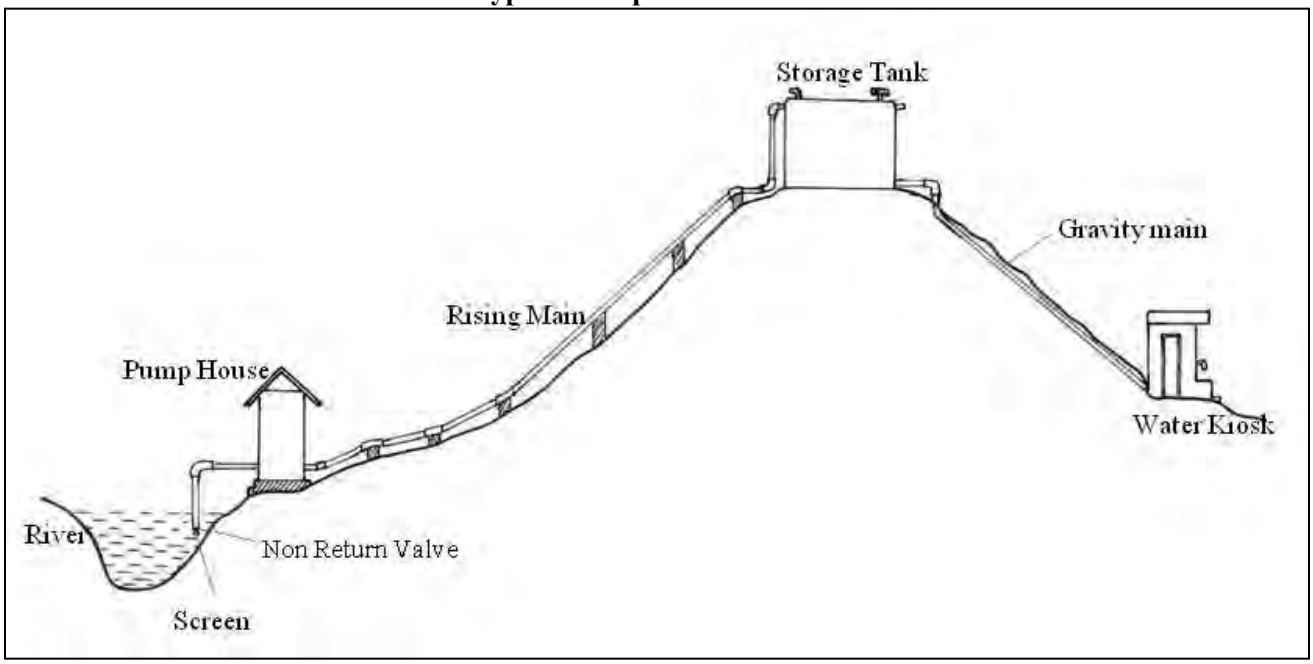
Step 4: Spares, Tools, & Technical Assistance	Spare Parts & Materials for pipelines include: • Pipe lengths for the diameters common in project; • Fittings for appropriate diameters; • Valves; • Taps & tap washers; • Threading Tape; and • Glue Supply Chain – most pipeline materials can be purchased at a well-provisioned hardware store. Technical Assistance – technical assistance should be sought if a pipeline keeps bursting at a particular point. This may indicate: • Lack of anchor blocks or supports; • Hammer pressures; • Unusual stress on the pipe; and • Poor design.
Review	• Are participants able to carry out basic pipeline repairs? • What are the factors that may cause problems in a pipeline? • How are these factors prevented?
Session Attachments	Attachment 1: Gravity and pumped water supply systems; Attachment 2: Typical Pipe network Attachment 3: Repair of broken PVC pipe

Attachment 1: Gravity and Pumped Water Supply Systems

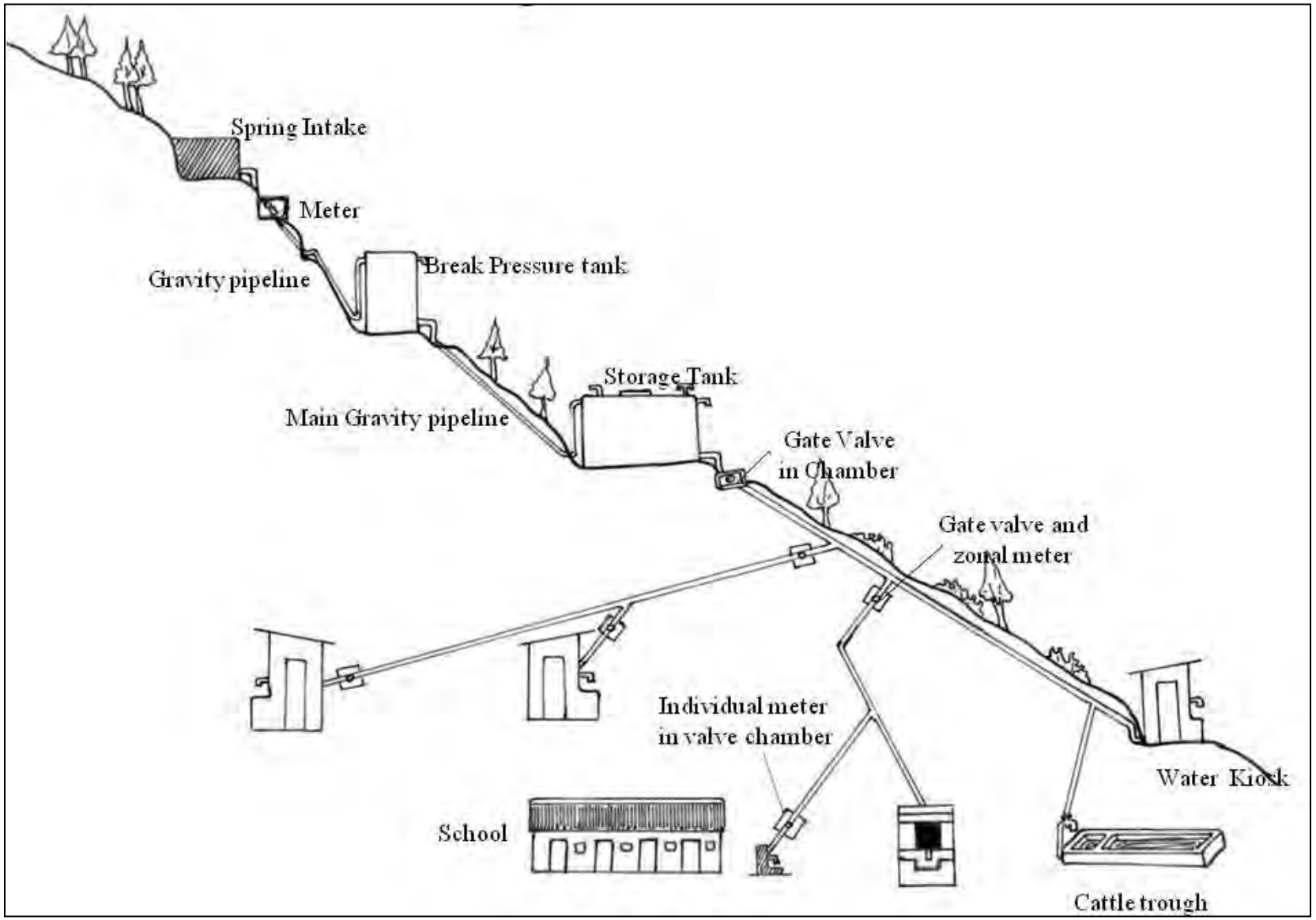
Typical Gravity Scheme



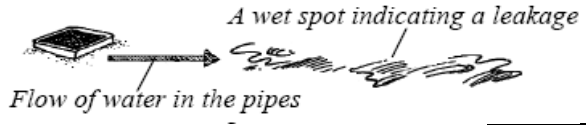
Typical Pumped Scheme



Attachment 2: Typical Pipe Network

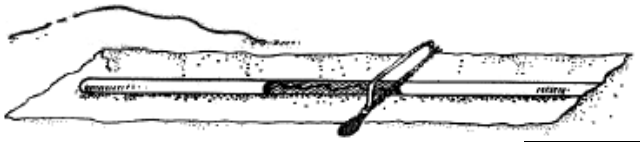


Attachment 3: Repair of broken PVC pipe



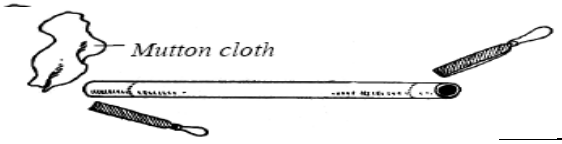
1. Isolate the leaking section by closing the sluice or the gate valve.

2. Dig the trench along the leaking pipe to find the leaking place that needs to be repaired. Dig the trench wide enough to give yourself working space. Dig the trench two meters on each side of the leaking point, to allow you to control the pipe.



3. Cut out the leaking piece using a hack saw.

4. Cut out a new piece of pipe. The new piece must be longer than the old one. Measure the length of the old piece; add 75 millimetres on both ends. This will be your "socket pipe".



5. File the edges of the pipes where you cut. Clean the cut ends of the pipes with the mutton cloth. Also file and clean the ends of the pipes in the trench.

6. Cut a short piece of the same diameter pipe to use for forming the sockets. Make a small fire.

7. Heat the end of the socket pipe for a distance of 75 mm as your mark shows. Keep rotating the pipe so that it is equally heated all the way round.

8. When the heated part is soft, insert the other short piece of pipe and rotate it until a socket is shaped. The socket should be 75 mm deep.

9. When the socket is correct, dip it into a bucket of water to cool. Make another socket at the other end.

10. File the edges of the socket pipe. Clean the ends of the socket pipe with mutton cloth. Apply tangit inside the sockets and outside the pipe in the trench. Be sure to read the instructions on the tin of the tangit. Obey the instructions.

11. Connect the pipes. Do not move the connection for at least five minutes. Fill the trench except for the part that has been repaired. Do not let water go through for some hours. Turn on the water and check for leaks. If there are no leaks, cover the rest of the pipe.

This kind of repair needs two people, you and your relief operator

MODULE H	**OPERATION AND MAINTANANCE**
SESSION H2	**GENERIC COMPONENTS**
SESSION H2.2	***STORAGE TANKS***
Appropriate Facilitator Background	Technician with relevant practical experience in the maintenance tasks associated with the type of tanks within the community project.
Introduction	Different kinds of tanks are available depending on the material of that makes them such as: • Reinforced concrete (floor, walls, roof) • Masonry walls on reinforced concrete floor & roof; • Rubble stone; • Brick; • Ferro cement; • Plastic; • Corrugated iron; and • Steel. Tanks with different names occur in different kinds of projects relating to their function and placement e.g.: • Rainwater harvesting tank • Rock catchment tank • Berkad (Somali name for an underground tank) • Storage tank • Break pressure tank The training session is generic to all forms of tanks.
Objective	At the end of the session, the participants will be able to: • Identify the main components of a tank • Describe the functions of the key components • Carry out maintenance tasks
Outputs	An O & M Plan
Timing	Session should take approximately 1 hr
Target Group	System operator or maintenance staff and WUA committee members
Appropriate Venue	A place within the community where discussions can be held with minimal interference and where there is easy access to the storage structures for practical exercises.
Methodology	This is intended to be a PRACTICAL session. The components will be taught by demonstration on the system itself not using drawings or description. The flip chart can be used to illustrate details if necessary. Reinforce the learning by allowing participants to handle components and describe their functions to each other.
Materials	• Valve key/wheel, • Pipe wrench and • Brush/ broom • Materials to make tank repairs.
Session Guide	
Step 1: Identification of Components	**Tank Components** Using Attachment 1, identify and demonstrate the functions of the key

components:

Component	Function
Inlet valve	valve to control flow into the tank; if closed water does not enter tank
Inlet pipe	lets water into tank above tank water level
Float valve	valve on inlet pipe that automatically closes when the tank is full of water (not applicable on a RWH tank or a pumped rising main)
Washout	pipe and valve that is opened to allow cleaning of the tank
Overflow	disposes of excess water
Manhole/cover and ladder (external & internal)	allows inspection and cleaning of tank
Ventilation pipe	allows circulation of air to keep the water aerated; must have mesh/netting over ends of pipe to prevent insects or animals from entering tank

Step 2: Tank Specific O & M tasks

Ask participants what problems might occur if maintenance of the tank is not carried out properly. Identify components that require maintenance and demonstrate and discuss maintenance procedures.

Discuss the O & M tasks which may include:

- Close and open control valves once a month
- Release jammed float valve
- Hold float valve in up position; there should be no flow
- Hold float valve in down position; there should be normal water flow
- Check float for leaks and seal leaks
- Replace rubber washer on leaking float valve (see Attachment 1)
- Replace pin on float valve arm
- Open washout and clear silt from tank once a month (note: tank should be practically empty and outlet valve must be closed before cleaning)
- Check manhole is properly covered to prevent insects and animals entering tank
- Repair cracked or damaged tank and cover
- Repair mesh over ventilation pipes
- Check support tower for elevated tank for structural defects
- Check ladder in tank to ensure it is safe for use

Step 3: Troubleshooting

Discuss the potential unexpected problems and what might be the cause and potential solutions.

Problem	Probable cause	Possible solution
Overflow from tank	Failure of float valve Gate valve blocked (outlet side)	Replace rubber washer Replace pin Remove and clear valve (replace if necessary)

<table>
<tr><td></td><td></td><td>Airlock in pipeline (outlet side)</td><td>Check/open nearest air valve</td></tr>
<tr><td></td><td>Leaks from tank wall</td><td>Crack in wall</td><td>Repair on inside – repair will depend on type of tank</td></tr>
<tr><td></td><td>Cracks in roof</td><td>Settlement of roof
Too much loading on roof</td><td>Seal crack, add additional support if necessary</td></tr>
<tr><td>Step 4: Spares, Tools, & Technical Assistance</td><td colspan="3">Tools

• Shovel and brush for removing silt
• Masonry tools for cement plastered tanks
• Pliers for repair of float valve

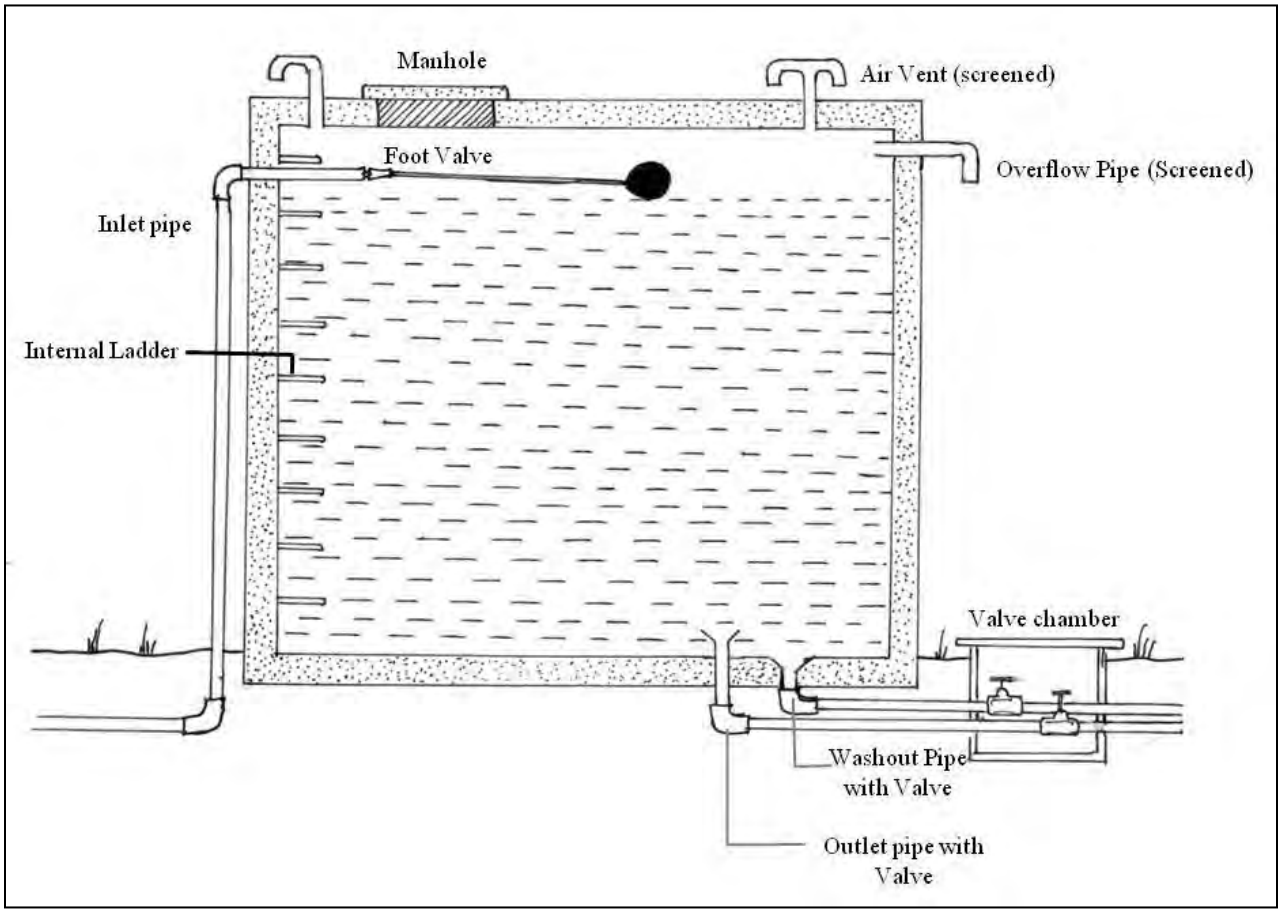
Spares – include:

• Pin for float arm;
• Mesh, strainer
• Check requirements of fittings for pipe inlets and control valves

Supply Chain – most tank materials can be purchased at a well provisioned hardware store.

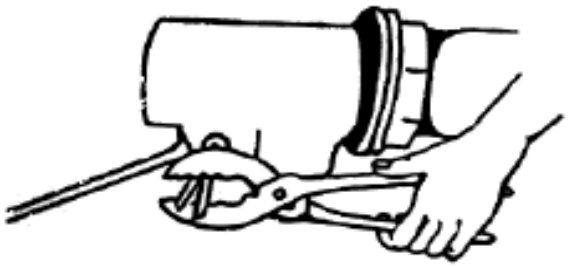
Technical Assistance – technical assistance should be sought if the tank wall has major leaks or if the roof shows significant cracks and the structural integrity of the roof is in doubt.</td></tr>
<tr><td>Review</td><td colspan="3">• What are the main problems that can occur to the tanks within the scheme?
• Can these problems be fixed by the WUA staff?
• Is there an O & M plan?</td></tr>
<tr><td>Session Attachments</td><td colspan="3">Attachment 1: Sketch of Typical Storage Tank
Attachment 2: Diagram for replacement of rubber washer on float valve</td></tr>
</table>

Attachment 1: Sketch of Typical Storage Tank



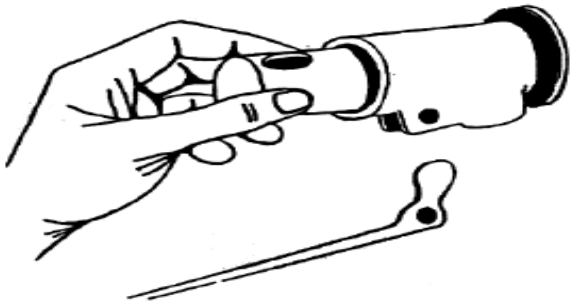
Attachment 2: Replacement of rubber washer on float valve

1. The faulty float valve

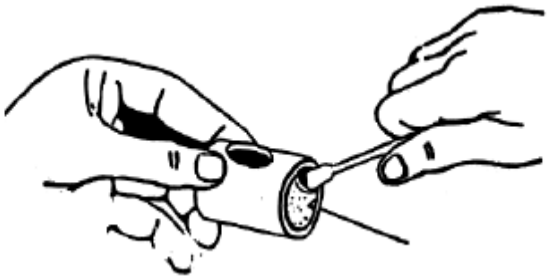


2. Press ends of the flexible metal lock together to ensure that it comes out of the assembly

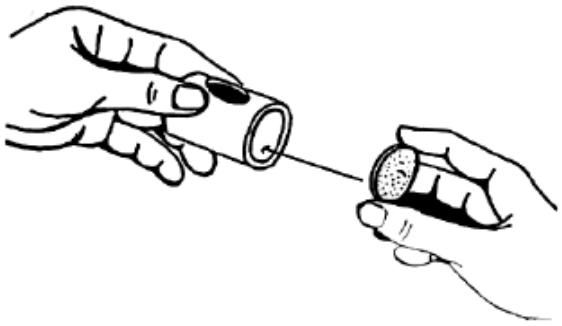
3. Remove the lock, thus releasing the connecting rod to the ball valve



4. Remove the metal block containing the worn out rubber washer



5. Remove the rubber washer using a flat metal plate



6. Carefully insert a new rubber washer and reassemble the float valve

<table>
<tr><td>MODULE H</td><td>OPERATION AND MAINTANANCE</td></tr>
<tr><td>SESSION H2</td><td>GENERIC COMPONENTS</td></tr>
<tr><td>SESSION H2.3</td><td>CONSUMER POINTS</td></tr>
<tr><td>Appropriate Facilitator Background</td><td>Technician familiar with the maintenance tasks associated with meters, taps and gate valves.</td></tr>
<tr><td>Introduction</td><td>This is a general discussion of the O & M for various consumer points which include:
Tap stand
Kiosk
Cattle trough
Individual connection</td></tr>
<tr><td>Objective</td><td>At the end of the session, the participants will be able to:
Identify the main components of consumer water points
Describe the functions of the key components of the water points
Carry out water point maintenance</td></tr>
<tr><td>Outputs</td><td>An O & M Plan</td></tr>
<tr><td>Timing</td><td>Session should take approximately 1 hr</td></tr>
<tr><td>Target Group</td><td>Operator, maintenance staff and water committee members</td></tr>
<tr><td>Appropriate Venue</td><td>A place within the community where training is taking place where participants can clearly hear and participate in the discussions and where there is easy access to the different parts of the community water project.</td></tr>
<tr><td>Methodology</td><td>This is intended to be a PRACTICAL session. The components will be taught by demonstration on the system itself not using drawings or description. Reinforce the learning by allowing participants to handle components and describe their functions to each other.</td></tr>
<tr><td>Materials</td><td>Valve key/wheel
Pipe wrench
Brush/ broom
Bucket; and
Clock/timer</td></tr>
<tr><td>Session Guide</td><td></td></tr>
<tr><td>Step 1: Identification of Components</td><td>Water Point Components

With reference to the drawings in Attachment 1, Identify and demonstrate the function of the key components:

<table>
<tr><th>Item</th><th>Description</th></tr>
<tr><td>Service/gate valve</td><td>stopcock or gate valve that opens or closes the water supply</td></tr>
<tr><td>Pipe stand</td><td>protects and supports the pipe at the water point</td></tr>
<tr><td>Tap / bibcock</td><td>valve to control flow at water point</td></tr>
<tr><td>Float valve/ballcock</td><td>To control water in cattle trough</td></tr>
<tr><td>Meter</td><td>Measures flow though the pipe</td></tr>
<tr><td>Meter box</td><td>To protect meter</td></tr>
<tr><td>Apron</td><td>concrete surround to water point</td></tr>
<tr><td>Drainage channel</td><td>leads the water away from the water point to a soak-pit or drain</td></tr>
</table></td></tr>
</table>

<table>
<tr><td></td><td>

1. Flow Measurement

Measure the flow from the water point using a bucket and clock (how long does it take the bucket to fill?) or record readings on flow meter. Measure the flow from another water point and compare the result. Discuss why the flows may be different Reasons may include:

- Location of water point; points close to tank may get more water
- Water pressure; height of tank above water point gives pressure
- Pipe leaks reduce pressure
- Blockages in pipes, valves or meter

2. Water Point Maintenance

A noticeable problem at many consumer points is associated with the care and management of the taps. Consideration should be given to:

- Using good quality taps (brass – check against fakes!!);
- Consider use of push-type (self closing) taps where appropriate

</td></tr>
<tr><td>Step 2: Water Point Specific O & M tasks</td><td>

Identify the O & M tasks associated with the water points. These may include:

- Check perimeter fence & repair
- Check water kiosk structure & repair
- Check tap
- Check tap by opening and closing tap and check for leakage or damage
- Replace washer if tap leaks (See Attachment 2) or replace tap
- Repair erosion around pipes or tap stand
- Repair leaking or damaged pipes
- Repair damaged valve chambers
- Close and open service valves once a month
- Repair cracked or damaged concrete surround or drain
- Check for stagnant water around water point and clear/open drain to soak away
- Clear bush and keep compound around water point clean and free of rubbish and animal or human waste
- Check meter is working properly
- Check ballcock on cattle trough & repair pin and/or washer if needed
- Remove meter, clean sieve and replace sieve and meter

Ask participants what problems might occur if maintenance of the water points is not carried out properly. Identify components that require maintenance and demonstrate and discuss maintenance procedures

</td></tr>
<tr><td>Step 3: Troubleshooting</td><td>

Discuss the potential unexpected problems and what might be the cause.

Problem	Probable cause	Possible solution
Leaking service/gate valve	Worn out valve	Replace valve. Check that valve is not being

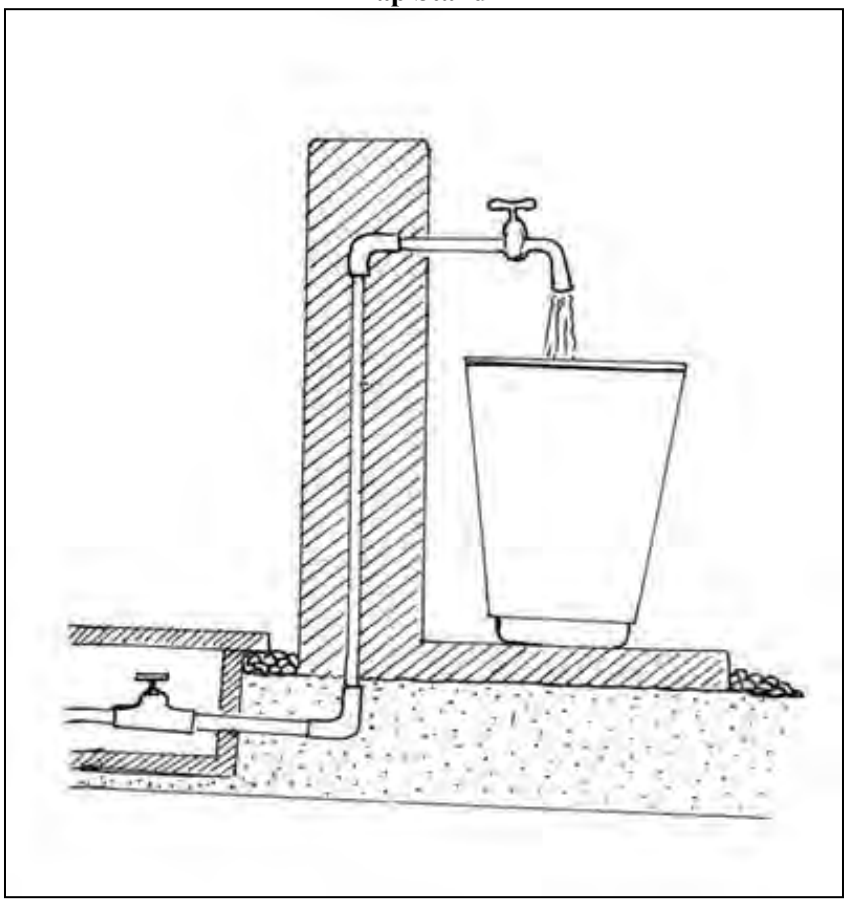
</td></tr>
</table>

			used where a tap is more appropriate.
	No/little water flowing	Storage tank empty Tank outlet pipe blocked Distribution pipe leaking/ broken Air lock in distribution pipe Service/Gate valve blocked or closed Meter blocked	Check flow in transmission pipeline Check strainer and outlet valve Repair pipe Check/open nearest air valve Remove and clear valve (replace if necessary) Remove & clean screen in meter
	Continuous leak from tap	Worn out screw thread in upper tap assembly Worn out washer	Replace tap Replace washer
	Silty/Muddy water flow	Silt/Mud in tank Silt/Mud in pipes	De-silt tank Open washouts
	Air coming through meter & tap	Air in pipe – indicates that tank goes empty	Check Air Valves, check operation of tank
	Hammer noise	Rapid flow that is turned on/off too rapidly	Slow opening/closing of gate valves/taps.
	Poor water quality	Contaminated raw water Poor storage Leaks in pipelines	Review water system from intake to consumer point to check for source of contamination. Take water quality sample and analyse to establish nature of pollutants & proper solution.
Step 3 Spares, Tools, and Technical Assistance	Tools – See Session H.1 for tools required. Spares – the following spares are usually required: • Tap washers • Tap • Spare meter • Meter sieve • Gate valve • Ball valve		

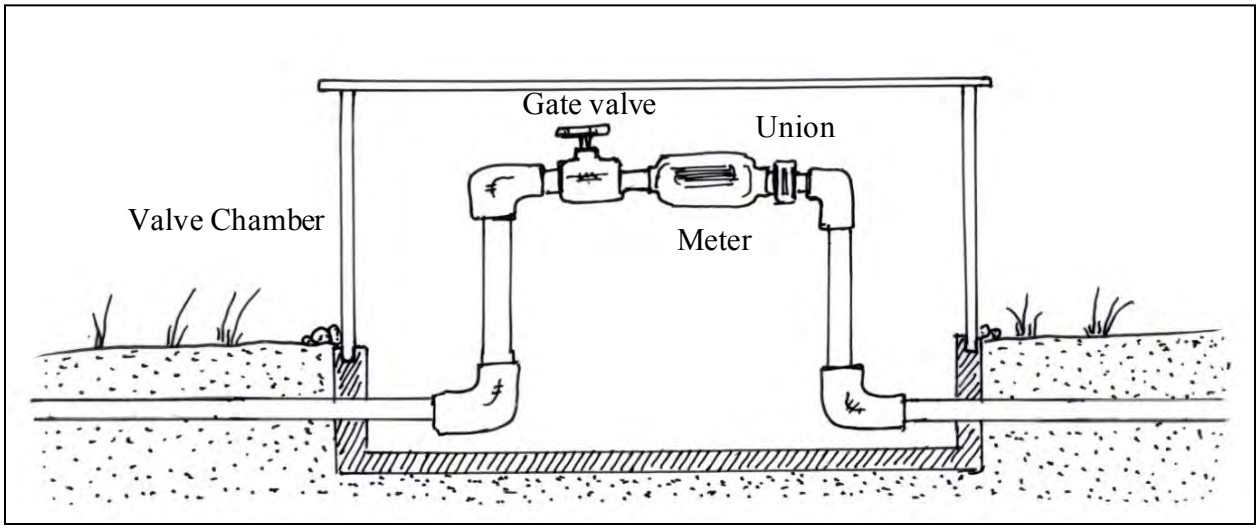
	• Spare Pin for ballcock Supply Chain – most materials can be purchased at a well provisioned hardware store. Note: Check supplier and quality of taps and meters available. Technical Assistance • Technical assistance should be sought if the meter frequently has air or gets blocked. • Servicing of meters is a specialised skill and should be undertaken by a trained technician (KEWI offers short courses on meter servicing). • Persistent water quality problems should be investigated with a water quality specialist, based on laboratory analysis of water quality.
Review	Check that the objectives of the session have been met by asking participants to explain what they have learned and demonstrate that they can carry out the maintenance without assistance.
Session Attachments	Attachment 1: Consumer Water Points Attachment 2: Replacement of worn out washer on a tap stand

Attachment 1: Consumer Water Points

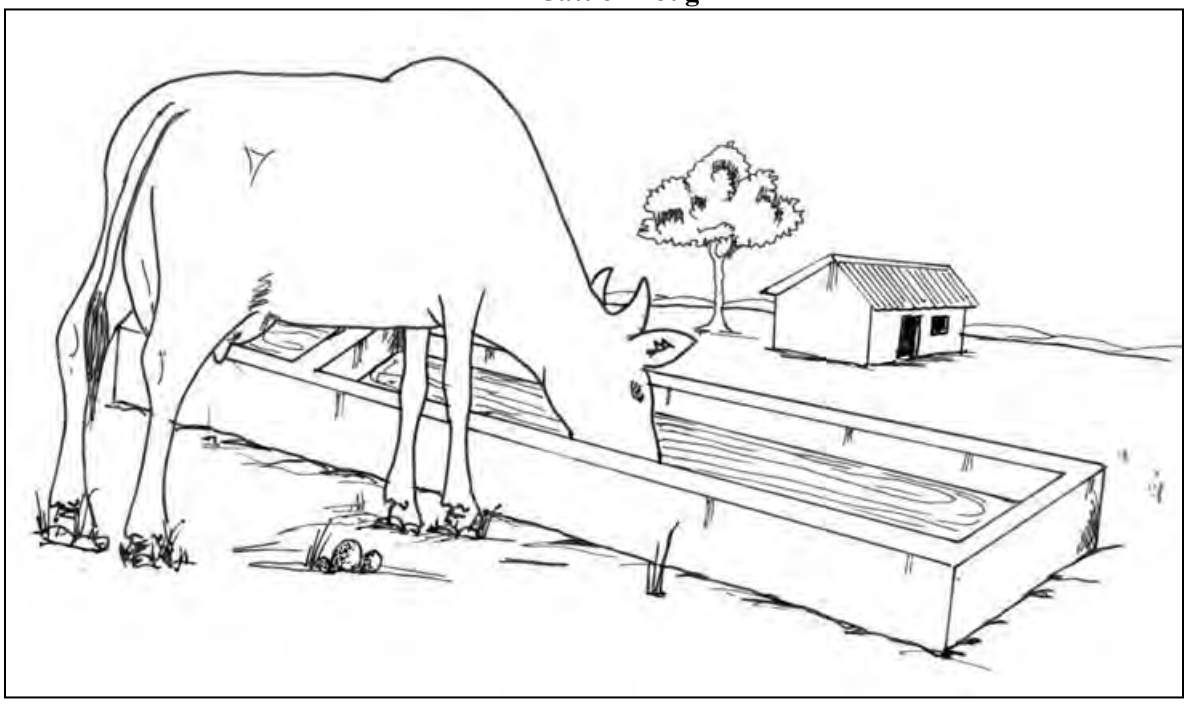
Tap Stand



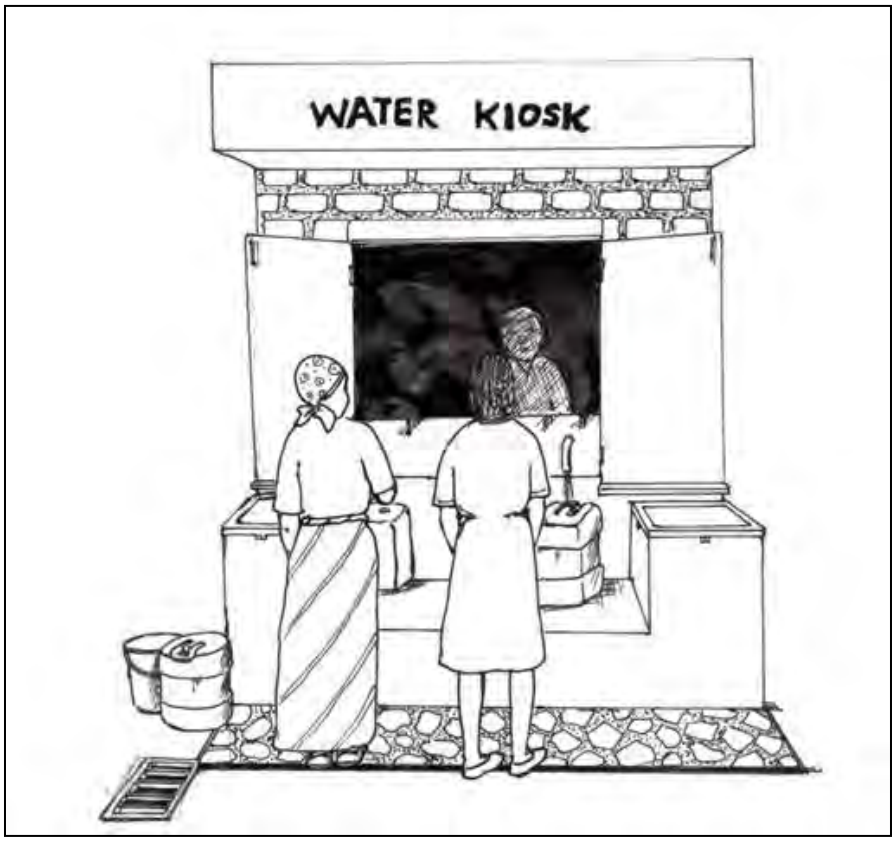
Individual Metered Connection



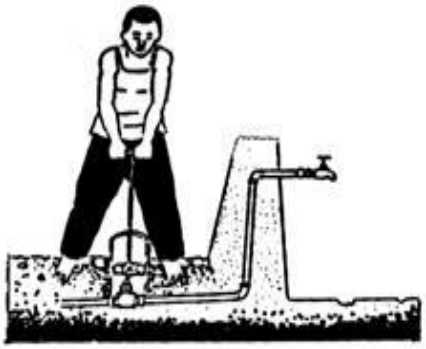
Cattle Trough



Water Kiosk

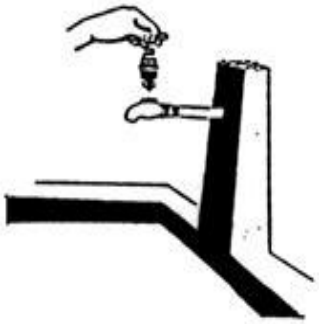


Attachment 2: Replacement of worn out washer on tap stand



1. Close water supply to tap

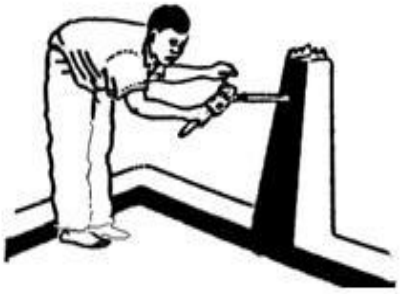
2. Open upper biptap assembly using a 14"pipe wrench



3. Remove the assembly and identify the washer

4. Remove the bottom nut and washer

5. Replace with a new washer and return and secure nut



6. Replace the assembly, open supply of water to tap, check to confirm no leaks.

MODULE H	**OPERATION AND MAINTANANCE**
SESSION H2	**GENERIC COMPONENTS**
SESSION H2.4	***WATER TREATMENT***
Appropriate Facilitator Background	Technician familiar with broad experience and knowledge of household water quality treatment systems.
Introduction	This is a general discussion on the O & M for household and water kiosk level water treatment options. Water treatment at a scheme level should be handled through more specialised investigation and training. The level of water treatment required is highly dependent on the quality of the raw water. A detailed water quality analysis to test if the raw water meets drinking water standards will provide much needed information on the nature and concentration of pollutants. Certain aspects of water treatment require specialised knowledge to determine the best course of treatment.
Objective	At the end of the session, the participants will be able to: • Know the different household water treatment options • Be familiar with using selected household water treatment methods properly
Outputs	Participants trained in the use of various household water treatment systems
Timing	Session should take approximately 2 hours
Target Group	Community members and WUA maintenance staff
Appropriate Venue	A place within the community where training is taking place where participants can clearly hear and participate in the discussions and where the practical demonstrations can be undertaken.
Methodology	This is intended to be a PRACTICAL session. The components will be taught by demonstration.
Materials	• 20 litres of raw water from different water sources, in marked containers to demonstrate different treatment options; • Covered buckets or covered bucket with tap; • Aquaguard or similar chlorine solution or tablets from local store; • Alum or local coagulant (e.g. Muringa seeds) material; • Local filter medium (sand, charcoal); • Chlorofloc; • Bone-char filter – Only for use in known high fluoride areas, along with a colour comparator field test kit to show the difference between raw and treated water; • Ceramic filter; • Bio-sand filter; • Clear domestic glass; • 2 litres plastic water bottle for SODIS demonstration; • Household sieve; • pH litmus paper • simple pH and Conductivity Meter • Pool tester for measuring residual chlorine • Current National Standards on drinking water quality
Session Guide	
Step 1: Understanding Water Quality	Facilitator should start by asking participants to identify water sources available within the community (refer to community resource map). Ask

participants whether certain sources are used for drinking and why.

Facilitator should lead a discussion on water quality from different sources within the community.

SOURCE	WATER QUALITY	LEVEL OF TREATMENT REQUIRED
Rainwater Tank	Clear	Disinfection
Shallow well (open)	Clear Could be brackish (high salinity) Could be acidic	Disinfection
Shallow well (covered) with handpump and properly disinfected	Clear Could be brackish (high salinity) Could be acidic	Check whether well can get contaminated from nearby latrines & other pollution sources, if so, disinfection is required
Sand dam, water drawn from shallow well or off take	Clear (Turbidity possible in rainy season)	Disinfection
Borehole	Generally clear Test for chemical and bacteriological composition	Depends on chemical and bacteriological composition
River water	Could be turbid and contaminated	Full treatment
Pan/Dam	Could be turbid and contaminated	Full treatment

Note: Assume ALL open water sources are contaminated and require disinfection. This includes rainwater.

Facilitator should guide the discussion towards establishing:

- Approximately how much water is used by a household per day?
- Out of the total, how much water is used for drinking and cooking only and should therefore be properly treated?

Step 2: Review of Household Water Treatment Options

Facilitator should ask participants to name and describe what forms of water treatment are currently being practiced and under what conditions. Use diagrams in Attachment 1 to help discuss local water treatment practices.

Facilitator should lead a discussion on various options available for treating water at a household level.

A. Household Treatment for Bacteriological Contaminants

Discuss the different options of treating water at the household level and the issues that should be considered. Treatment depends on level of contamination of source water and the circumstances. The following is a brief guide on the process that households should follow to obtain safe drinking water on a reliable basis

i. Course Filtration (for water with heavy sediments or organic matter)

- Filter through cloth (for example in a flood, when relief has not arrived, household goods have been lost and drinking water is an immediate need)

ii. Settlement (if water has sediments) (again, for example in a flood, but when a water storage container is available and time is available, e.g., overnight, for allowing settlement)

- Let water stand so that sediments can settle
- Decant clear water, dispose of sediments;

iii. Coagulation (if water is turbid)

- Check and record pH of water sample using pH litmus or pH meter
- Fill a 20 litre jerry can with turbid water, add and stir in coagulant
- Quantity of coagulant will depend on the type of coagulant being used and level of turbidity
    - Note: use sufficient coagulant to demonstrate positive effect
- Let water stand so that sediments/coagulant can settle
- Check and record pH of water sample – note change to pH
- Check whether pH is 6.5 – 8 otherwise coagulation is unlikely to work
- Decant clear water, dispose of sediments/floc – this is important as the coagulant can add a foul taste to the water;

iv. Filtration (if water is turbid or has flocculants)

- Filter through sand/charcoal filter
- Filter through ceramic filter
- Removal of Fluoride can be undertaken with a bore-char filled defluroidation filter produced by the Catholic Diocese of Nakuru

v. Disinfection

- Boil water – kills pathogens but does not remove chemical contaminants. Does not leave a disinfectant in the water so stored water may need to be re-disinfected;
- Waterguard/Aquaguard (tablets or liquid) - follow instructions on bottle or sachets (be sure to stir after application of tablets);
- Chlorofloc tablets - follow instructions on sachets;

- Put water in clear PET (polyethylene) plastic bottle, and put in sunshine for 12 hours (SODIS) (Note: be sure to remove label on bottle to maximise UV penetration to water)
- Secondary filtration through microbial removing filter

vi. Storing & Using Potable Water

Put treated water into:

- A clean bucket with a lid and preferably with a tap
- Jerry can with lid
- Smaller clean bottles for children
- Ladle for drawing water should have a long handle and be hung off the ground and used only for drawing water

Store bucket or jerry can in dark place (away from light).

B. Household Treatment for Chemical Contaminants

Treatment for chemical contaminants typically requires chemical laboratory analysis to determine which contaminants are present and specialised knowledge to determine treatment options.

For the purposes of this manual, fluoride removal is described briefly below because fluoride contamination occurs naturally in many groundwaters in Kenya at concentrations above potable water standards (i.e. WHO standard of 1.5 mg/l).

Fluoride Removal (for only areas with high levels of fluorides in drinking water)

Fluoride above 1.5 mg/l may cause dental (damage to tooth enamel with a characteristic brown stain, no weakening, affecting only children) and skeletal fluorosis in older people, which is increased density and brittleness in bones making them prone to fractures and stiffening of joints. Symptoms may include:

- Brown and/or chipped teeth;
- Skeletal deformities, etc;

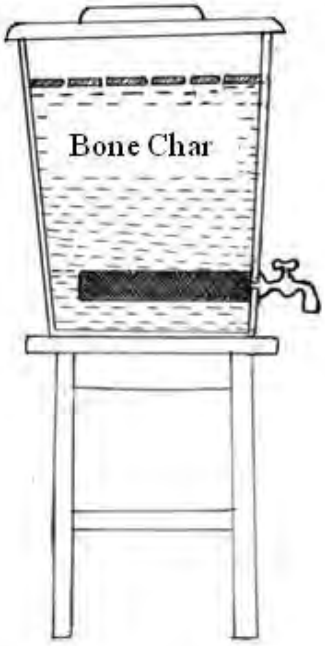
These symptoms may lead to social stigma and limited mobility and ability to work, especially for adults.

To address fluoride contamination:

1. Undertake a fluoride test (in laboratory) to determine level of concentration;
2. Remove fluoride using one of the following methods:
    a. Activated alumina;
    b. Reverse osmosis (sophisticated technology, high initial and maintenance cost, high power cost);

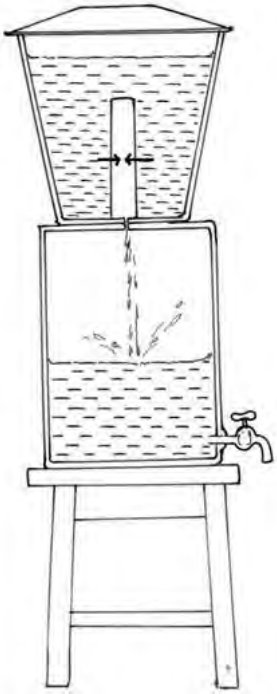
	c. Nalgonda technique; d. Bone char.
Step 3 Spares, Tools, & Technical Assistance	See Generic Session for general tools. Tools - no specialised tools required for household treatment Spares • Ceramic filters/candles • Bone-char for areas with high fluoride waters. Supply Chain – ensure store in village has adequate supply of household treatment options (e.g. Water Guard) and spares (e.g. Ceramic candles) Technical Assistance – for collective treatment, technical assistance is required to analyse water quality, establish treatment process and train water treatment operators.
Review	• Why would you filter water through a sieve? • What is the advantage of disinfecting with chlorine solution? • Why is proper storage important? • Why is high fluoride in water dangerous to your health?
Session Attachments	Attachment 1: Diagrams of household water treatment options

Attachment 1: Diagrams of Household Water Treatment Options

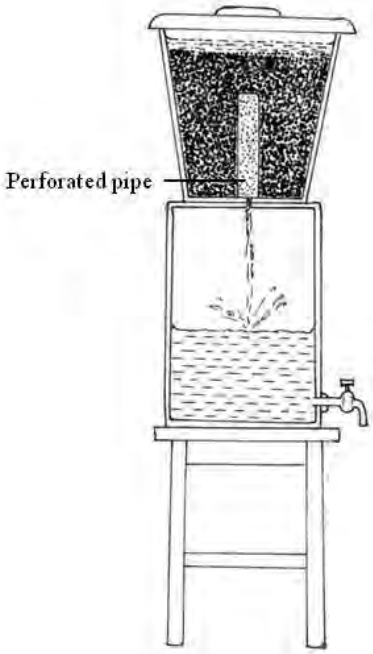


Household Fluoride Removal

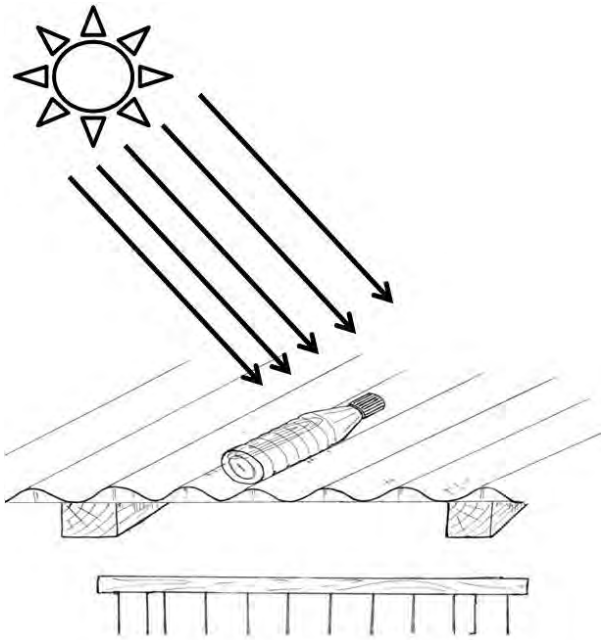
Household Filtration



Filtration using Ceramic Candle



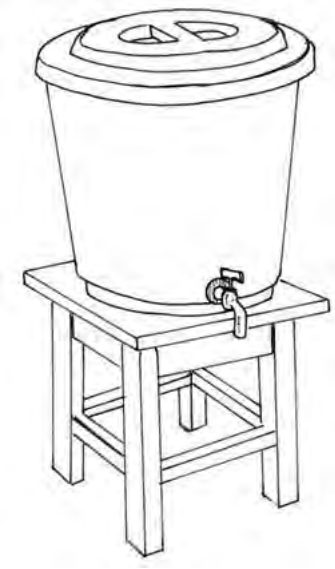
Sand and Charcoal Filter



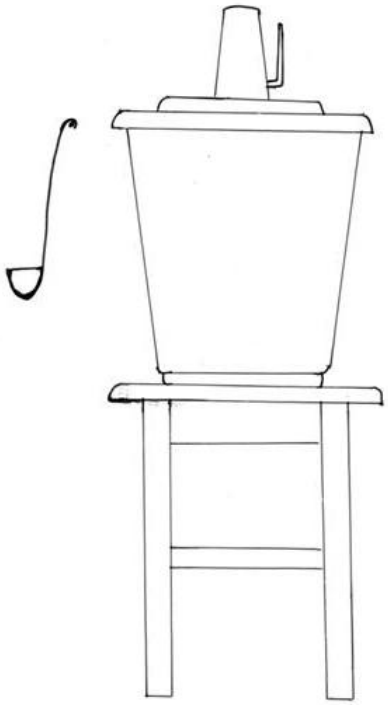
24 hours Sunlight Disinfection System - SODIS

Disinfection through Boiling

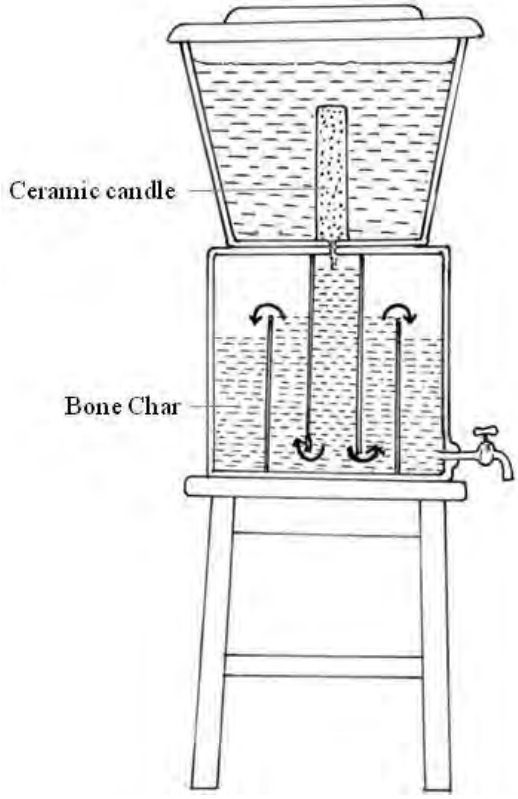
Chlorine Solution



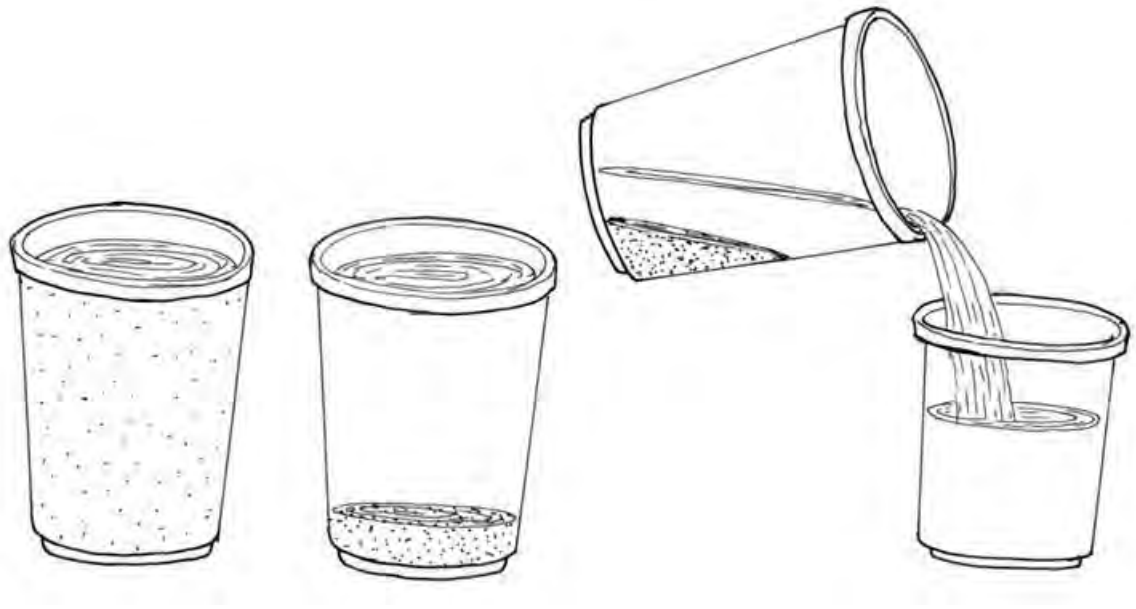
Proper Water Storage



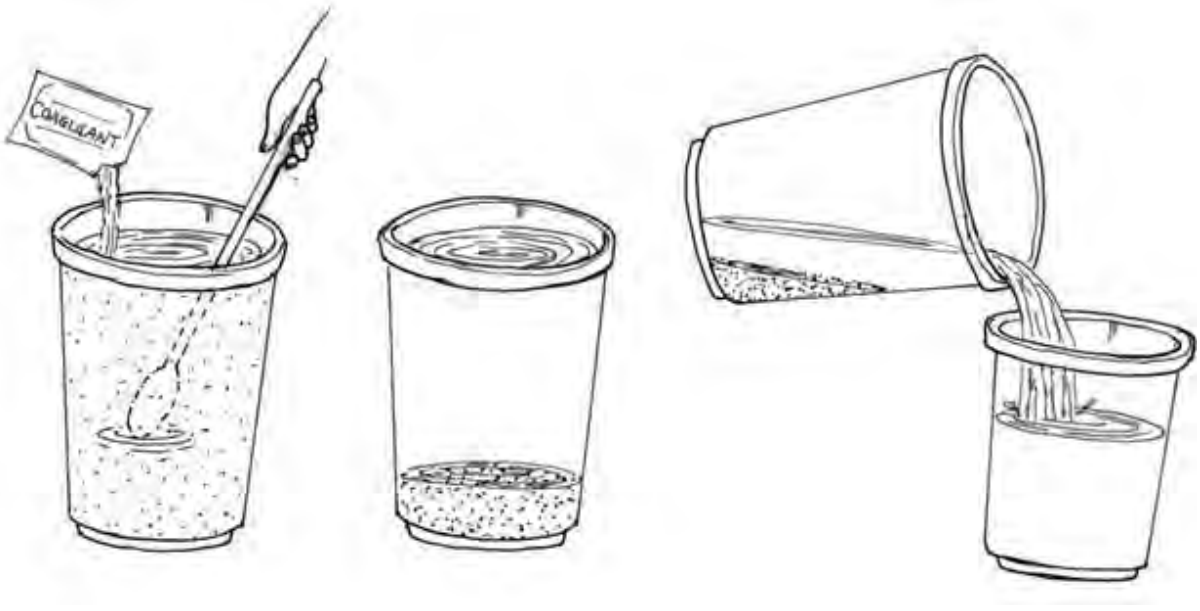
Proper Storage and Laddle



Combined Ceramic and Defluoridation Filter



Settlement Process



Coagulation Process

MODULE H	**OPERATION AND MAINTANANCE**
SESSION H3	**DAMS AND PANS**
Appropriate Facilitator Background	Water technician with experience on dams, pans and/or sand dams
Introduction	This session covers dams and pans. The facilitator should select or adapt the appropriate materials for the particular community.
Objective	At the end of the session, the participants will be able to: • Identify the main components of their dam, pan • Describe the functions of the key components • Carry out maintenance tasks
Outputs	An O & M Plan
Timing	Session should take approximately 1 hr
Target Group	WUA maintenance staff, WUA committee members and community members
Appropriate Venue	At the dam or pan
Methodology	Site walk and practical demonstrations. The components will be taught by demonstration on site. The flip chart can be used to illustrate details if necessary. Reinforce the learning by allowing participants to handle components and describe their functions to each other.
Materials	• Valve key/wheel • Pipe wrench • Tools – shovel, rake, etc
Session Guide	
Step 1: System Identification	**1. Purpose of the Dam and Pan** Discuss who uses the dam/pan and what for. This makes a big difference regarding what water quality is required from the source. If it is a livestock watering dam, then also discuss where domestic water is obtained. **2. Is it a Dam or a Pan?** Discuss the difference between a dam and a pan and decide whether the structure being viewed is a dam or pan (Refer to Drawings in Attachment 1). • Dams have a wall designed to hold back water; • Dam walls must be structural and watertight; • Pans hold water below original ground level; • Pan embankments are not designed to hold water – they are created from the material that is excavated from the ground. The issue in the distinction is that a dam wall should be able to hold water whereas the embankment on a pan serves no structural purpose. It is frequently and incorrectly stated that the embankment on pans are washed out because they were incorrectly built. However, an embankment being washed out can usually be explained by an inadequate spillway or outlet or incorrect spillway levels. **3. System Components** Potential system components are listed below. The facilitator should identify those components that are observed in the community structure. Discuss the purpose of each component.

	<table><tr><th>Item</th><th>Purpose</th></tr><tr><td>Catchment Area</td><td>Area above the source where rain falls and the runoff comes from</td></tr><tr><td>Source</td><td>Where water is taken from, e.g. river or stream</td></tr><tr><td>Inlet channel</td><td>A channel that conveys water from the source and puts it into the dam or pan</td></tr><tr><td>Pan Embankment</td><td>Wall of excavated material</td></tr><tr><td>Dam Embankment</td><td>Wall that is built and compacted to hold the water</td></tr><tr><td>Storage area</td><td>The volume that is filled with water</td></tr><tr><td>Spillway sill</td><td>Wall in the spillway to control top water level</td></tr><tr><td>Spillway channel</td><td>Channel to safely discharge excess water to water course or away from the dam/pan</td></tr><tr><td>Outlet/draw-off</td><td>Pipe-work to take water out of the dam</td></tr><tr><td>Perimeter fence</td><td>Constructed to prevent livestock, wild animals and children from entering the dam/pan area and contaminating the water</td></tr></table> **4. Catchment Area Maintenance** Where does the silt come from? Which part of the catchment contributes the most silt and why? Are soil erosion features (e.g. gullies), exposed roots of bushes and trees, etc) visible? Discuss why vegetation is important to the catchment area: • Vegetation holds soil in place and so reduces siltation • Vegetation slows down runoff and helps water to soak into the soil Inspect the catchment area for signs of harmful activities (charcoal burning, over-grazing etc). Discuss how the catchment area could be improved.
Step 2: Dam/Pan O & M Specific tasks	Ask participants what problems might occur if maintenance of the dam/pan is not carried out properly. Identify components that require maintenance and demonstrate maintenance procedures. The most common problem with pans and dams is silting up which reduces the stored volume and therefore the reliability or the period of time that there is water in the dam or pan after the end of the rains. Discuss with the community how they can measure the amount of water available in their dam or pan at any time (e.g. place one or series of permanent graduated staff gauges). Discuss with the community how they can measure the amount of silt that has accumulated in their pan (e.g. place one or series of permanent graduated

staff gauges).

Discuss desilting options with the community:

- Earthmoving equipment (bulldozers, tractors etc)
- Draught animals and desilting scoops (oxen, camels and handlers)
- By hand with shovels

Discuss the cost and practicality of the different methods.

The most common cause of dam/pan failure is overtopping of the embankment because the spillway is of insufficient size, is blocked by vegetation, or is at the wrong level. Note spillways that do not get flow frequently may be neglected as so cannot function as needed when there is high floods.

An additional problem is that the flood water through a spillway erodes the spillway, with the result that the capacity of the dam or pan is reduced.

Discuss the tasks relevant to the operations and maintenance of the system components. These may include:

- Patrol perimeter fence and repair
- Clear bush from and repair inlet channel (an eroded inlet channel can become the main watercourse)
- Inspect and desilt silt trap(s) and inlet channels
- Desilt pan before top water level reaches embankment (Note: inlet channel needs to be blocked during desilting)
- Clear bush from spillway
- Check spillway sill for damage and repair as necessary
- Check spillway channel for signs of erosion and take steps to prevent erosion by improving grass cover, stone pitching, spreading flow in the channel by building horizontal sill(s)
- Check dam embankment for cracks and erosion and repair
- Check dam embankment for tree or bush growth and remove, improve grass cover on embankment
- Check downstream side and toe of dam wall for leaks.
- Open and close all outlet valves once a month
- Monitor leakage from dam
- Check for rodents nesting in embankment and remove
- Read meter to monitor abstraction from dam
- Read staff gauge to establish water level

Step 3: Trouble shooting

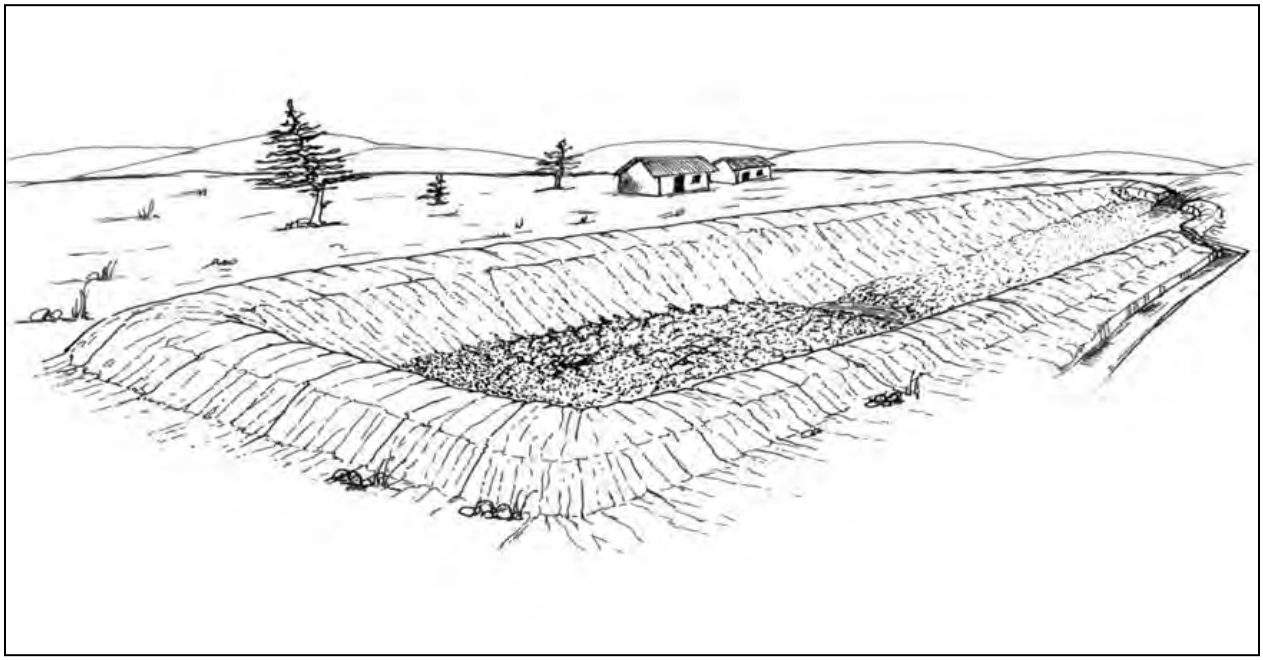
Discuss the potential unexpected problems and what might be the cause sand solutions.

Problem	Probable cause	Possible solution
Leakage along toe of dam wall	Poor design and construction	Monitor leakage

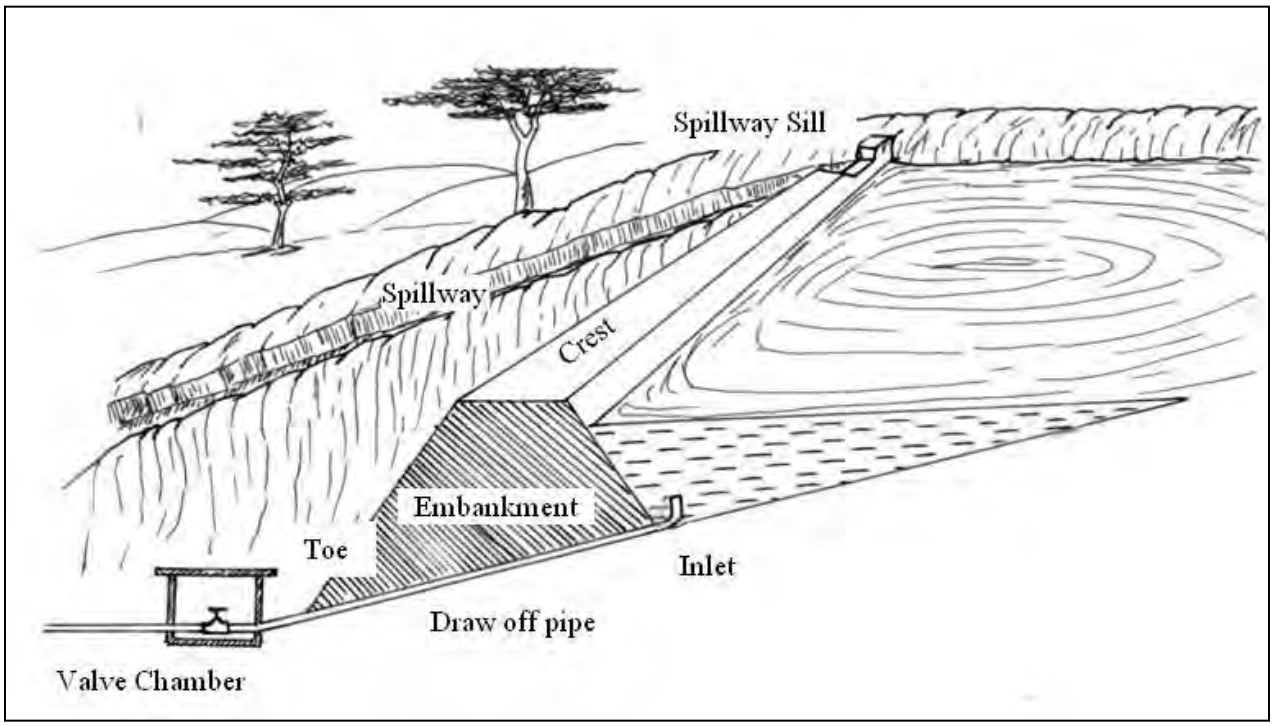
	Water does not last long after end of rains	Reservoir area has accumulated a significant amount of silt, Erosion of catchment area, Excessive seepage due to pervious soil in reservoir area.	Remove silt from reservoir area Reduce erosion in catchment area Apply and mix in clay, preferably bentonite clay to impoundment area
	No water from outlet	Outlet pipe blocked	Clear blockage at mouth of draw off pipe. ; Protect pipe by placing ballast surround to mouth of draw off pipe; Note a blocked pipe through a dam can be very difficult to unblock. Do NOT remove the pipe.
	Polluted water	Livestock in dam/pan Contamination from catchment area	Fence pan/dam Control access; discourage open defecation in the catchment
	Excessive weed growth	High nutrient concentration in water	Address source of nutrients, possibly by controlling access to dam/pan or catchment area by livestock
Step 4: Spares, Tools, & Technical Assistance	Tools • Shovels, pick axes, jembe, wheel barrows for moving silt and undertaking embankment repairs • Pangas for removing bush Spares – include: • Valves for outlet • Taps and tap washers Supply Chain – O & M materials can be purchased at a well provisioned hardware store. Technical Assistance – technical assistance should be sought if the dam or pan shows signs of excessive leakage/seepage, erosion of inlet channel (pans) and erosion of spillways and where dam embankment integrity is in doubt.		
Review	• What are the essential maintenance tasks to ensure dam/pan performs according to design? • How do we prevent silt from entering the dam/pan?		
Session Attachments	Attachment 1: Diagrams of a pan and a dam		

Attachment 1: Diagrams of pan and dam

A Pan



A Dam



MODULE H	**OPERATION AND MAINTANANCE**
SESSION H4	**SAND DAMS AND SUB-SURFACE DAMS**
Appropriate Facilitator Background	Facilitators should be familiar with the installation of sand dams and sub-surface dams. Technical training in water engineering, agricultural engineering, or building construction would be an advantage**.**
Introduction	• These dams have proved to be very important for water storage in dry areas, particularly in eastern Kenya. • Coarse sand can hold about 30% of its volume as water. • In the dry season evaporation will take place but only to about 0.5 m below the surface. • Water stored in these dams will reduce the need for people (usually women and girls) to travel long distances to get water in the dry season. • Water stored in these dams can improve the potential for tree nurseries, vegetable growing, brick making, etc, in valley bottoms. • Protection of the water from pollution is very important. The construction of shallow wells can be used to improve the water quality. • Dam construction should ensure that wing walls provide protection from damage during high floods.
Objective	• To create awareness of the potential of sand dams and sub-surface dams. • To enable participants to understand the best way to manage and maintain the water supply. • To create awareness of the problems that can arise with these dams and how they may be tackled.
Outputs	• Participants are aware of the potential for sand dams and subsurface dams. • Participants are aware of the importance of maintaining water quality. • Participants are informed about ways to maintain the effectiveness of the structures. • Participants develop rules for the management and utilisation of the resource.
Timing	One session of introduction taking 60 to 90 minutes followed by visits to dam sites. Diagrams can be used to illustrate issues.
Target Group	WUA committee and community members
Appropriate Venue	Inside a building or under a tree at a dam site.
Methodology	- Short presentations, informal and participatory - Question and Answer
Materials	- Illustrations, flip charts, pens,
Session Guide	
Step 1: Introduction to sand dams and sub-surface dams	• Explain the difference between sand dams and sub-surface dams. • Explain the benefits that have arisen from the construction of these dams. • Discuss the typical problems that arise in the management of the sand-dam(s) or sub-surface dams and the utilization of the water.
Step 2: Field visit	• If possible visit two or three dams showing good and bad management. If a field visit is not possible, use diagrams (see attachments). • Participants should pay attention to the effectiveness of the structure and the way the water is utilized. • Find out what guidelines or rules, if any, have been developed by the

<table>
<tr><td></td><td>community for using the resource and how well they are implemented.</td></tr>
<tr><td>Step 3: O & M Tasks specific to Sand Dams</td><td>

Review the pros and cons of the situations that have been studied.
Develop guidelines/rules and schedules for community management of sand dams and sub-surface dams.

Discuss the tasks relevant to the operations and maintenance of the system components. These may include:

Check condition of the sand dam to prevent avoidable contamination from livestock and laundry or bathing activities
Check the wall of the sand dam for erosion on the sides or undercutting of dam wall. Establish protective measures to prevent additional erosion.
Check dam wall for cracks and leaks. Undertake plaster repairs as required.
Open and close all outlet valves once a month
For shallow wells with handpumps that are associated with a sand dam, refer to the Session on handpumps.

</td></tr>
<tr><td>Step 4: Troubleshooting</td><td>Discuss the potential unexpected problems, what might be the cause and solutions
<table>
<tr><th>Problem</th><th>Probable cause</th><th>Possible solution</th></tr>
<tr><td>Water in sand dam but nothing in the well</td><td>No connection between sand dam and shallow well.

Blockage of filter drain to shallow well</td><td>Excavation and repair of filter drain</td></tr>
<tr><td>No water in the sand dam</td><td>Lack of inflow

Seepage under or around the wall of the sand dam

Faulty leaking draw off pipe</td><td>Check for seepage path and take measures to prevent seepage by sealing flow path with clay or waterproof plaster on upstream face of wall.
Fix leaky draw off pipe</td></tr>
<tr><td>No water in the sand dam</td><td>Dam full of silt not sand. Dam may be incorrectly sited in a water course with insufficient sandy material or wall raised too quickly during construction which can result in a top layer of silt which prevents water seeping into the lower sandy material</td><td>Remove silt if the water course has sufficient sandy material</td></tr>
</table>
</td></tr>
</table>

	Wall at risk from erosion undermining the wall	Turbulent and erosive water spilling over the wall. Lack of sufficient protection for toe of wall	Place grouted riprap to create protective apron on downstream toe of wall
	Polluted water	Livestock or human activities polluting surface area of dam resulting in contamination of the water.	Control access through establishing clear rules of access and behaviour and monitoring compliance to the rules
	No sand	Sand harvested for construction purposes	Control access through establishing clear rules of access and regulate quantity of sand harvested from the sand dam.
Tools, Spares & Technical Assistance	Tools • Shovels, pick axes, jembe, wheel barrows for moving silt and undertaking repair of wall Spares – include: • Valves for outlet • Taps and tap washers Supply Chain – O & M materials can be purchased at a well provisioned hardware store. Technical Assistance – Technical assistance should be sought if the sand dam signs of excessive erosion at the edge or downstream toe of the wall. If the sand dam is actually full of silt, technical assistance may be required to determine the best course of action. If there is no water in the shallow well, technical assistance to determine best course of action may be required.		
Review	• Ask participants to explain the potential and constraints to expansion of sand dams and sub-surface dams. • Ask them to outline the best practices for managing the water resource.		
Session Attachments	Attachment 1: Handouts on maintenance and management of sand and sub-surface dams Attachment 2: Exercise on Sand Dams		

Attachment 1: Handout on maintenance and management of sand and sub-surface dams

1. System Components

Definition: The term sand dams and sub-surface dams are often used inter-changeably for structures built across sand rivers. However, it is useful to make a distinction.

The term **sand dam** is used for a structure, usually masonry or concrete, which is built across a sandy river bed to a height of about 1-2 metres above the existing sand level. In this way sand is trapped behind the structure and the water level upstream is raised. During flood periods water passing over the dam creates a waterfall. Such dams are commonly built where there is a rock bar across the river so that the waterfall will not undermine the structure. Note that before independence sand dams were referred to as sub-surface dams. At that time the focus was on the water stored below the surface of the sand rather than on the structure itself.

The term **sub-surface** dam is used for a structure that is built across a sand river bed but only up to the existing level of the sand. Such structures can be made of masonry, concrete or well-compacted clay. As the sand level above and below the dam is the same, there is no waterfall during flood periods.

The construction of sand dams and sub-surface dams has been increasing particularly rapidly in eastern Kenya where there are many sandy rivers. But there has been serious competition between those who want to harvest sand for construction and those who want to conserve sand for water storage.

There are four components to consider: the river, the dam, the water reservoir and the method of abstraction.

(a) River

Each river is different and therefore the design of a dam has to be appropriate to the situation. The best situation is where the river bed slopes gently and any dam installed will cause the water to be held up for a considerable distance up stream. Sand dams require high banks or wing walls to prevent flood water cutting round the side. The sand must be plentiful as a dam that fills with too much silt or clay will hold little water. Where a river is large, meandering, and has little slope to the river bed, dams can be problematic as any obstruction to the flow of water may cause the river to change course, especially if the river banks are low.

(b) Dams

Dams have to be constructed on a good foundation and sand dams require a strong apron of rock, masonry or concrete on the downstream side.

(c) Water reservoir

The amount of water stored in the dam depends on the quality of sand. Where the sand is coarse, up to 30% of the volume will be available for water storage. During the dry season some of the water will be lost to evaporation but once the water level falls to 50 cm below the surface, evaporation virtually ceases.

(d) Water abstraction

There are three main ways for water abstraction: (1) Digging a hole in the sand and using a scoop made from a gourd to collect the water and pour it into jerry cans; (2) Constructing a shallow well to the side of the reservoir; (3) Installing a pipe in the dam wall and drawing off the water below the dam.

2. Maintenance

(a) Dams

Subsurface dams should not require maintenance if they have been well constructed but sand dams may need repairs if there is any damage during major floods. The most likely damage is from flood waters cutting into the river bank at the side of the dam wall. Repairs may involve installing wing walls or, if they already exist, strengthening and possibly extending them. Damage may also occur where the flood waters start undermining the dam on the lower side. Strengthening or extending the apron at the foot of the wall may be needed. When sand dams are under construction it is recommended to leave a gap in the centre of the wall and build it up in stages, adding about 30 cm after each flood that has deposited coarse sand. If the wall is built to its maximum height in one operation, there is a risk of silt and clay being deposited. But when the installation is in stages, the silt and clay should be carried over the wall and the coarse sand will be trapped where it is needed.

(b) Water reservoir

The main problem is pollution. Livestock can contaminate the water if they are allowed to wander over the surface. People can contaminate the water if, for example, they bathe, wash laundry, clean motor bikes or cars and let the dirty water back into the reservoir. In one instance a farmer was seen spraying livestock against ticks close to the reservoir. The chemicals could be dangerous for people drawing water for drinking. Urinating or defecating close to the reservoir must be avoided because of the risk of spreading bilharzia or gastro-enteritis. While some increase in vegetation along the river bank can be beneficial it is a mistake to allow plants or bushes to encroach into the dam area as transpiration will reduce the available water. Fencing of the reservoir area is useful in preventing contamination by livestock but this will only apply where a trough for watering animals has been installed.

(c) Water abstraction

Water abstraction from a hole dug in the sand is the most common method but there can be problems. Dirty receptacles will add to the pollution of the water. A hole has to be dug deeper and deeper as the dry season progresses. The effort of hauling up 20 litre jerry cans from a deep hole can be difficult for children who are often the ones sent to fetch water and there is always a risk of the sand caving in. The hole is also prone to being silted during each time there is flow in the river bed.

Water abstraction from a shallow well installed on the river bank is preferable as the water at the bottom of the well will have automatically been strained through the sand. However, there is the same need to ensure that the receptacles used for drawing the water are clean. Wells should preferably be installed above the highest point that floods are likely to reach but if this is not possible some protection from flood damage will be needed (e.g. raising the wellhead platform above high water levels).

Water abstraction through a pipe in the dam wall has certain advantages and disadvantages. Water can be taken from the pipe to a tap stand and a trough for livestock, thereby reducing the risk of pollution. In some situations there may be a legal requirement to keep a pipe open so that even in dry weather some water is allowed through the dam wall for the benefit of downstream users. In other situations it may be permissible to put a lockable gate valve or tap on the lower side to prevent wastage of water. But the risk of breakage or theft should be considered and a lockable manhole may have to be constructed. Any pipe installed through the dam wall must have a properly constructed filter on the upstream side or it will soon get blocked.

The maintenance of sand dams and sub-surface dams should be the responsibility of a committee representing the local community. Issues on which decisions may be needed include:

- Who has rights to abstract water and how much?
- Who is responsible for maintaining a well and the windlass or pump if there is one?

- Who is responsible for the tap stand if there is one below the dam?
- Can people be allowed to abstract water upstream for vegetable growing?
- If the dam is to be fenced to exclude livestock, who is responsible?
- What should be done if sand harvesters come to take the sand for construction?
- What should be done if people are found polluting the water?

One issue that will need more consideration in future is the rights of individuals versus the rights of the community. As individual rights become more firmly established on land that was previously owned by the community, the rights to access and abstract water need to be clearly established.

Attachment 2: Exercise on Sand dams

Trainees are invited to look at the drawing of a sand dam construction to try and identify the problems and suggest solutions.

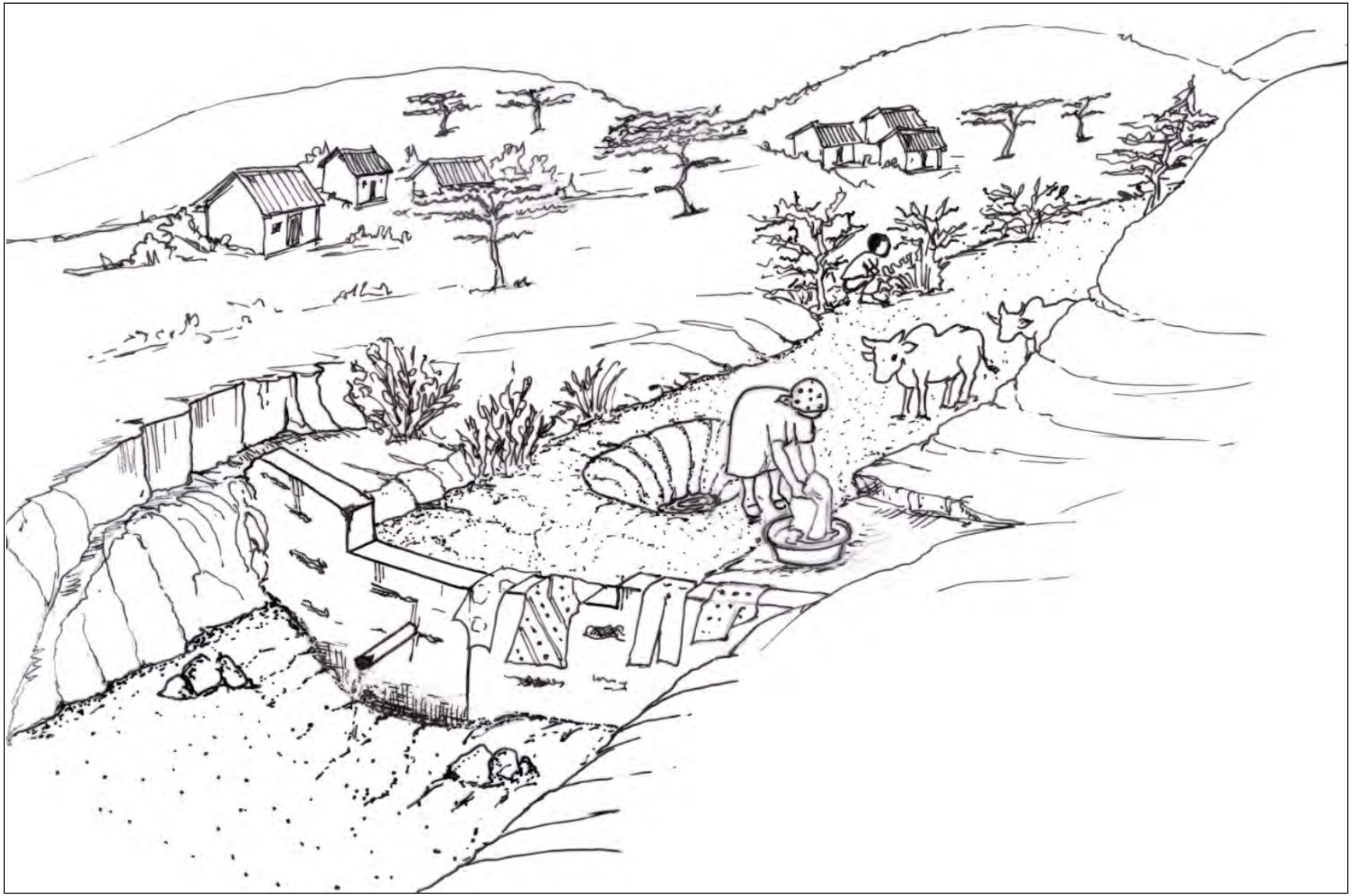
The Problems

1. Wing wall is missing or broken and flood waters are by-passing the dam. Eventually all the sand will be swept downstream and the dam will cease to function.
2. The dam wall is being undercut by the waterfall during floods probably because the foundation was poorly constructed and there was no apron. If nothing is done it will overturn.
3. The dam is not fenced so livestock can wander in at will.
4. Weeds and bushes are growing on the dam and extracting water through transpiration.
5. Livestock are polluting the water.
6. A person is defecating on the river bank.
7. A woman is washing clothes and tipping the dirty water back onto the sand.
8. The pipe has lost its tap and is spilling water that may be needed later.
9. The hole dug in the sand is deep and dangerous, especially for children trying to get water.

Suggested Solutions

1. Install a wing wall on proper foundations to ensure the flood waters go over the centre of the dam.
2. Repair the foundations and install an apron to take the impact of the water.
3. Provide a fence or hedge to the dam with a gate for people.
4. Remove weeds and bushes growing within the dam.
5. Install a trough for watering livestock downstream and pipe the water from the dam to the trough.
6. Develop community awareness and education to prevent the spread of diseases and construct a pit latrine on the bank above the water level.
7. Install a shallow well to the side of the dam and educate the community to use dirty water for watering vegetables or tree seedlings.
8. Check local regulations and find out if the pipe inlet must be kept open for the benefit of downstream users. If this is not necessary, pipe the water to a tap stand with a gate valve in a lockable manhole.

SAND DAM



MODULE H	**OPERATION AND MAINTANANCE**
SESSION H5	**INTAKES**
Appropriate Facilitator Background	Technician familiar with the maintenance tasks associated with intakes
Introduction	This session covers intakes in general. There are many kinds of intakes and the facilitator should keep the discussion focused on the intake of the water supply system in question. Different kinds of intakes include: • River intakes • Spring intakes • Lake intake • Infiltration gallery
Objective	At the end of the session, the participants will be able to: • Identify the main components of an intake • Describe the functions of the key components • Carry out intake maintenance
Outputs	O & M Schedule
Timing	Session should take approximately two hours excluding the site walk
Target Group	Maintenance staff, operator and water committee members
Appropriate Venue	At the community intake
Methodology	This is intended to be a **PRACTICAL** session. The components will be taught by demonstration on the system itself. The flip chart can be used to illustrate details if necessary. Reinforce the learning by allowing participants to handle components and describe their functions to each other.
Materials	• Valve key/wheel • pipe wrench • Tools – shovel, rake
Session Guide	
Step 1: System Identification	**1. Catchment Area Maintenance** Discuss why vegetation is important to the catchment area: • Vegetation holds soil in place and so reduces erosion/siltation • Vegetation slows down runoff and helps water to soak into soil Inspect the catchment area for signs of harmful activities (charcoal burning, over-grazing, de-forestation, etc). • Discuss how the catchment area could be improved; • Discuss which other institutions should be alerted in regard to catchment degradation and lobbied for collective action. Note: WUA that rely on a catchment that extends beyond the boundary of the community will need to recognise that catchment conservation activities require a multi-stakeholder approach. WUA should link up or form a WRUA to develop a platform for collective action on catchment conservation.

2. Intake Components

(See Attachment 1 for diagrams of different kinds of intakes)

Component	*Function*
Catchment Area	Surface area where water flows towards the source
Source	Where the water originates – e.g. spring, river
Intake	The structure to abstract the water from the source
Intake chamber	Collects water from the source
Valve chamber	Protects the control valve
Weir (river intake)	Wall that regulates the level of the river
Infiltration gallery	Perforated pipe and filter material that enables water to enter pipe and be channelled to the sump
Sump	Collection chamber from which water is drawn
Screen/ strainer	Sieves objects entering the pipeline
Washout	Pipe and valve that is opened to allow cleaning of the chamber
Perimeter Fence	Boundary to stop livestock & children from entering source area
Compensation pipe	Pipe at the bottom of the intake weir to allow for downstream flow regardless of level of water above weir

Step 2: Intake Specific O & M tasks

Discuss the tasks relevant to the operations and maintenance of the system components. These may include:

- Patrol catchment area for damage/harmful activities;
- Report catchment degradation to WRUA and WRMA;
- Patrol perimeter fence and repair;
- Clear weir wall and screens of any debris;
- Check walls or supports for any damage, undercutting, bypassing and repair;
- Open washout on weir wall and remove accumulated silt;
- Open washouts to clear out silt from chambers;
- Clear screen of any material and replace if damaged;
- Disinfect spring box if someone has entered;
- Read master meter.

Step 3: Troubleshooting

Discuss the potential unexpected problems, what might be the causes and the solutions.

Spring Intakes

Problem	Probable cause	Possible solution
Leaking gate valve	Worn out valve	Replace stuffing box packing in gate valve or replace entire valve
No/ little water flowing into intake chamber	Inlet pipe blocked	Inspect source and unblock pipe
Overflow from intake	Gate valve blocked	Remove and clear valve

chamber	Blockage in pipeline (e.g. airlock) Damaged strainer Clogged strainer	(replace if necessary) Check/open nearest air valve Replace strainer Clean strainer
Dirty water	Silt in chamber	Clean out chamber

River Intakes with Weir Wall or Sump

Problem	Probable cause	Possible solution
No/ little water flowing into intake chamber or sump	Screens on inlet chamber clogged	Clean screens
Erosion around side of weir wall	Insufficient height of wing and cut off walls to prevent flow around the weir	Construct or raise wing and cut off walls to prevent flow around weir
Undercutting of weir wall on downstream toe or undercutting of sump	Excessively turbulent flow over weir wall and insufficient width of downstream apron	Provide protected apron (concrete, grouted rip rap, etc) at toe of weir wall or around base of sump.
Dirty water	Excessive sediments upstream of weir wall Silt in intake chamber or sump	Clean out sediments from area immediately upstream of weir Clean out chamber Protect catchment from severe erosion.

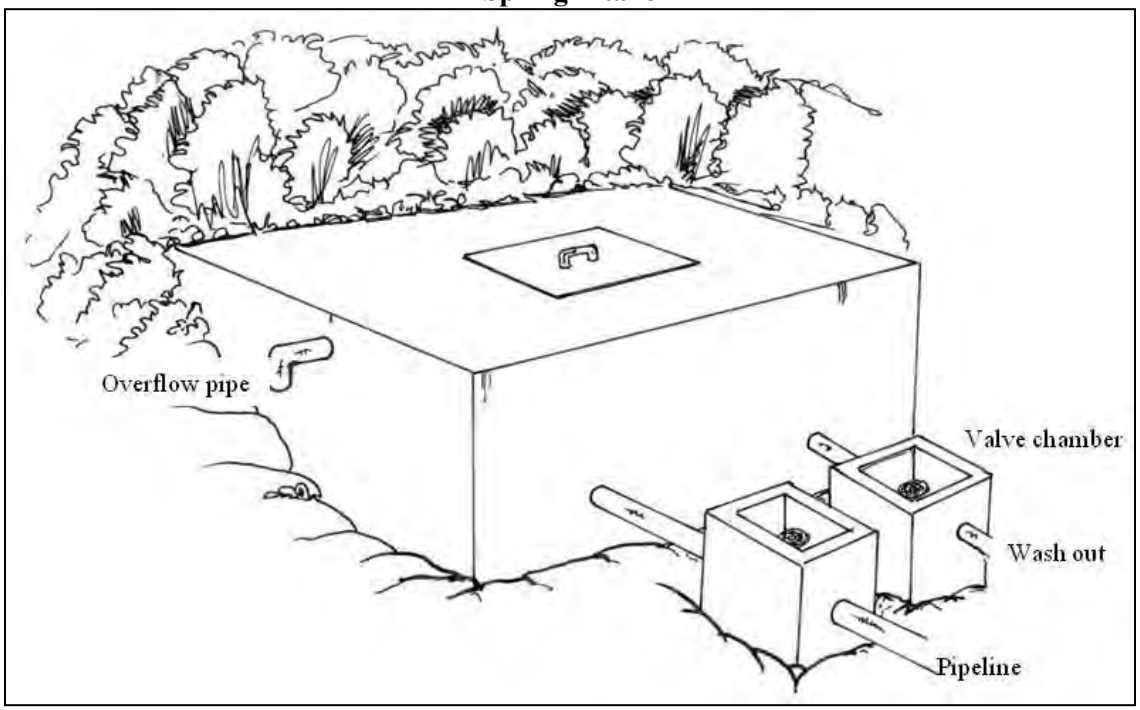
Infiltration Gallery

Problem	Probable cause	Possible solution
No/ little water flowing into intake chamber or sump	No water within sandy material in river bed Perforated pipe is blocked or damaged	Excavate shallow well to determine whether there is water in the sand in the river bed Remove filter drain and draw off pipe and reconstruct infiltration gallery. Consider additional protection for draw off pipe
Dirty water	Filter material (gravel/sand) washed away and replaced with silt or silt laden sand Silt in intake chamber or sump	Check condition of filter drain. Replace filter material if required. Consider additional protection of filter material. Clean out sump

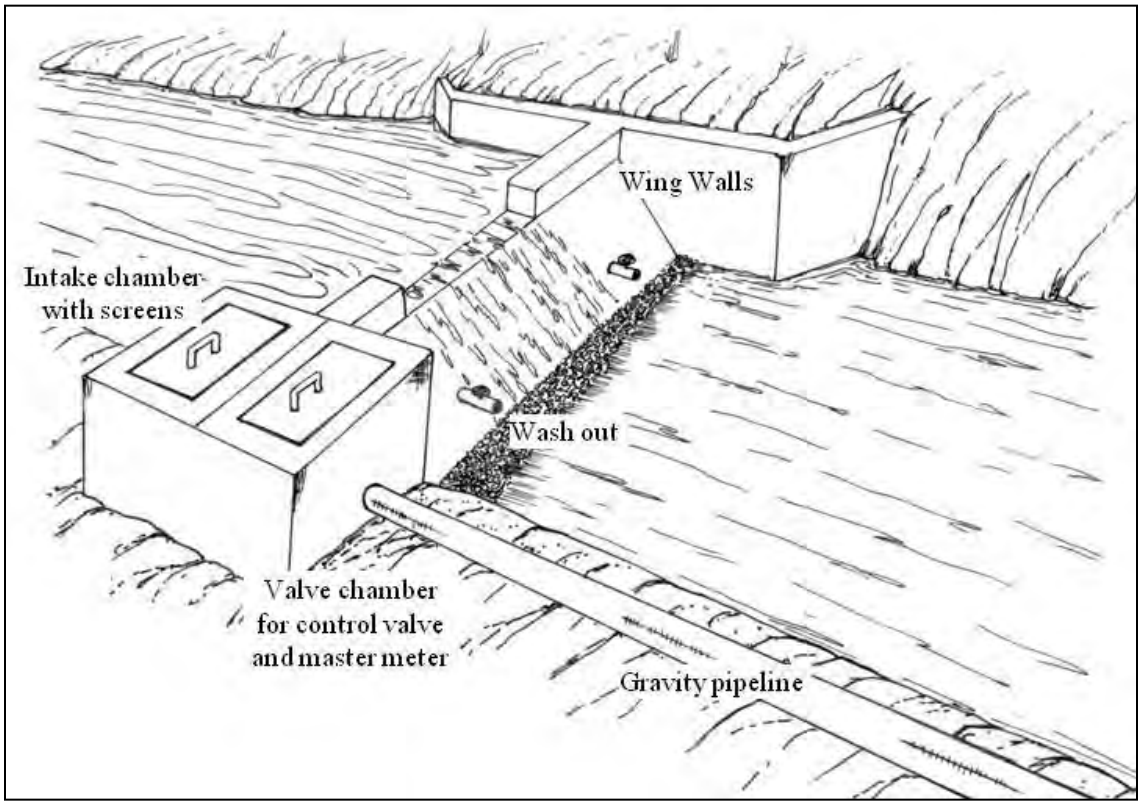
Step 4: Spares, Tools, & Technical Assistance	Tools - See Module H1. Spares – include: • Mesh for screens; • Valves • Masonry materials Supply Chain – most intake materials can be purchased at a well provisioned hardware store. Technical Assistance – technical assistance should be sought if the spring source diminishes without explanation. It is important that no back-pressure is placed on the source in a spring intake otherwise the eye of the spring may shift. Technical assistance may be required in a river intake if excessive or repeated erosion takes place around the weir or sump to determine a more durable solution to the problem. Technical assistance should be obtained to determine a robust solution if the infiltration gallery frequently gets washed out or blocked.
Review	• What are the main risks to the proper operation of the intake? • Is the WUA staff able to confidently handle the O & M tasks that are required? • Are there clear issues that should be forwarded to the WRUA, government water officials, WRMA and NEMA in regard to catchment management.
Session Attachments	Attachment 1: Diagram of different intakes

Attachment 1: Diagrams of different Intakes

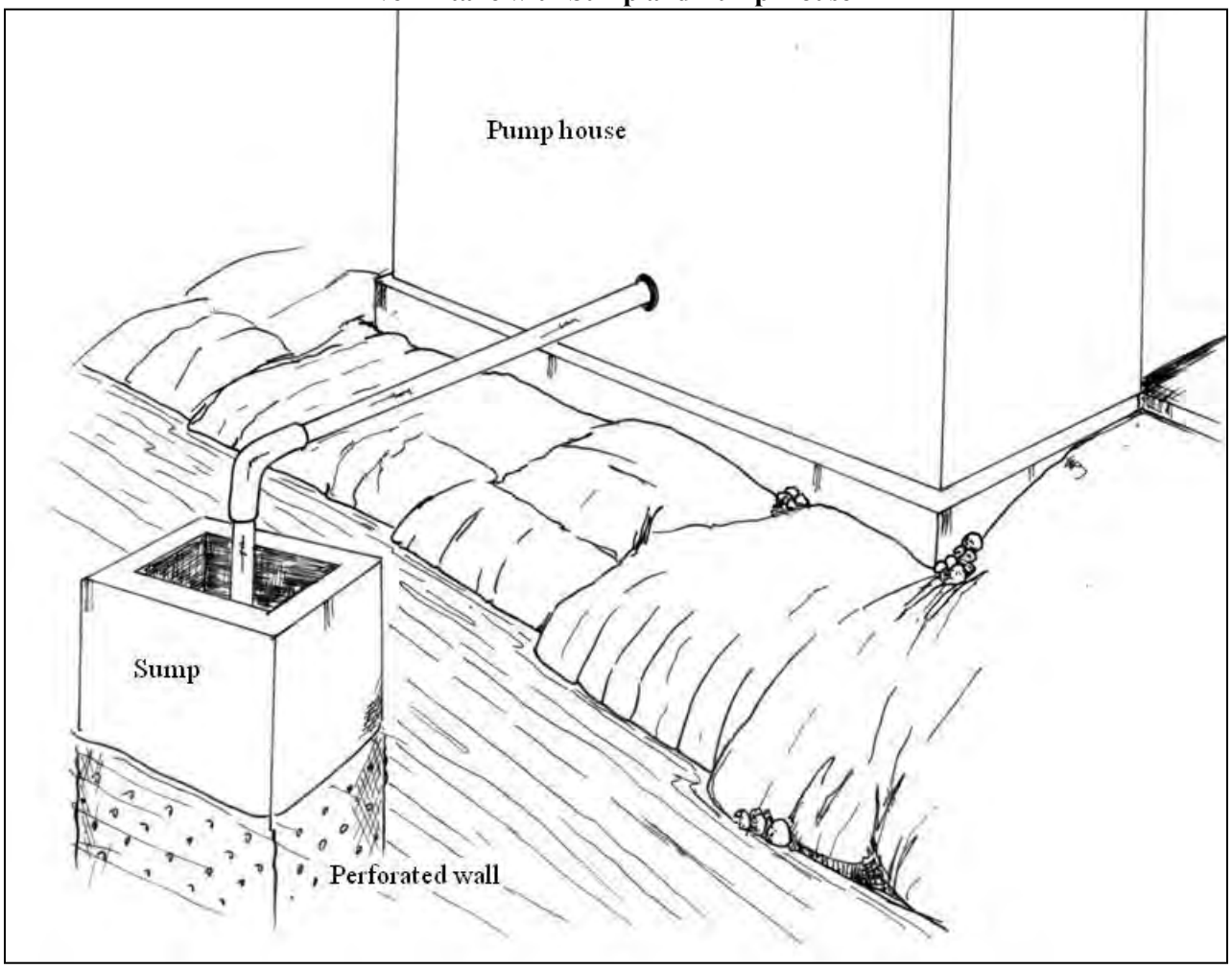
Spring Intake



River Intake with Weir



River Intake with Sump and Pump House



<table>
<tr><td>MODULE H</td><td>OPERATION AND MAINTANANCE</td></tr>
<tr><td>SESSION H6</td><td>SHALLOW WELLS</td></tr>
<tr><td>Appropriate Facilitator Background</td><td>Water technician with experience in maintenance and repair of open shallow wells</td></tr>
<tr><td>Introduction</td><td>This session covers shallow wells. Water is drawn by a variety of methods. Reference should be made to the session that covers handpumps and other types of water lifting devices, if relevant.</td></tr>
<tr><td>Objective</td><td>At the end of the session, the participants will be able to:

• Identify the main components of their shallow well
• Describe the functions of the key components
• Carry out well maintenance</td></tr>
<tr><td>Outputs</td><td>An Operation and Maintenance Schedule</td></tr>
<tr><td>Timing</td><td>Session should take approximately 2 hr</td></tr>
<tr><td>Target Group</td><td>Community members and water committee members</td></tr>
<tr><td>Appropriate Venue</td><td>At a community shallow well</td></tr>
<tr><td>Methodology</td><td>This is intended to be a PRACTICAL session. The components will be taught by demonstration on the system itself, not using drawings or description. The flip chart can be used to illustrate details if necessary. Reinforce the learning by allowing participants to identify components and describe their functions to each other.</td></tr>
<tr><td>Materials</td><td>Depends on extraction method</td></tr>
<tr><td>Session Guide</td><td></td></tr>
<tr><td>Step 1: System Identification</td><td>System Components

Potential system components are listed below. The facilitator should identify those components that are observed in the community shallow wells. Discuss issues related to each component.

<table>
<tr><th>Item</th><th>Description</th></tr>
<tr><td>Head wall</td><td>Wall built at the surface to prevent accidental entry into the well and to prevent runoff from entering the well</td></tr>
<tr><td>Extraction System</td><td>There are a variety of possible extraction systems for open wells:
• Human ladder
• Rope & Bucket
• Rope & Washer pump
• Windlass
• Handpumps (discussed in different session)
• Manual Pump (e.g. Moneymaker or similar within the limit of its suction head)
• Motorised/diesel powered portable pump
• Solar powered pump</td></tr>
<tr><td>Apron</td><td>Hard material (concrete slab) around well head to provide a clean and safe area for</td></tr>
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<table>
<tr><td></td><td>
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<tr><td></td><td>users to draw water and to prevent seepage of contaminated water into the well.</td></tr>
<tr><td>Well lining</td><td>Hard material (e.g. concrete rings, brickwork, plastic culverts, etc) that is used to prevent the walls of the well hole from collapsing</td></tr>
<tr><td>Drain</td><td>Constructed integrally with the apron to remove waste water away from apron and well head</td></tr>
<tr><td>Perimeter fence</td><td>Made from local material, to prevent unwanted access to well area</td></tr>
</table>
</td></tr>
<tr><td>Step 2: O & M Tasks</td><td>The facilitator should lead a discussion on how the well and extraction system is operated and maintained at present, drawing out issues. Relevant issues may include:

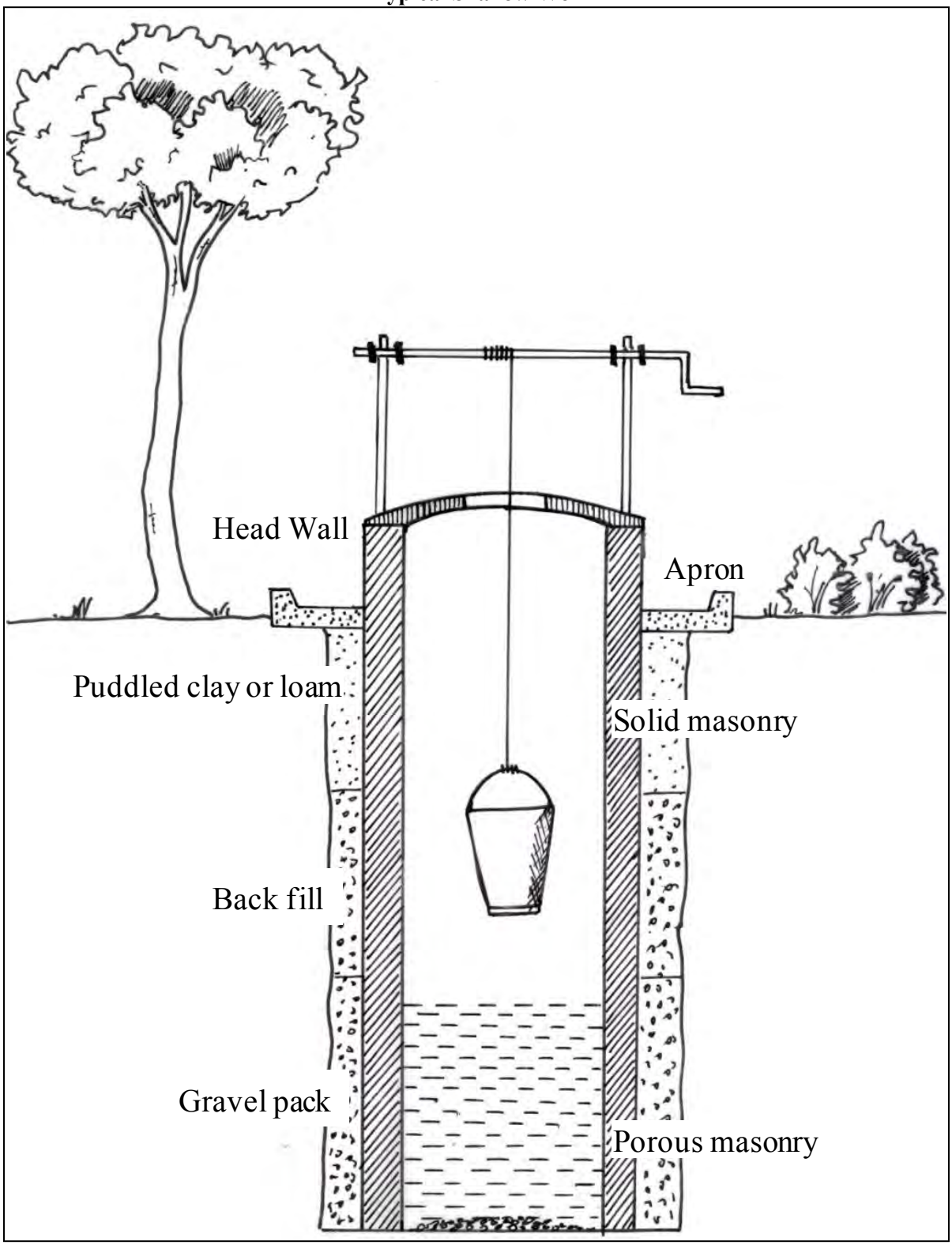
• Safety – how to prevent children from falling into well;
• Inspect perimeter fence and system for controlling access to well area;
• Is well „protected' or „unprotected'? What does this mean?
• Contamination of the water – how to prevent contamination by runoff, dirty buckets or unwanted things being put into the well;
• Method of extraction – the need for a system that can be used safely and reliably by children, women, and men;
• Inspect extraction system and check for wear or damage. Repair or replace as necessary;
• Inspection and repairs to the head wall and apron;
• Inspection and cleaning of the well (removing silt or any debris from inside the well);
• Disinfection of the well through application of chlorine;
• Inspect well area and remove rubbish and any faeces.</td></tr>
<tr><td>Step 3: Trouble Shooting</td><td>Discuss the potential unexpected problems and what might be the causes and solutions.

<table>
<tr><th>Problem</th><th>Probable cause</th><th>Possible solution</th></tr>
<tr><td>Collapsing well</td><td>Poor construction – usually insufficient well lining and well head</td><td>Repair/improve well lining, head wall and apron.</td></tr>
<tr><td>Well goes dry</td><td>Water level falls
Water is extracted faster than the recharge rate</td><td>Deepen well – there is a limit to how deep a well can be safely excavated. This depends on the surrounding material</td></tr>
<tr><td>Well washed out by floods (in cases where well is placed in river bed)</td><td>Placing a well in a water course is risky and prone to damage due to the turbulence and force of the flood waters, and objects</td><td>Seek a safer place to construct the well – usually at the edge of the water course
Alternatively, protect well from flood water</td></tr>
</table>
</td></tr>
</table>

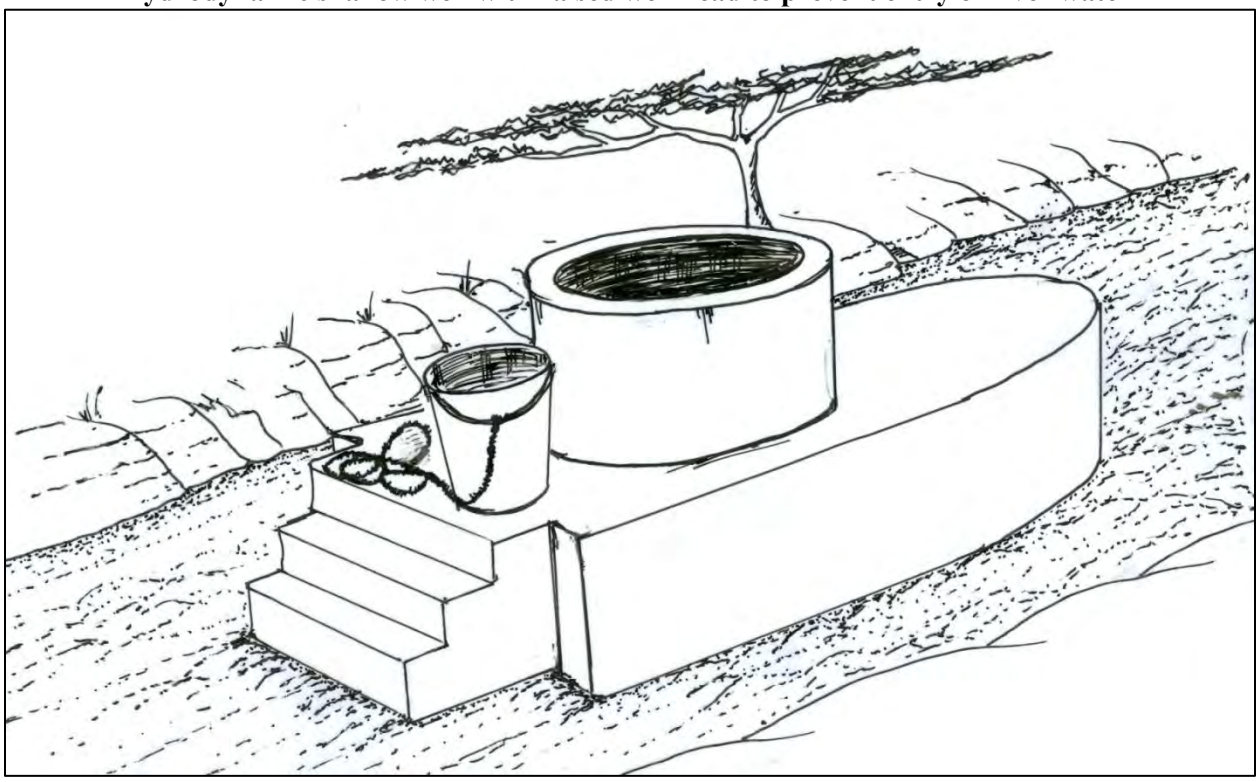
		(e.g. logs, rocks) carried by the flood waters	by building hydrodynamic wellhead
	Well silted due to flooding	Wrong placement of well in flood prone area or insufficient height on the well head to prevent runoff inflow	Raise the well head above flood level
Step 4: Spares Tools & Technical Assistance	Tools • Shovels, buckets, ropes and ladder to enable desilting of well • Masonry tools for repair to wellhead and apron. Spares • Chlorine compound for well disinfection • Materials for the extraction system Supply Chain – O & M materials can be purchased at a well provisioned hardware store. Technical Assistance - Desilting a well is a task that requires experience to enter and work in the confined space of a well. This experience is usually available within the village.		
Review	• What are the main risks to the water users from using the wells and drinking the well water; • Have reasonable steps been identified and taken to minimise risks to water users and those drawing water? • What steps should be taken to improve water quality from the wells?		
Session Attachments	Attachment 1: Diagrams of wells		

Attachment 1: Diagram of wells

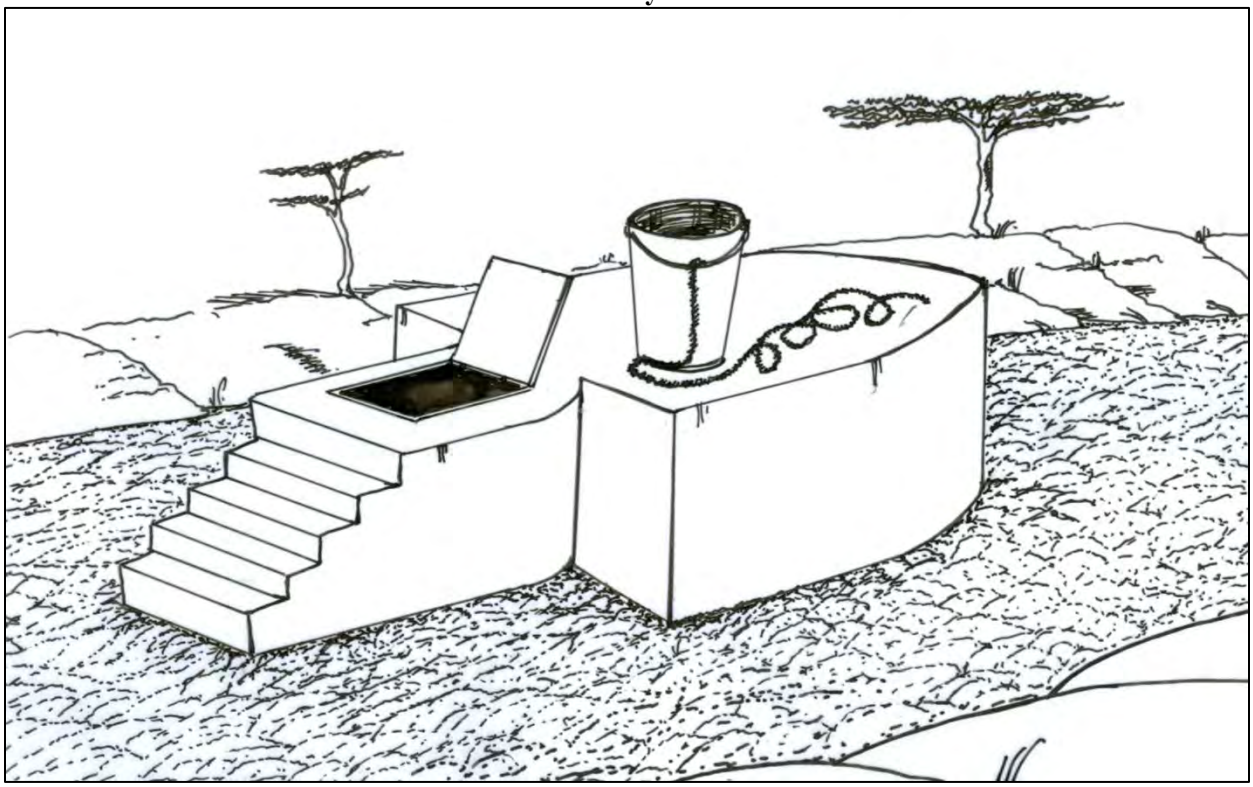
Typical Shallow Well



Hydrodynamic shallow well with raised well head to prevent entry of river water



Shallow well with hydrodynamic well head protection and lid to prevent damage to well head and entry of river water



MODULE H	**OPERATION AND MAINTANANCE**
SESSION H7	**BOREHOLES WITH SUBMERSIBLE PUMPS**
Appropriate Facilitator Background	Water technician or engineer with experience on operation and maintenance of boreholes
Introduction	Borehole systems typically include a number of different components. Most of these components are discussed individually under the sessions on generators, tanks, consumer water points and pipelines. This session is intended to be an INTRODUCTION to Boreholes.
Objective	• Participants will be able to identify the different components of the borehole system • Participants will have developed an Operation and Maintenance Plan
Outputs	An Operation and Maintenance Plan
Timing	Session should take approximately 2 hrs
Target Group	Community members and water committee members
Appropriate Venue	At a community borehole
Methodology	Site Walk, Question & answer, demonstration
Materials	Flip charts, pens, flash cards
Session Guide	
Step 1: System Overview	In combination with a site walk, ask the participants to identify each component of their borehole system and discuss the purpose of the component. The following components are typically found:

Item	**Purpose**
Borehole	Protected hole which penetrates to the aquifer and which is filled by water from the aquifer.
Wellhead	Prevents surface water from seeping down the edge of the casing and entering the aquifer or borehole
Borehole casing	Casing prevents the hole from collapsing.
Screens	Perforated parts of the casing to allow water from the aquifer to enter the borehole.
Seal	Prevents seepage water from moving from higher aquifers or near surface to lower aquifers
Submersible electrical pump	Raise water from aquifer to tank. The pump is located in the hole and is protected by the borehole casing.
Rising Main	Water is raised from the pump to the tank through the rising main
Dipper tube	Dipper tube allows the water level in the borehole to be measured
Meter	Measures volume of water extracted by the borehole from the aquifer
Pump House	Structure which usually contains the control panel. If the pump in use is an electrical submersible, then the pump house is also likely to contain the generator or the circuit board for the mains electricity power.
Generator („Genset')	Provides electricity to run the pump. Generator may also be a standby for when mains power is not available. Generator is driven by a motor/engine

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<tr><td></td><td>which may be diesel powered.</td></tr>
<tr><td>Control panel</td><td>The control panel is a set of electrical circuits whose purpose is to control the power to the pump.</td></tr>
<tr><td>Fuel Store</td><td>A well ventilated and secure store for fuel</td></tr>
<tr><td>Tank</td><td>Borehole water is typically raised to ground or elevated tank from which water is distributed to the consumer points.</td></tr>
</table>
</td></tr>
<tr><td>Step 2: O & M tasks specific to boreholes</td><td>Discuss the tasks relevant to the operations and maintenance of the system components. Note that specific sessions have been provided for generators, solar-voltaic powered systems, wind pumps, tanks, and consumer points.

Tasks may include:
• Check pump house and fuel store structures for defects and repair as required.
• Sweep and clean pump house;
• Read and record current to pump;
• Read and record voltage to pump;
• Read and record electricity meter reading (daily);
• Read and record water meter readings (daily);
• If no meter, measure discharge from borehole using either a bucket and stopwatch or recording the time to fill the storage tank (remember to close all outlets to the tank);
• Calculate the power production ratio on a monthly basis (m^3/Kw-hr). This is the water quantity produced by one Kw-hr. A reduction in the ratio indicates that the pump is not working efficiently or there is increasing resistance in the rising main;
• Once per year, take a 2 litre water sample (use a clean drinking water bottle) and send for chemical analysis. Changes to the water quality can provide early indication of borehole or aquifer problems;
• Check borehole permit and renew if required;
• Pay water use charges to WRMA.</td></tr>
<tr><td>Step 3: Trouble Shooting</td><td>Discuss the potential unexpected problems and what might be the cause and solution. In general, all remedial action should be taken by skilled and qualified staff.

<table>
<tr><th>Problem</th><th>Probable cause</th><th>Possible solution</th></tr>
<tr><td>Pump fails to start</td><td>• Broken or loose electric connection
• Blown fuse- check the installation before replacing fuses
• Motor overload
• Low voltage
• Damaged supply cable insulation- check insulation resistance
• Cable- cable joint</td><td>Check power source
Check switches
Check fuses
Call for Technical Assistance</td></tr>
</table>
</td></tr>
</table>

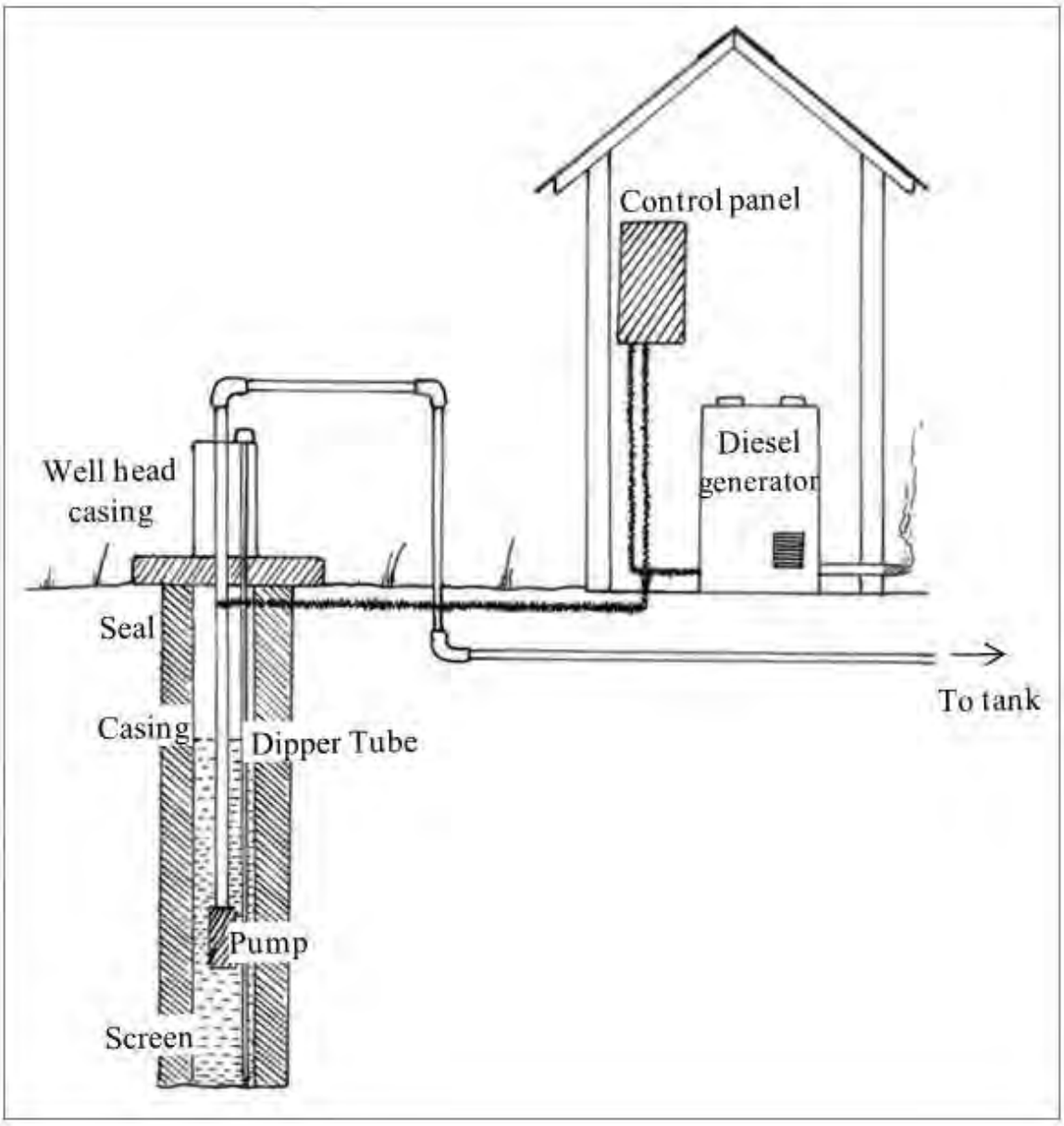
		or motor windings may be wet or earthed • Impeller plugged *(Pump blocked with sand)*	
	No water from borehole	• No power to pump • Pump is faulty and not working • Pump not submerged (pump set too high or water level has fallen) • Pump rotating in the wrong direction • Leak(s) in riser pipe joints or corroded pipe • Riser pipe joint threads corroded and disconnected • Non-return valve in pump blocked or corroded • Valves or discharge line blocked, damaged or not full open • Worn pump due to pumping sand or other particles • Strainer or impellers blocked with sand or chemical deposits • Blocked or damaged borehole screen • Pumping head too high for pump	Check power source. Check switches Check fuses Check depth of water in borehole Call for Technical Assistance
	Pump turns on and off frequently	Excessive drawdown. Capacity of pump exceeds borehole yield so water level drops below level of pump	Call Technical Assistance to investigate in detail. This may require test pumping, monitoring water level in borehole, changing pump, or lowering

			pump in borehole.
	Pump overload switch trips out	• Current overload/motor temperature sensor- possible causes: blockage, insufficient flow of water over motor, overload due to mechanical problems, low voltage • Under-voltage- Low voltage on supply system • Incorrect oil level in dashpot operated overloads • Low-level cut-out – excessive drawdown • Incorrectly set overloads- check settings.	Call Technical Assistance
	Borehole delivering less water than expected	Screens are blocked Leaks in riser pipe	Call Technical Assistance to determine whether plunging borehole will result in improved yield. Remove riser pipe and repair/replace
	Persistent case of sediments in borehole water (i.e. not immediately after borehole development)	Sediments are passing through the screens	Depending on the nature of the sediments, the sediments may be damaging to the pump. Check water quality
	Water quality is too saline	Water in the aquifer is saline	This is a feature of the aquifer and only surface treatment of the water (through reverse osmosis) can be used to make water potable.
Step 4: Spares, Tools, & Technical Assistance	• See Modules related to pumps, tanks, pipelines and consumer points Technical Assistance – technical assistance should be sought from a registered hydrogeologist (List of registered hydrogeologists available from the DWO) in the event of down borehole problems. A specialised or electrician is required for generator or electric problems and a specialised mechanic is required for problems with the motor/engine to the generator.		

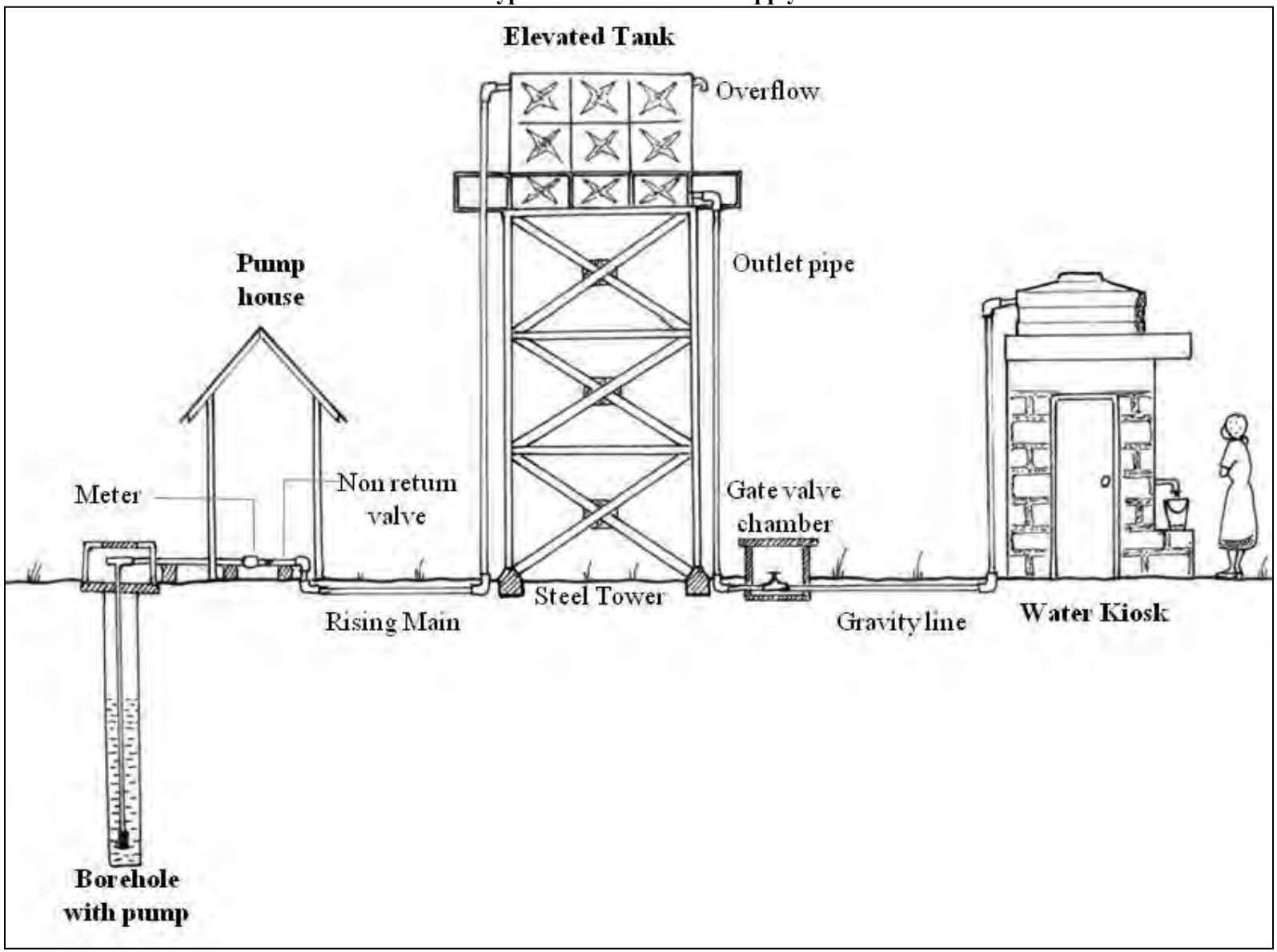
Review	• Where is the pump? • What does the ‚genset' do? • What will the WUA do when the genset runs but there is no water?
Session Attachments	Attachment 1: Drawing of Borehole Attachment 2: Typical Borehole Water Supply

Attachment 1: Drawing of Borehole

Borehole with Submersible Pump



Typical Borehole Water Supply



MODULE H	**OPERATION AND MAINTENANCE**
SESSION H8	**ROOF CATCHMENT SYSTEMS FOR RAINWATER HARVESTING**
Appropriate Facilitator Background	Facilitators should be familiar with the installation of roof catchment systems for rainwater harvesting (RWH). Technical training in water engineering, civil engineering or building construction would be an advantage.
Introduction	• RWH is of increasing importance in view of the difficulties associated with the provision of clean piped water on a dependable basis to a growing population. • RWH can play an important role in promoting health as more water of better quality is available close to the homestead for washing hands, bathing, cooking and drinking. • RWH can reduce the labour of fetching water from streams and ponds. In dry seasons girls sometimes miss school on account of the need to fetch water. • RWH can provide supplementary irrigation for small gardens and support the production of vegetables, tree seedlings, etc in dry periods.
Objective	• To create awareness of the potential and procedures for rainwater harvesting from roofs in different climatic regions. • To enable participants to understand the problems associated with rainwater harvesting from roofs and how they may be solved. • To assist participants to expand rainwater harvesting from roofs in cost-effective ways.
Outputs	• Community support for the installation and maintenance of rainwater harvesting systems. • Expansion of effective rainwater harvesting systems in the area. • Participants informed about how to solve problems and where to get technical or financial assistance when needed. • Participants informed about the health risks (usually negligible) associated with drinking untreated rainwater that has been harvested from roofs.
Timing	Steps 1 and 2 should each take between 1½ hours. With a break between the main points can be covered in a morning. The afternoon can be devoted to a field visit taking 1 ½ hrs followed by a wrap up session of ½ hr. This requires a total time of about 5 hours.
Target Group	Committee & Community Members
Appropriate Venue	Inside a building or under a tree if the weather is fine.
Methodology	• Short presentation, informal, participatory. • Question and Answer
Materials	• - Photocopies of different installations, flip charts, pens,
Session Guide	
Step 1: Awareness Creation	Find out from participants what experience they have had with rainwater harvesting and what problems they have encountered. Find out from participants: i. How many live in houses where rainwater is harvested. If not, why not? ii. How many use rainwater either from the house where they live or a nearby building, e.g. school. iii. How many use rainwater for drinking and cooking, for bathing, for washing clothes, for cleaning, for irrigation of plants. iv. How many think that they could, or would like to, collect and use more rainwater. v. Find out how participants perceive the potential for RWH and what the obstacles to collecting and storing it are.

<table>
<tr><td></td><td>vi. Develop a list of the main issues to be addressed in the training.</td></tr>
<tr><td>Step 2: Understanding how to deal with problems</td><td>Work through each issue to facilitate understanding e.g.
• Uncertainty of rainfall. How to plan utilization of water.
• Difficulty of knowing how to match the tank size with the roof size.
• Problems of gutters and down-pipes: how to prevent overflow and leakage.
• Problems of tanks and draw off: how to deal with leakage.
• Safety of rainwater: the causes and avoidance of contamination.
• Finance: how to source finance and minimize costs without loss of efficiency</td></tr>
<tr><td>Step 3: Field visit</td><td>• Visit one or more buildings where rainwater harvesting has been installed and carry out an evaluation of the installation, maintenance and utilization. Participants could work in pairs and if possible each pair could visit different buildings and then report to a plenary what they have observed.
• Visit a site where a leaking tank is under repair to understand possibilities.</td></tr>
<tr><td>Step 4: Specific O & M Tasks for RWH Systems</td><td>Discuss the tasks relevant to the operations and maintenance of the system components. These may include:
• Inspect gutters for cracked joints or loose brackets
• Clean gutters of silt and organic material
• Clean or replace mesh/sieve
• Check tap and replace washer if tap is leaking;
• Check drainage from draw off point and improve drainage if required
• Clean out tank
• Disinfect tank
• Where feasible, ensure water is retained in tank to avoid cracking</td></tr>
<tr><td>Step 5: Trouble Shooting</td><td>Discuss the potential unexpected problems, what might be the causes and solutions.

<table>
<tr><th>Problem</th><th>Probable cause</th><th>Possible solution</th></tr>
<tr><td>Water does not enter tank</td><td>Blockage in downpipe

Gutter is not installed at a gradient to allow water to flow to the tank; gutter sag</td><td>Remove blockage
Clean or replace screens
Check levels on gutter and reset levels if required; put more brackets on the gutter</td></tr>
<tr><td>No water in tank</td><td>Leaky tap
Leaky tank
Overuse</td><td>Check for leaks and repair
Monitor usage</td></tr>
<tr><td>Water does not last long after end of rains</td><td>Storage volume is low compared to consumption</td><td>Regulate consumption
Provide additional storage if more water can be harvested. However, check whether tank usually overflows. If not, then additional roof area and storage is required.</td></tr>
<tr><td>Smelly water</td><td>Organic matter in tank decomposing</td><td>Drain tank and clean tank</td></tr>
</table></td></tr>
<tr><td>Step 4: Spares, Tools, & Technical</td><td>Tools – see tools listed in Module H2.</td></tr>
</table>

Assistance	Spares – include: • Tap washers • Mesh Supply Chain – O & M materials can be purchased at a well provisioned hardware store. Technical Assistance – RWH is a technology that generally does not require external technical assistance.
Review	• Ask participants to explain the potential and constraints to the expansion of rainwater harvesting in the area. • Ask participants to explain the main problems with RWH as currently practiced. • Draw up a draft schedule to manage a rainwater installation at a school showing what action is needed at which time of the year. • Ask participants what should be done to expand RWH in the area.
Session Attachments	Attachment 1: Handout on maintenance of RWH systems and safety precautions when using rainwater harvested from roofs. Attachment 2:Exercise on RWH system

Attachment 1: Components of Rainwater Harvesting System

1. System Components

The system of rainwater harvesting from roofs has four main components: the roof, the gutters, the downpipe and the tank. These are discussed briefly.

(a) Roof
The most suitable roofs for rainwater harvesting are made of tiles, galvanized metal sheets (mabati), concrete or roofing felt. Roofs that are thatched with grass or makuti (palm leaves) can also be used though the water harvested is not as clean and may be tainted. Roofs with asbestos cement sheeting are not recommended for rainwater harvesting because asbestos has carcinogen properties.

A flat roof with a concrete or tiled surface can provide a good catchment surface. Roofing felt is less satisfactory.

Plastic sheets placed over thatch or used for greenhouses can be very useful for harvesting rainwater.

(b) Gutters
Gutters are normally made from sheet metal or plastic. Metal gutters are made in sections that can be bolted or soldered together. Plastic gutters are made in sections that are either glued together or connected with plastic connecter pieces. Certain types of bamboo with large stems can be used if they are split lengthwise and the joints are cleaned out. Some roofs on large buildings have concrete gutters as an integral part of the roof. The brackets supporting the gutters should be placed close enough so that the gutters cannot sag when full of water.

(c) Downpipes
Downpipes are normally metal or plastic. Tall buildings sometimes have a chain to carry water to the ground.

(d) Tanks
Tanks have traditionally been brick, stone, reinforced concrete, rubble stone or plastic. Tanks made of galvanized corrugated iron are common but prone to rusting and leakage after a few years. Tanks made of sheet metal are used in some parts of Kenya. Oil drums can be used and may be plastered inside with cement plaster to reduce contamination. Black plastic tanks have proved advantageous in many situations because they are light and easy to move. They are especially useful where building materials such sand and stone are hard to get or very expensive. Tanks are normally placed on a plinth about 50 cm from the ground to facilitate filling buckets and jerry cans at the outlet. Where the roof is low this may not be possible and a pit may have to be dug with steps to access the outlet. Pipe inlet to tanks, and tank overflow pipes should be at the top so that no storage space is wasted. Details on tanks are given in a separate section of the manual.

2. Maintenance

(a) Roof
A well made roof should not require maintenance except to prevent leaks. Flat roofs need to be swept periodically to remove leaves and other trash.

(b) Gutters
The main problem with gutters is overflowing during heavy storms and leakage from joints. Overflowing can be due to the accumulation of trash, so cleaning the gutters should be a routine measure before each

rainy season. In order to minimize leaves dropping into gutters it is advisable to cut back the branches of any trees overhanging the roof. Overflowing may also be due to a failure in design. Either the gutter is not large enough in relation to the size of the roof or it has insufficient slope to the outlet. Also placing brackets too far apart can cause the gutter to sag and lead to overflowing. Leakage at joints may be prevented using a bitumen sealant.

As a rough guide, there should be 1 square cm of gutter cross section for every square metre of roof area. Gutters should normally have a 1% slope to the outlet. Gutters are normally semi-circular or square shaped. It may sometimes be cheaper to make V shaped metal gutters and to install splash guards to ensure that runoff from the roof does not shoot over the gutter during heavy storms. These gutters can be installed where there is no facia board attached to the end of the rafters.

(c) Downpipe
Downpipes often have bends at the top where they connect to the gutter. If bends are at 90 degrees they are at risk of blocking with leaves and trash. 45 degree bends should be used as they are less likely to block.

(d) Tank
The main concern is to prevent rubbish, insects, rats, etc entering the tank and polluting the water. There must be a tight lid that is large enough to allow cleaning periodically. Prevention of mosquitoes breeding is important and can be achieved using a screen around the lid and the inlet to the tank. There are two approaches to removing trash. One is to have a first flush device which diverts water at the beginning of the rainy season into a container from which the trash can be removed periodically. Once it is full the rainwater goes straight to the tank. Another arrangement is to have a self cleaning mesh screen over the entrance to the tank. If the screen is at 45 degrees most of the rubbish will be washed off while most of the water goes into the tank.

Leaking or broken taps are a major problem with tanks. Where the tank is a communal water point, the tap should be lockable or enclosed in a lockable box. Leaks are often caused by worn out washers which are easily replaced if the necessary tools are available (usually a pipe wrench and/or adjustable spanner).

A tank should be cleaned from time to time depending on the amount of trash that comes in with the rainwater. This can be done when it is empty or nearly empty. If the tank is a large one a ladder will be needed for a person to climb in.

Leaking tanks can often be repaired and made usable again. Methods of repairing different types of tanks can be found by searching the internet under www.infonet-biovision.org-water storage.

Water quality
Rainwater can be of very good quality if roofs, gutters and tanks are kept clean. However, droppings of birds, lizards, etc can cause some contamination. If rainwater is used for drinking it will be safer if it is treated with a proprietary fluid such as Waterguard or Jik which contains chlorine. Care is needed to follow the instructions for using the chemical.

Attachment 2: Exercise on Rainwater Harvesting System

Trainees are invited to look at the drawing of a rainwater harvesting installation that is not working well and to try and identify the problems and suggest solutions.

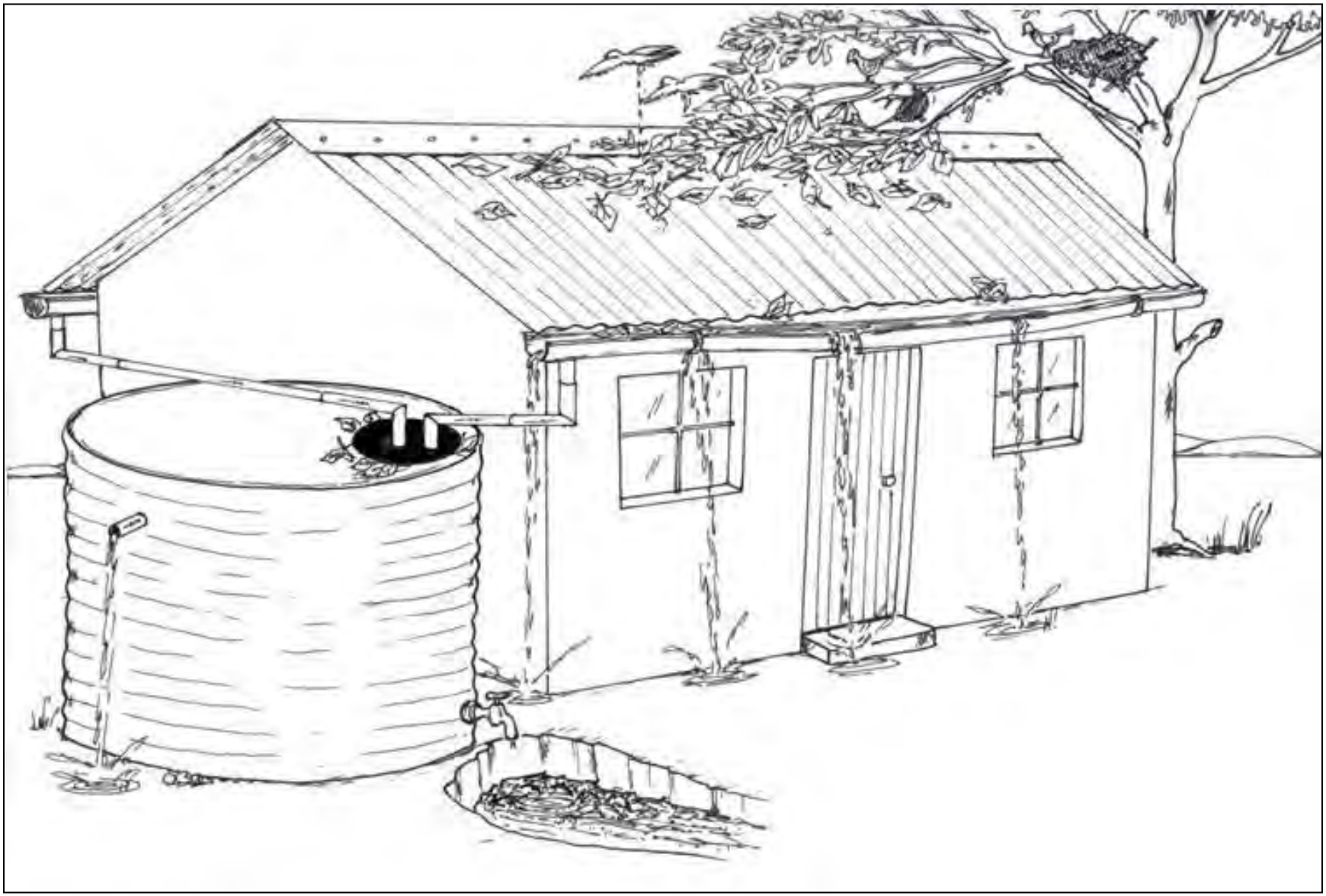
The Problems

1. The gutter brackets are too far apart and the gutter has sagged so that water is spilling.
2. One of the gutter joints is leaking.
3. The rainwater tank is overflowing which suggests that it may be not big enough to capture all the water from both sides of the roof.
4. The overflow from the rainwater tank is too low so the tank can never fill completely.
5. The outlet for drawing water from the tank is too high so all the water cannot be used.
6. The tank is sitting on the ground so to get a bucket under the outlet, a hole has been dug. This becomes wet and muddy because of spillage.
7. The top of the tank has no cover to prevent rat, lizards, etc falling in.
8. There is no gauze to prevent mosquitoes.
9. The trees over the house encourage birds to pollute the roof with droppings.
10. Leaves from the trees will block the gutters and down pipes.
11. The down pipe has a 90 degree bend which is liable to block with the leaves.
12. There is no mechanism to prevent trash passing straight into the tank.

Suggested Solutions

1. Put brackets closer together or use a stronger material for the gutter.
2. Repair leaks by soldering if the gutter is metal or use of bitumen sealant.
3. Look for a second tank to take water from the other side of the roof.
4. Close the existing overflow pipe and put a new one nearer the top of the tank.
5. Select or construct tanks with the outlet near the bottom.
6. Raise the tank on a plinth above ground level and make a drain to carry away any water that spills from the outlet.
7. Use a cover that rats and lizards cannot pass through.
8. Use mosquito gauze over the openings to the tank.
9. Cut back the branches of the trees so they don’t overhang the roof.
10. Clean the gutters before each rainy season.
11. If bends are needed in the down pipe use 45 degree bends.
12. See if it is possible to install a 45 degree self cleaning screen at the tank inlet.

TYPICAL RAINWATER HARVESTING SYSTEM



MODULE H	**OPERATION AND MAINTENANCE**
SESSION H9	**ROCK CATCHMENT SYSTEMS**
Appropriate Facilitator Background	Technical training in water engineering, agricultural engineering, or building construction. Experience with rock catchments would be an advantage.
Introduction	• Exposed rocks surfaces provide excellent opportunities for harvesting runoff. • The quality of water will not be as good as that harvested from roofs. There will often be sediment and organic matter. Therefore removal of sediment and treatment of water may be needed if the water is used for domestic purposes such as food preparation and drinking. • Water that is not good for domestic purposes can be used in many other ways e.g. for cleaning, watering livestock, watering plants, brick making, etc.
Objective	• Create awareness about the different ways that water can be harvested from rocks surfaces. • Establish the operation and maintenance requirements for rock catchment systems. • Explain common problems that can arise and how they may be solved.
Outputs	• Awareness of the potential for harvesting water from rocks surfaces. • Understanding of the issues related to water quality. • Awareness of problems that can arise and how they can be dealt with.
Timing	One session of introduction taking 1 to 1½ hrs followed by visits to sites. Where this is not possible, diagrams can be used to illustrate the issues.
Target Group	Committee & Community Members
Appropriate Venue	Inside a building or under a tree at a runoff harvesting site.
Methodology	- Short presentation, informal and participatory - Question and Answer
Materials	- Illustrations, flip charts, pens, - Digital camera (optional) (to record training activities)
Session Guide	
Step 1: Introduction to runoff harvesting from rock catchments	• Note that depending on the situation the main storage will be a reservoir on the rock or a tank below. • Give examples of successful rock catchment systems e.g. from Kitui District. • Explain the benefits that have arisen from the installation of these systems. • Discuss the problems that have arisen in the management of the rock catchment systems and the utilization of the water. • Explain how the problems have been resolved.
Step 2: System Components	Ask participants to identify the different components of their rock catchment system. Draw the system on a flip chart, naming each component. Discuss the purpose of each component. Refer to Attachment 1 in Session H10: Runoff Harvesting Systems from Ground Surfaces **Component** — **Purpose** Catchment area — The area that drains towards the rock

	catchment weir or tanks
	Gutter: Low wall that is built on the rock surface to direct the runoff water towards the collection point
	Dam: The dam stores the runoff water and spills any excess water
	Intake/filter box: Ballast acts as a partial filter and prevents sticks from entering the draw off pipe
	Draw off pipe: Gravity line that conveys water from the dam to the storage tanks
	Scour pipe: Used to flush out sediments from dam
	Storage Tanks: Covered reservoir where the water is stored
	Control valve: Controls the flow of water between the dam and the storage tanks
	Water kiosk: Point where consumers can draw water in a controlled way.
	There are many different rock catchment systems, each developed to suit local conditions. In analysing the system components, it is useful to consider the role of the dam: 1. Is the purpose of the dam purely to provide short term storage to collect water and allow it to drain to the storage tanks, or 2. Is the dam acting as the principle storage volume for the system? In the first case, the dam does not have to be large or necessarily entirely water tight as the principle storage is in the storage tanks. In the second case, any leaks will reduce the reliability of the system and maintaining reasonable water quality is a challenge as the water is continually exposed to contamination and algae growth.
Step 3: Rock Catchment Specific O & M Tasks	Discuss the tasks relevant to the operations and maintenance of the system components. These may include: • Monitor pollution of the rock surface by wild animals, livestock and/or human activity; • Develop and enforce bylaws for the protection of the rock catchment; • Patrol and repair the perimeter fence; • Patrol the gutter and repair as needed; • Monitor for leakage along contact line between dam/weir and rock surface; • Open and close all gate valves once per month; • Maintain the ballcock/float valve on the tank to prevent all water draining out of weir – see modules on Tanks; • Clean silt out of the dam. This can be done manually or, if there some residual water in the dam, the silt can be flushed out through the scour pipe; • Wash and renew ballast in filter box; • Maintain storage tanks – see module on Tanks for details;

<table>
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Maintain water kiosk – see module on Consumer Points for details;
Remove any residual water from the dam to ensure there is no stagnant water that can become a breeding ground for mosquitoes.

</td></tr>
<tr><td>Step 4: Troubleshooting</td><td>Discuss the potential unexpected problems, what might be the causes and solutions.
<table>
<tr><th>Problem</th><th>Probable cause</th><th>Possible solution</th></tr>
<tr><td>Leakage along toe of dam wall</td><td>Poor design and construction</td><td>Monitor leakage
Plaster internal face of joint with waterproof sand/cement grout</td></tr>
<tr><td>Water in dam but no water in storage tanks</td><td>Control valve closed
Blockage along draw off pipe</td><td>Check control valve on draw off pipe
Remove blockage from draw off pipe</td></tr>
<tr><td>No water in dam after rainfall event</td><td>Break in gutters so runoff water is lost
No regulation of overflow from storage tank</td><td>Check and fix gutters

Check and fix float valve or system for controlling overflow from storage tank.</td></tr>
<tr><td>No water in tanks</td><td>Unregulated consumption</td><td>Control consumption.
Keep consumers informed of water availability</td></tr>
</table>
</td></tr>
<tr><td>Step 5: Spares, Tools, & Technical Assistance</td><td>Tools

Shovels, jembe, and wheel barrows for moving silt;
Masonry tools for undertaking repairs to gutter, dam and tanks
Pipe wrenches for pipework

Spares – include:

Valves for outlet
Taps and tap washers for water kiosk

Supply Chain – O & M materials can be purchased at a well provisioned hardware store.

Technical Assistance – technical assistance should be sought if the dam shows signs of excessive seepage, erosion of spillways and in cases where dam structural integrity is in doubt.</td></tr>
<tr><td>Review</td><td>

Ask participants to explain the potential and constraints to expansion of runoff harvesting from rock catchments
Ask them to outline the best practices for managing the water resource.

</td></tr>
<tr><td>Session Attachments</td><td>Attachment 1: Exercise on Rock Catchments and Runoff Harvesting</td></tr>
</table>

Attachment 1: Exercise on Rock Catchments and Runoff Harvesting

1. How much water can be harvested from a rock catchment?
For example, assume that the rock has a surface area of 0.5 ha from which runoff can be harvested. Assume that there is a heavy rainfall of 100 mm of which 40% gets trapped in cracks or evaporated. How much water can be collected and stored? [5,000m^2 x 0.1m x 0.6 = 30 m^3].

2. How long can the water last for human consumption?
For example, assume there are 100 people living in the area and each needs a minimum of 15 litres per day, how long can this water last? [The daily requirement is 100 x 0.015 = 1.5 m^3. Therefore the water can last 30/1.5 = 20 days].

3. How can the runoff be stored?
For example, assume there is a good rainy season with 200 mm rain and a potential to store 60m^3 how can it be stored? Some rock catchments have a natural valley that can be dammed with a concrete or masonry wall so that the main water storage is above the dam. Others have quite a limited area for storage so most of the water has to be stored in a tank or tanks below the dam.

Assume that there is room to store 40 m^3 above the dam and a tank is needed to store 20 m^3. If the tank height is 2 m what would be the diameter? [20 = 2 x 3.142 x r^2 therefore r = 1.78 m and the diameter of the tank would be 3.6 m].

If 2 x 10,000 litre black plastic tanks were purchased to store the 20 m^3 water the cost, excluding transport and installation, would be 2 x Kshs 77,000 = Kshs 154,000. [If one 20,000 litres tank is purchased the cost would be KShs 225,485 so it would be cheaper to have 2 x 10,000 litre tanks. It would also be more practical for transport and for management]. Note the prices are based on Roto Moulders price list of June 2011. The costs of transport and installation would have to be added.

If a 20 m^3 concrete or rubble stone tank were constructed the cost would depend on the availability of stone, sand, ballast and water nearby and the cost of cement, reinforcing, etc. Note that a concrete or masonry tank would require a roof to prevent pollution and reduce evaporation.

MODULE H	**OPERATION AND MAINTENANCE**
SESSION H10	**RUNOFF HARVESTING SYSTEMS FROM GROUND SURFACES**
Appropriate Facilitator Background	Technical training in water engineering, agricultural engineering, or building construction.
Introduction	• Runoff from roads, treated surfaces, and small catchments can be channelled into storage tanks (e.g. Berkads) and/or ponds for a variety of uses • Runoff harvesting from ground surfaces is similar to that of rock catchments except runoff harvesting systems typically rely on tanks/ponds below ground level.
Objective	• Create awareness about the different ways that water can be harvested from roads, treated surfaces and small catchments • Establish the operation and maintenance requirements for runoff harvesting systems. • Explain common problems that can arise and how they may be solved.
Outputs	• Awareness of the potential for harvesting water from runoff surfaces. • Understanding of the issues related to water quality. • Awareness of problems that can arise and how they can be dealt with.
Timing	One session of introduction taking 1 to 1½ hrs followed by visits to sites. Where this is not possible, diagrams can be used to illustrate the issues.
Target Group	WUA committee and community members
Appropriate Venue	Inside a building or under a tree at a runoff harvesting site.
Methodology	- Short presentation, informal and participatory - Question and Answer
Materials	- Illustrations, flip charts, pens, - Digital camera (optional) (to record training activities)
Session Guide	

Step 1: Introduction to runoff harvesting from roads, treated surfaces and small catchment areas	• Describe various types of runoff harvesting techniques
	• Discuss the pros and cons of various ground surfaces for runoff harvesting. These include:
	  ◦ Quantity of sediment and organic matter
	  ◦ Protection of catchment from pollution
	  ◦ Water quality
	  ◦ Water storage
	• Give examples of the use of roads for providing water for livestock, minor irrigation, etc.
	• Give examples of ground catchments that have been prepared using plastic sheets, Mazeras slabs, flat rocks, concrete, tarmac, etc.

Step 2: System Components	Ask participants to identify the different components of their runoff catchment system. Draw the system on a flip chart, naming each component. Discuss the purpose of each component. Refer to diagram in Attachment 1. **Component** — **Purpose** Catchment area — The area that drains towards the storage pond or tank Gutter or drain — Channel that directs water to the tank or pond Storage — Underground tank (e.g. Berkad) or pond

Sediment/silt trap	Small stilling basin designed to capture some of the sediment before it enters the storage tank
Tank Roof	Controls access to water Prevents sunlight which would result in algae growth
Manhole	Point of access to the water and into the tank
Ladder	Provides a safe way of entering the tank

1. Road Catchments

Road catchments have potential to harvest large amounts of runoff especially if the road has a tarmac surface. Such catchments are a major source of water for livestock in pastoral areas. Commonly the runoff is stored in pits or hollows from which material has been excavated for building up the road. Water reaches the reservoir from road drains or culverts. In some situations the water is conveyed to a constructed dam with an earth embankment.

Water from small rural roads can usefully be diverted into retention ditches with zero or slight gradient where it can facilitate the growth of fruits such as bananas and pawpaws.

2. Specially prepared surfaces

Water harvesting catchments can be constructed using stone slabs that are laid on a firm surface and plastered together or even laid on a heavy duty plastic sheet to prevent leakage. The ground should have a slight slope. Water is directed to the lowest point and stored in a pond or concrete storage tank. In some situations tarmac has been used to seal the surface. Concrete can also be used but is liable to crack under the heating and cooling temperatures that are characteristic of semi-arid and arid areas.

Step 4: Specific O & M Tasks for Runoff Harvesting Systems

Discuss the tasks relevant to the operations and maintenance of the system components. These may include:

- Monitor pollution/degradation of the catchment area by wild animals, livestock and/or human activity. Develop and enforce bylaws for the protection of the catchment.
- Patrol and repair the perimeter fence
- Patrol drains and inlet channels as needed
- Clean silt out of the silt trap and tank.

Step 5: Trouble shooting

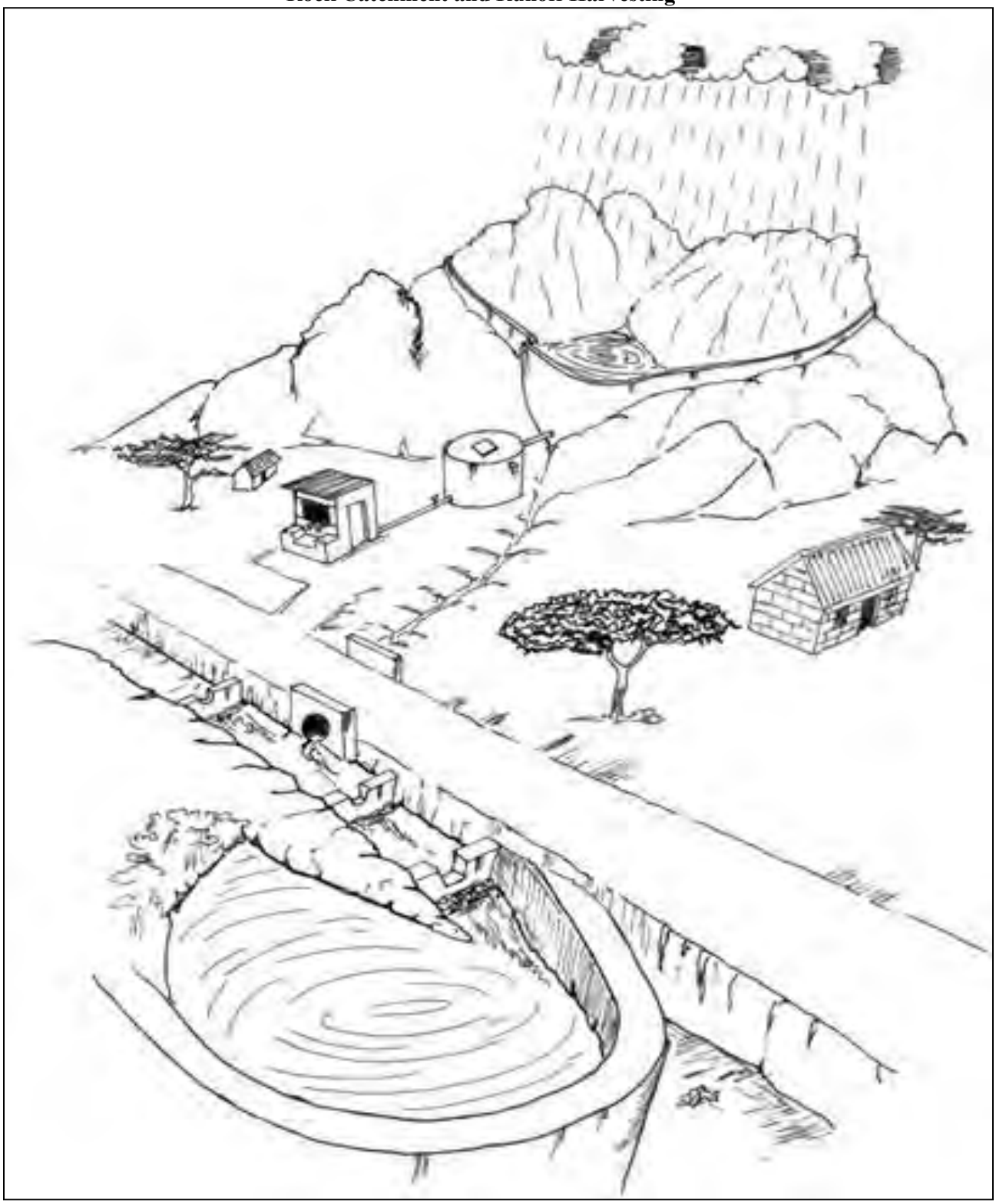
Discuss the potential unexpected problems, what might be the cause and solutions.

Problem	Probable cause	Possible solution
Excessive sediment in tank/pond	Runoff velocity too high in inlet channels causing soil erosion	Construct check dams along inlet channel to reduce water velocity and to trap sediments. Clean sediment trap on a regular basis

	No water in pond/tank	Inlet channels or drains are blocked or eroded	Patrol inlet channel and excavate as required to ensure water flows to the tank or pond
		Unregulated consumption	Control consumption. Keep consumers informed of water availability
Step 4: Spares, Tools, & Technical Assistance	Tools • Shovels, jembe, and wheel barrows for moving silt; • Masonry tools for undertaking repairs to tanks Spares – no specialised spares required Supply Chain – O & M materials can be purchased at a well provisioned hardware store. Technical Assistance – technical assistance should be sought if the tank routinely fills with excessive silt so that a robust solution can be established.		
Review	• Ask participants to explain the potential and constraints to expansion of runoff harvesting from ground catchments • Ask them to outline the best practices for managing the water resource.		
Session Attachments	Attachment 1: Diagrams for runoff harvesting options		

Attachment 1: Runoff harvesting options

Rock Catchment and Runoff Harvesting



MODULE H	**OPERATION AND MAINTANANCE**
SESSION H11	**HANDPUMPS**
Appropriate Facilitator Background	Water technician with experience in the operation and maintenance of the handpumps in use within the community
Introduction	Many handpumps are designed to be village level operated and maintained (VLOM). Despite this, evidence shows that 30 – 40% of handpumps at any one time are not operational. This indicates that while village level maintenance is possible, there are still significant issues in the implementation of this practice. There are many different kinds of handpumps commonly used in Kenya, namely Afridev, India Mark 2 and Duba pumps. This session is generic in that it describes the process of preparing the WUA and community to understand the importance of preventative maintenance of the hand pump. The diagrams are however specific to the Afridev Hand pump. Duba pumps are typically found in Turkana County. They are durable deep well pumps. The Catholic Diocese of Lodwar offers maintenance for Duba handpumps and one of these staff should use used if the handpump in question is a Duba pump. This material should be complimented with more detailed maintenance manuals for the specific type of hand pump in the community.
Objective	At the end of the session, the participants will be able to: • Describe the key components of the handpump and explain how it works • Assemble and disassemble the hand pump without assistance • Identify maintenance requirements on the hand pump • Carry out routine maintenance of the key parts of the pump • Recognise how poor maintenance of a handpump can reduce water yield
Outputs	An Operation and Maintenance Plan
Timing	Session should take approximately 4 hrs
Target Group	Operator and water committee members
Appropriate Venue	Village handpump
Methodology	This session is intended to be PRACTICAL sessions. The components should be taught by demonstration on the system itself. Reinforce the learning by allowing participants to handle parts and describe their function to each other. A CASE STUDY can be told as a STORY or acted as a ROLE PLAY. The purpose is to stimulate a discussion about how maintenance can keep the pump working. The story can be adapted to be more appropriate to a particular community.
Materials	• Bucket • Spanner • Sample handpump for demonstration purposes • Fishing tool
Session Guide	
Step 1: Understanding system	Start by explaining how the whole system works from aquifer to delivery spout. Describe the following parts and explain their purpose:

components

Item	Purpose
Aquifer	Source of water
Hand dug well	Hole that is excavated by hand to a depth sufficient to penetrate the water bearing soil/rock.
Drilled well or borehole	Hole that is excavated by mechanical means to a depth sufficient to penetrate the water bearing soil/rock.
Handpump	Equipment that allows someone at the surface to manually work the pump which is lower in the well
Apron	Provides a firm base and foundation for the pump stand, a clean and convenient place for users to draw water and prevents waste water from re-entering the well from the immediate vicinity of the well by providing a sanitary seal around the well.
Drain/soak away	Drainage channel or pipe which takes excess water away and so prevents water from stagnating near the handpump.
Fence	Prevents uncontrolled access to the well area. This is important to stop livestock polluting the well area and children from playing with the handpump.

Allow participants to discuss the system and ask questions.

Step 2: Understanding the Pump Mechanism

A. Remove the handpump from the well (including rods and plunger and foot valve) and explain the main parts (see Attachment 1 for Afridev Handpump).

Above-Ground Components	1. Pump Head assembly
	2. Pump stand assembly
Below-Ground Components (also called "Down-the-Hole components)	3. Rising Main assembly
	4. Cylinder assembly
	5. Pump rod assembly
	6. Riser Main support Rope

B. Explain the basic components of the cylinder and how it works.
C. Explain how the pump rods and rising main work
D. Explain how the pump head works.

Reassemble pump head showing how the parts connect together.

Demonstrate how moving the handle moves the rods and the foot valve up and down.

Step 3: Preventative Maintenance

Explain the difference between:

- Preventative maintenance;
- Break-down maintenance.

	Preventative Maintenance
	
	1. Undertaken while the system is in operation;
	2. Scheduled at an interval to pre-empt any failure of parts;
	3. Involves the replacement of parts before they have completely worn out and exceeded their life span;
	4. Intended to keep systems working without any unexpected breakdowns; it focuses on improving system reliability.
	
	Break Down Maintenance
	
	1. Undertaken only after the system has broken down;
	
	Allow participants to discuss the advantages and disadvantages of each type of maintenance service.
	
	The steps in preventive maintenance are:
	
	• Understand if a pump is functioning properly. If it is not, then understand the nature of the problem and identify the solution required.
	  o Checking the discharge of the pump: This is done by observing whether the discharge rate of water from the pump is adequate and timely. This gives a very good picture of the condition of the Below-ground components of the pump – the cylinder, the riser pipe and connecting rod assemblies.
	  o Checking the physical condition of the pump: This is done by observing the movement of the handle, looking for external signs of wear and tear, rusting, condition of components such as nuts & bolts, flanges, handle and handle bracket, chain, etc. These observations give the condition of the Above-ground components of the pump.
	• Dismantle the pump for maintenance, if necessary and reassemble it after replacing the defective components or the components that have reached their serviceable life span;
	• Maintain a record of the maintenance history and observations of pump condition for each pump in a given area (See Attachment 2: Handpump Maintenance Record).

Step 4: Testing Hand Pump Performance	**1. Demonstrate the Leakage test and the Discharge Test** • Explain the purpose of the two tests which is to determine whether there is a downhole problem with the pump and the nature and extent of the problem. • Leakage in the rising main indicates worn bobbin or O-ring on the foot valve, disconnected rising main joints or cracked riser pipes; • Low discharge indicates a problem with the bobbins or the cup seal. **A. Leakage Test**

	• If the below-ground assembly of the handpump is leaking then the water level in the riser pipe will fall. When the handle of such a pump is operated it will not immediately yield water since the initial strokes of the handle will be required to fill the riser pipe to replace the water that has leaked out. • The method of assessing leakage is to count the number of idle (non-productive) strokes required before water begins to flow from the pump's spout. This test is performed after pump not been used for 30 minutes. Count the number of strokes of the handle required before the pump begins to yield of water. If the number of idle strokes exceeds 5 strokes, then the leakage is unacceptable. • Leakage can be caused by a leak in a pipe joint, a small perforation in the riser pipe wall, worn out bobbin valves or a leakage at the "O" ring in the foot valve. • The cause of the leakage then needs to be diagnosed and corrected. Proceed with maintenance steps outlined in the Attachment 3: Trouble Shooting Chart for Afridev Handpump. **B. Discharge Test** • After completing the Leakage Test, the Discharge Test should start after the pump is producing water continuously when the pump handle is operated. • When water is flowing continuously, it should be collected in a container or bucket for 40 continuous and full strokes of the pump handle. • Measure the quantity of water collected. Ideally, the water collected should not be less than 16 litres. • If the discharge is less than 10 litres, then it has dropped to lower than acceptable limits and the pump needs to be repaired. • Discharge can fall if the plunger U seal or bobbin valve are worn out, the foot valve "O" ring or bobbin valve are leaking or if there is a significant leak in the riser pipe. • A leak in the riser pipe can be further confirmed by the Leakage Test. • Proceed with maintenance steps outlined in the Trouble Shooting Chart.
Step 5: O & M Schedule	In discussion with the community members, formulate an O & M Schedule for all the handpumps within the community. **1. Maintenance of Pump Surroundings** The hand pump platform should offer good protection to the water source because it seals off the well from surface contamination. However, contamination can still occur, if: • the platform and drain are cracked or broken, • the pump stand had become loose in its foundation, • waste water accumulates in the close vicinity of the well, • solid waste is disposed near the well in a garbage dump, • animals (and humans) defecate close to the well, • the well is in the natural drainage path and the platform is prone to flooding during rains All of the above should be prevented/ corrected/ repaired.

1.1 Weekly Checks

- Check that the base flange and head flange nuts and bolts are tight.
- Check that the Fulcrum pin and Hanger pin nuts are tight.
- Check that the handle moves smoothly, moves for its full arc, and water comes out when the handle is operated.

1.2 Three Monthly checks

- Check if any nuts, bolts of parts in the pump head are missing. Replace any missing parts.
- Check if there is any unusual noise when the pump is operated. Refer to the Trouble shooting Chart and correct the problem.
- Check if the pump is loose in its foundation (or foundation bolts even if the bolts are tight), this can allow contaminated waste water to enter the water source. Repair the platform, allowing time for the cement to set properly, before the reusing the pump.
- Check if the pump is yielding adequate water. This is done by conducting the Discharge Test.
- Check if there is leakage in the pump. If more than 5 strokes are required before the pump begins to yield water, it means that the water level is dropping in the riser pipe due to a leakage.
- Reduction of discharge and leakage in the pump could be due a number of reasons such a leak in a pipe joint, a small perforation in the riser pipe wall, worn out bobbin valves or a leakage at the "O" ring in the foot valve. The procedures for conducting the Discharge Test and the Leakage Test are described in details in Step 4 above.
- Repairs to the rising main require a skilled mechanic with the proper equipment. It should not be attempted by the Caretaker alone.

1.3 Annual Maintenance Tasks:

- Replace fulcrum/hanger bearings
- Replace plunger seal and plunger bobbin
- Replace foot valve bobbin and foot valve "O" ring.

To reiterate, it is important for the handpump caretaker to:

- regularly check all nuts and bolts are tight and that the movement of the handle is smooth, complete and yields water,
- perform the Leakage and Discharge Tests and records the results,
- check the platform and drain for cracks and breaks, the pump stand should be firm,
- eliminate collection and stagnation of waste water near the pump by keeping the drain clean, by filling with earth and draining,
- maintain the fence, if any, around the pump to prevent animals from coming close to the pump,
- keep the pump surroundings clean at all times,
- instruct and motivate users to keep the pump surroundings clean and dry and to use the pump properly
- Check perimeter fence and repair as required

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Take water quality samples for analysis
Assist in disinfecting the well
Assist in desilting the well

</td></tr>
<tr><td>Step 6: Trouble shooting</td><td>Discuss the potential unexpected problems and what might be the cause. See Attachment 3 for Trouble Shooting Chart.</td></tr>
<tr><td>Step 7: Spare Parts, Tools and Technical Assistance</td><td>
Discussion Questions:
1. What spare parts are needed for routine maintenance?
2. What tools are needed for routine maintenance?
3. Where are these spares and tools available?
4. If the system requires major repairs where will they find a technician to repair the system?

The facilitators should discuss with the committee members about possible sources of spares and technical assistance if they are not familiar with all the possibilities.

Tools

The tools for Afridev and India Mark 2 are slightly different.

Afridev Tools
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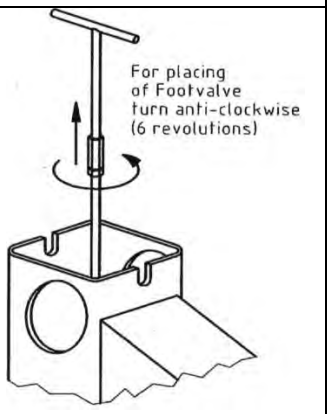
<td> 
</td>
</tr>
<tr>
<td>24 size spanner for M16 hexagonal nuts</td>
<td>Fishing tool for retrieving foot valve</td>
<td>Connecting Tool</td>
</tr>
</table>

Rod Resting Tool to be used when the cylinder installation depth is of the order 30 m to 45 m, the total weight of pump rods is heavy.

India Mark 2

19mm spanner

Spares

Fulcrum pin
Bobbin
O-ring
Pump Washer
Cup seals
Bearing bushes

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<tr><td></td><td>
Supply Chain- Establish where the nearest store that stocks spares for the handpump is. In addition, obtain contact name & phone number for handpump maintenance provider:
<table>
<tr><td></td><td>NAME & CONTACT OF HANDPUMP TECHNICIAN (1)</td><td>NAME & CONTACT OF HANDPUMP TECHNICIAN (2)</td></tr>
<tr><td>NAME</td><td></td><td></td></tr>
<tr><td>TELEPHONE</td><td></td><td></td></tr>
</table>
Technical Assistance: Technical assistance may be required if the well goes dry to ascertain whether the well should be deepened.
</td></tr>
<tr><td>Step 8: Case Study</td><td>
Nzaui Case Study

The “Maji” NGO project constructed a handpump in Nzaui community. When this handpump was handed over to the community, it worked well in both the rainy season and the dry season. When people came to fill their jerry cans, a lot of water would come out after one or two strokes.

After a year, though, it was very difficult to get water. A community worker, Monica, heard about the problem during a follow-up visit. She decided to gather information on the problem before she reported to the NGO that the pump was broken.

Monica decided that she had better learn what the residents of Nzaui thought about the problem. She decided to just walk around and talk to people as she met them.

In the discussion with elders (men) from Nzaui, the participants said, "Maji NGO put the well in a place where there is no water. The NGO should come back and make us a new well in a different place."

In the discussion with women, they also thought that “Maji NGO” should come back and make a new well. However, Monica learned something else. The women who actually used the well said that water would come out if they pumped for a long time. However, it was not as much water as before. The women gave up using the well, because they spent too much time and effort to get such little water. Instead, they walked to other handpumps or used the traditional sources.

Monica went to the handpump immediately and tested it. She found out that what the women said was true. Monica pumped for about ten minutes and finally some water came out. She waited for a little while, and then pumped again. She had to pump for just as long before any water came out.

Discussion Questions

Use the following questions to guide the discussion.
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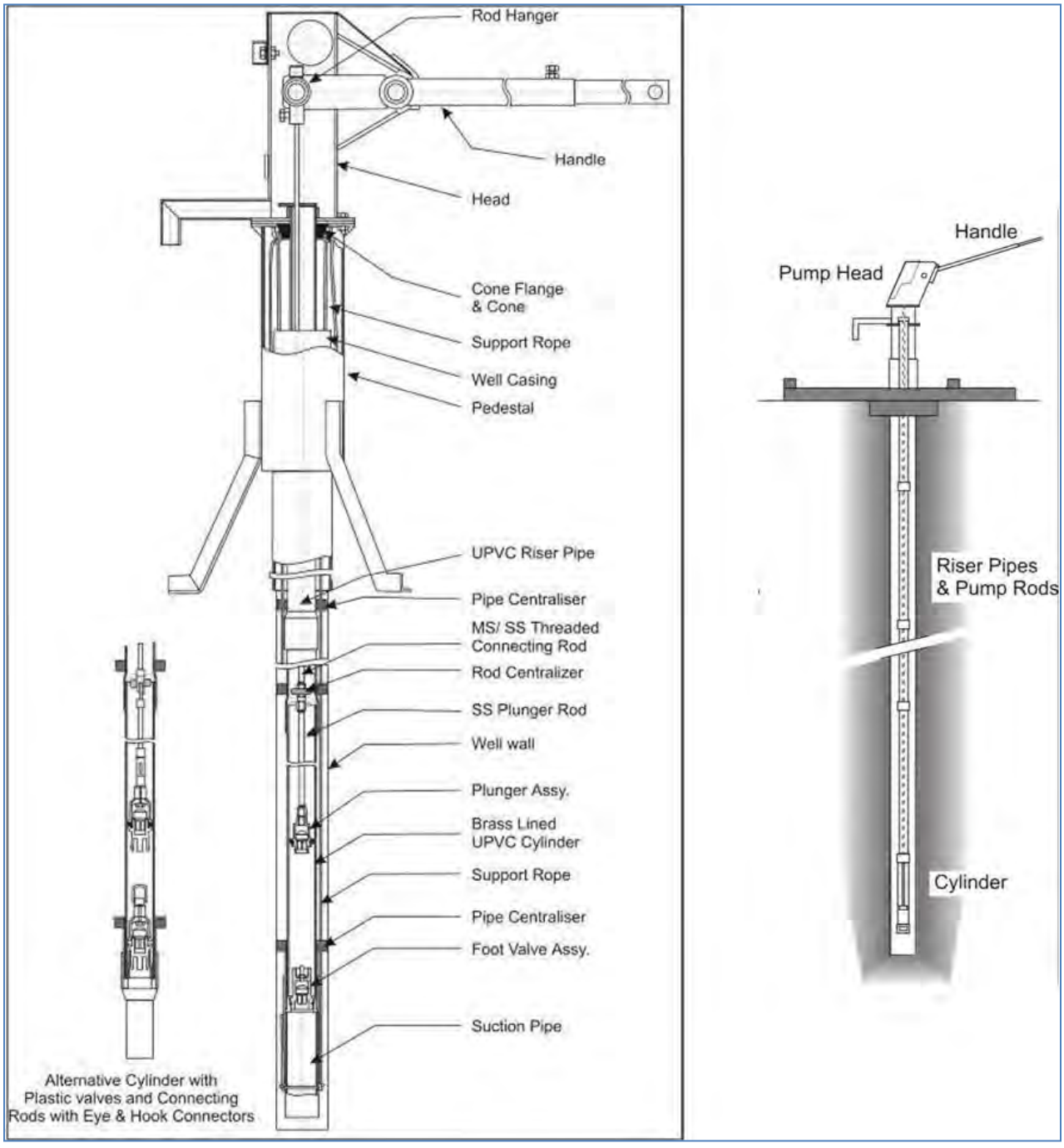
	1. What do you think is the probable problem with the well, and why? 2. What would you do to determine the real problem? 3. What would you advise Monica to do? Participants should be encouraged to discuss whether they feel that their operator or committee members would be able to identify and repair a problem like the one in the story.
Review	• Are the participants familiar with how a handpump works and the need for preventative maintenance? • Has the handpump caretaker or maintenance person demonstrated the ability to remove, examine, repair and re-install the handpump? • Has the community established bylaws on proper use and care of the handpump?
Session Attachments	Attachment 1: Diagram of Afridev Handpump Attachment 2: Handpump Maintenance Record Attachment 3: Trouble Shooting Chart for Afridev Handpumps

Attachment 1: Diagram of Afridev Handpump



Attachment 2: Handpump Maintenance Record

Village/ Community	
Location/ sub-location	
Division/ District	
GPS References	N/ S E
Handpump Type	☐ Afridev ☐ India Mark II Other: ……
Hand Pump Code/ Serial No:	

Preventive Maintenance - Results of Discharge & Leakage Tests

Date	1st Observation Leakage - Strokes	2nd Obsevation Discharge - Litres	Remarks

Maintenance Interventions

Date	Complaints	Date repaired	Parts replaced	Costs & Remarks*

Remarks could include: Separate costs for parts and mechanic's fees and name

Attachment 3: Trouble Shooting Chart for Afridev Handpump

Problem	Indication	Cause	Corrective Steps
Reduced discharge, confirmed by the Discharge Test	Handle is difficult to operate	Cup seal is tight	Replace Cup seal
	Handle operation is normal	Complete stroke not available	The check for the correct length of pump rods has to be made every time the below-ground assembly is dismantled for repairs. Adjust the length of the top rod to get the full movement of the handle. Correct the stroke by adjusting the length of rod as described earlier
		Plunger seal defective/ worn out	Pull out rods, with plunger and foot valve. Examine the Plunger seal, Foot valve "O" ring and both the bobbins and sealing surfaces. Replace worn parts and reinstall rods.
		Bobbins worn out	
		Leakage in the foot valve "O" ring	
Delayed flow, confirmed by the Leakage Test	Handle operation is normal	Complete stroke not available	Correct the stroke by adjusting the length of rod as described earlier
		Leaky valves or leaking foot valve "O" ring	Pull out rods, with plunger and foot valve. Examine the foot valve "O" ring and both the bobbins and sealing surfaces. Replace worn parts and reinstall rods.
		Leakages in pipe joints	Take out the riser mains and look for a leakage. This could be due to external abrasion of pipes if the bore hole is not fully cased and/or if pipe centralizers have not been used. Perforation of PVC pipe from inside is also possible if rod centralizers have not been used and rod couplings have cut through the pipe from inside. Cut off the riser at the point of leakage, examine the inside of the pipe carefully for signs of wear, replace/ repair the defective part/s of the riser main, following the pipe repair procedure.
Pump handle shaky	Handle is shaky when operated	Fulcrum Bushes are worn	Replace fulcrum bushes
		Fulcrum pin loose	Tighten nuts fully
		Hanger pin loose	Tighten nuts fully
	Pump head is shaking	Loose flange bolts	Tighten flange bolts and nuts
	Pump stand is shaking	Loose pump stand, cracked	Repair platform

Problem	Indication	Cause	Corrective Steps
		platform	
Abnormal noise during operation	Handle operation is normal	Rods rubbing against pipes; centralizers worn out	Ensure that the rods are straight. Replace rod centralizers.
	Handle is rough/ uneven to operate	Rods bent and rubbing,	Replace rods with good ones. Straighten bent rods if replacement rods are not available.
		Worn out fulcrum bushes, handle fork touches pump head	Replace fulcrum bushes
No Water	Handle is very easy to operate, virtually free	Pump rods have disconnected	The rods feel very free to lift. Pull out all rods till the broken/ disconnected rod joint comes out. Insert a small rod fishing tool into the riser pipes to extract the remaining rods, till the plunger assembly comes out. Replace the damaged rod/s (or rethread rod joint/s) and reinstall the plunger and rods as described in the Installation manual.
			Alternative: If no rod fishing tool is available, pull out the rod till the broken joint. Counting the number of rods that have come out, pull out the riser pipes for at least the length of rods pulled out earlier. Then pull out the riser pipe for least 3 m more (one pipe length) to be sure that remaining rods can be reached. Cut off the riser pipe to expose the remaining rods. Then pull out all the remaining rods till the plunger comes out. Use a repair socket with solvent cement to join the cut riser pipes. Allow the join to cure and lower the riser pipes. Now replace the damaged rod/s (or rethread rod joint/s), and proceed to reinstall plunger and the rods.
		Riser pipes have disconnected	Pull out the rods. The plunger should come up to indicate that the rod connections were intact. Remove the pump head and lift the cone flange. Carefully loosen the supporting ropes, keeping them taut. Lower the ropes a little to see if the tension on the ropes slacken – in which case the pipes have not disconnected. If the ropes go down and the tension remains on the ropes, then it indicates that the pipes have disconnected but is still hanging on the ropes. Anchor the ropes to bolts on the pump stand flange. Pull out the riser pipes that are attached to the cone. The length of riser pipes that come out would be shorter than the rods and the cylinder would be missing. A comparison of the lengths of the riser pipe and the rods will give an indication of the length of riser pipes that are now hanging by the support ropes. Pull out both end of the support rope evenly till the broken/ disconnected end of the riser pipes comes up. Then pull up all the remaining riser pipes. When the entire length of the rising main has been accounted for, examine the riser pipe
	Handle is		

Problem	Indication	Cause	Corrective Steps
No Water (Contd.)	very easy to operate, virtually free (contd.)	Riser pipes have disconnected (contd.)	thoroughly for any other damage. Cut off damaged parts and repair the rising main. Reinstall cylinder and riser pipes, taking care to repair the broken part carefully. A pipe fishing tool may have to be used in case the riser pipes do not come up with the support ropes. This may happen in case the upper end of the riser pipe fouls with the bore wall or the lower end of the casing pipe. Fishing will also be required if the support ropes have failed and the pipes have dropped to the bottom of the well.
			Alternative: If fishing is not possible or is unsuccessful, then consider installing new riser pipes and cylinder. This will be determined by the Static Water Level (SWL) in the bore well and the total depth of the bore. The bore should be deep enough and the SWL should be high enough to accommodate a new riser main and cylinder. Be sure to record these details on your repair work record.
	Handle operation is normal	Plunger seal defective Bobbins worn out	Pull out rods, with plunger and foot valve. Examine the Plunger seal, Foot valve "O" ring and both the bobbins and sealing surfaces. Replace worn parts and reinstall rods.
		Riser pipes have disengaged	Pulling out the rods does not reveal any problem. Remove the pump head and lift the cone flange. Untie the ropes very carefully and anchor them securely to the pump stand flange with anchor bolts. Lift the riser main out. As it comes out, the support ropes WILL NOT GO SLACK confirming that there is still weight suspended on the ropes. The final confirmation of a disengaged riser will be possible when only a short (in comparison to the rods) length of risers come out. After this, the support ropes have to be pulled out uniformly on both sides, to bring out the remaining length of rising main from the bore. When the entire length of the rising main has been accounted for, examine the riser pipe thoroughly for any other damage. Cut off damaged parts and repair the rising main. Reinstall cylinder riser pipes as per installation instructions, taking care to repair the broken part carefully. Fishing may have to be attempted as described earlier.
		Water level has dropped below the cylinder	Remove rods and plunger. Examination of plunger shows no defects. Remove riser pipes with cylinder. This assembly too shows no defect. Measure the SWL with plumb line. Also measure the total depth of the bore to judge if space is available for more riser pipes, i.e., a deeper cylinder setting. Compare the depth of SWL with the length of pipes pulled out. The pipes (including cylinder) should measure less that the SWL. This confirms that the water level has dropped below the cylinder level. Add at least one pipe to the riser mains and one rod or more, if the well depth can accommodate more riser pipes.

MODULE H	**OPERATION AND MAINTANANCE**
SESSION H12	**WIND PUMPS**
Appropriate Facilitator Background	Water technician with experience in maintaining wind pumps
Introduction	This session supports a community to understand the basic operations and establish an operation and maintenance program. It is based on the Kijito Wind pump although there are various other brands available (e.g. Southern Cross). Kijito is a local Kenyan company.
Objective	At the end of the session, the participants will be able to: • Identify the main components of the wind pump system • Describe the functions of the key components • Explain how the water reaches the taps • Tie and secure the rotor • Carry out routine greasing of the moving parts • Move around the wind pump safely
Outputs	An Operation and Maintenance Plan
Timing	Session should take approximately 4 hrs
Target Group	Operator and WUA committee members
Appropriate Venue	At the community wind pump
Methodology	This is intended to be a PRACTICAL session. The components should be taught by demonstration on the system itself. Reinforce the learning by allowing participants to handle parts and describe their function to each other
Materials	• wind pump, • adjustable spanner • screw spanner and • screwdriver • grease and grease gun
Session Guide	
Step 1: General Layout	Start by explaining how the whole system works from borehole to water points. Describe the following parts: • Borehole • Pump cylinder (“down the hole” equipment) • Wind mill • Pipe • Tank • Troughs/tank Allow participants to discuss the system and ask questions. See diagram in Attachment 1: Typical Wind pump.
Step 2: Identification of Components	• Explain the main parts of the windmill (see Attachment 2: Kijito Wind pump) • Rotor • Tower • Transmission assembly • Pump rods • Riser and stuffing box

	• Outlet • Base plate • Borehole casing It is not necessary for the participants to understand exactly how each component functions. Explain how the parts operate together.
Step 3: Routine Maintenance	1. **Safety procedures** Like many powerful mechanical devices „Kijito" Wind pumps can be dangerous, if they are not approached with the correct attitude and experience. Adherence to the following simple rules will help prevent accident. **Safety Procedures for Wind pump** 1. Always work on the wind pump with at least <u>two people</u>, never work on a wind pump alone 2. Keep your fingers well clear of any moving parts. 3. When climbing the wind pump keep your feet clear of the moving pump rods, and check you are not coming up directly under the rotor. 4. If possible do not stand or work underneath the wind pump, when someone is working on it, unless you are wearing a hard hat/helmet 5. It is good practice to wear hard hat/helmet at all times, even if you are just climbing the wind pump to check its operation. It is quite easy to get distracted and this could result in the crank striking your head, as it rotates. 6. The towers have steps built into one of the tripod legs, please use them 7. The tower is designed with sufficient clearance between it and the tower legs, to allow you a safe clearance, should the rotor change direction, while you are up on the wind pump. 8. Even if you are experienced with working up on the wind pump, it is also still a good idea to use a simple quick release harness, to attach yourself to the tower. This also allows you to use both hands when necessary. 9. Never allow children to play on or near the wind pump. 10. Experienced people actually sit on top of the transmission while checking or servicing it. No matter how experienced you get, never do this without securing the rotor first. 11. While servicing your machine it is easy to leave grease on the tower. Please make sure it is wiped off before you leave, as it could cause someone to slip. Where possible demonstrate the dangers.

2. How to tie and secure the rotor
(See Diagram in Attachment 3).

How to Furl and Secure the Wind Pump Rotor

i) Choose an undamaged piece of rope at least 2 cm thick, and long enough to pass a double strand round both anchor points on the rotor
ii) Secure the middle of the piece of rope securely underneath one of the tower cross beams just opposite the rotor ring
iii) Take one end and loop it round where the blade spar crosses the rotor ring, and choose one where the blade is together with a rotor support spar. This will reduce the chance of damage to the rotor or blade spar if the wind changes direction very strongly during maintenance.
iv) Having secured the rotor in this one place, get the assistant to turn the rotor until the rope is tight, and then take the other end of the rope and lash it in the opposite direction to another blade and support bar.
v) Make sure the knots are tight
vi) Never leave the wind pump tied up after leaving. A strong wind could result in the rotor being bent.
vii) Never try to furl the wind pump while up the tower; this can be dangerous
viii) Never leave the rope hanging from the furling chain, after the maintenance has been carried out, as it could get entangled, damaging the rotor, or enable unauthorised people to tamper with the machine

Make sure at least two people (the operator and assistant) can demonstrate how to do this satisfactorily

3. Greasing

This is the main routine maintenance activity that should be carried out on wind pumps. Greasing prevents wear on the moving parts and helps to ensure that the wind pump runs for a long time without requiring major repairs.

Greasing must be done using a GREASE GUN.

Greasing should be done EVERY 6 MONTHS.

Each greasing session will use approximately 1 x ½ kg tin of grease.

Apply 2-3 strokes of the grease gun on each grease point.

The points that should be greased are shown on Diagram in Attachment H12f. They are marked on the machine in “red”.

Make sure at least two people (the operator and assistant) can locate the grease points and demonstrate how to do the greasing satisfactorily.

<table>
<tr><td>Step 4: Establishing O & M Plan</td><td>Review the points that have been demonstrated and ask the participants to draw up an Operation and Maintenance Plan

O & M Tasks include:

• Patrol perimeter fence and repair
• Check tower frame for damage, loose bolts, or weakness
• Check condition of pumping rods and securing bolts
• Grease all grease nipples
• Check rotor blades are not bent or damaged
• Measure volume of water delivered by each stroke to check condition of pump washers
• Replace pump washers
• Check pipe line from wind pump to tank
• Test all valves
• Repaint tower
• Take water sample for analysis</td></tr>
<tr><td>Step 5: Troubleshooting</td><td>Discuss potential problems and required action

<table><tr><th>Problem</th><th>Probable cause</th><th>Possible solution</th></tr><tr><td>Wind pump does not self furl</td><td>Furling mechanism not working</td><td>Repair furling system</td></tr><tr><td>Windmill working but no water being raised</td><td>Borehole has run dry
Pump washers leaking
Leaky riser</td><td>Remove pump and inspect/repair. Use dipper to check water level in borehole</td></tr></table></td></tr>
<tr><td>Step 6: Spares Tools & Technical Assistance</td><td>See Generic Session for general tools.

Tools
• Grease gun

Spares
• Grease
• Pump washers

Supply Chain- Grease and other plumbing materials can be purchased at a well provisioned hardware store.

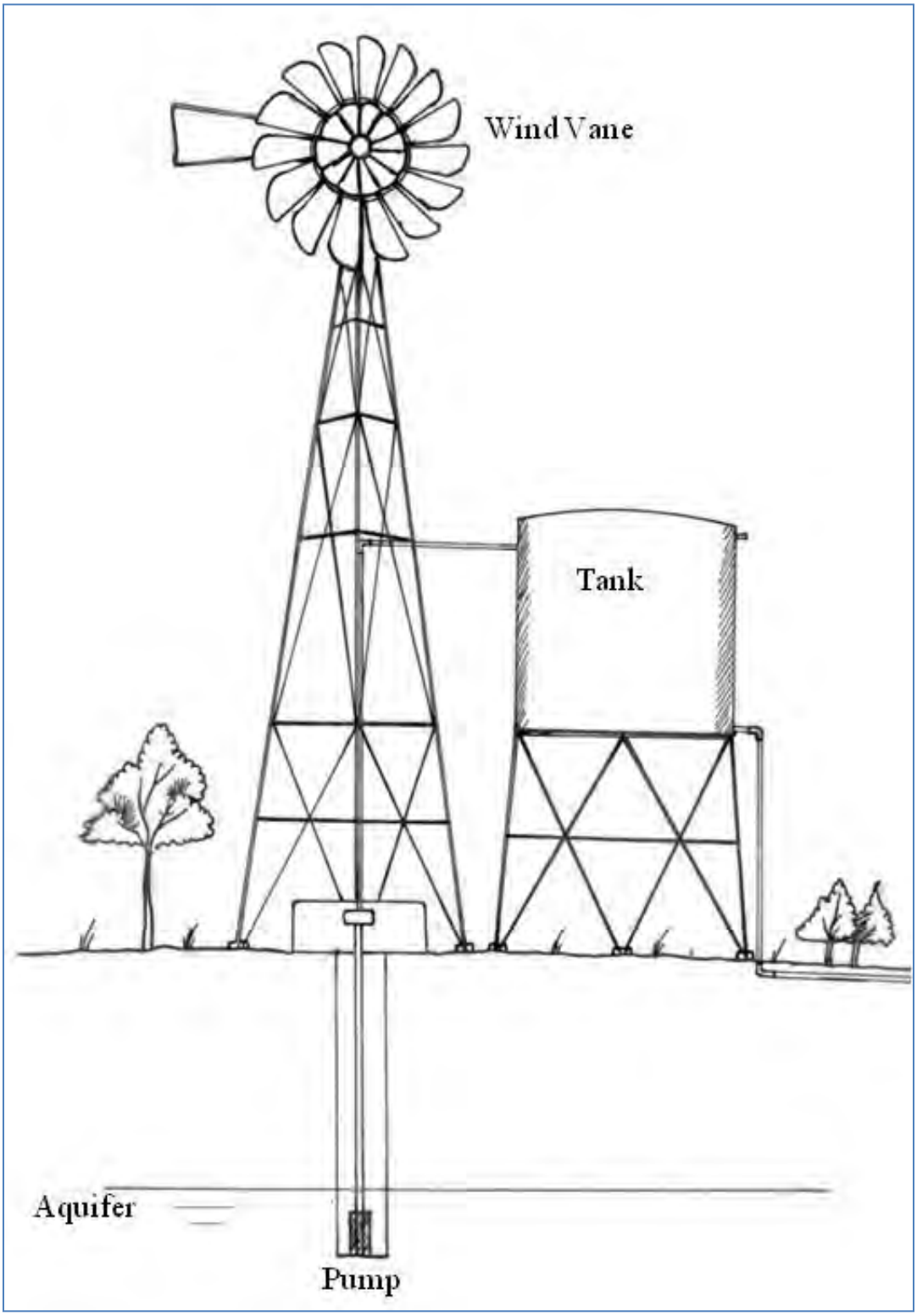
Technical Assistance- Specialised technical assistance may be required to remove pump from borehole.

Specialised technical assistance is required to lower the tower.

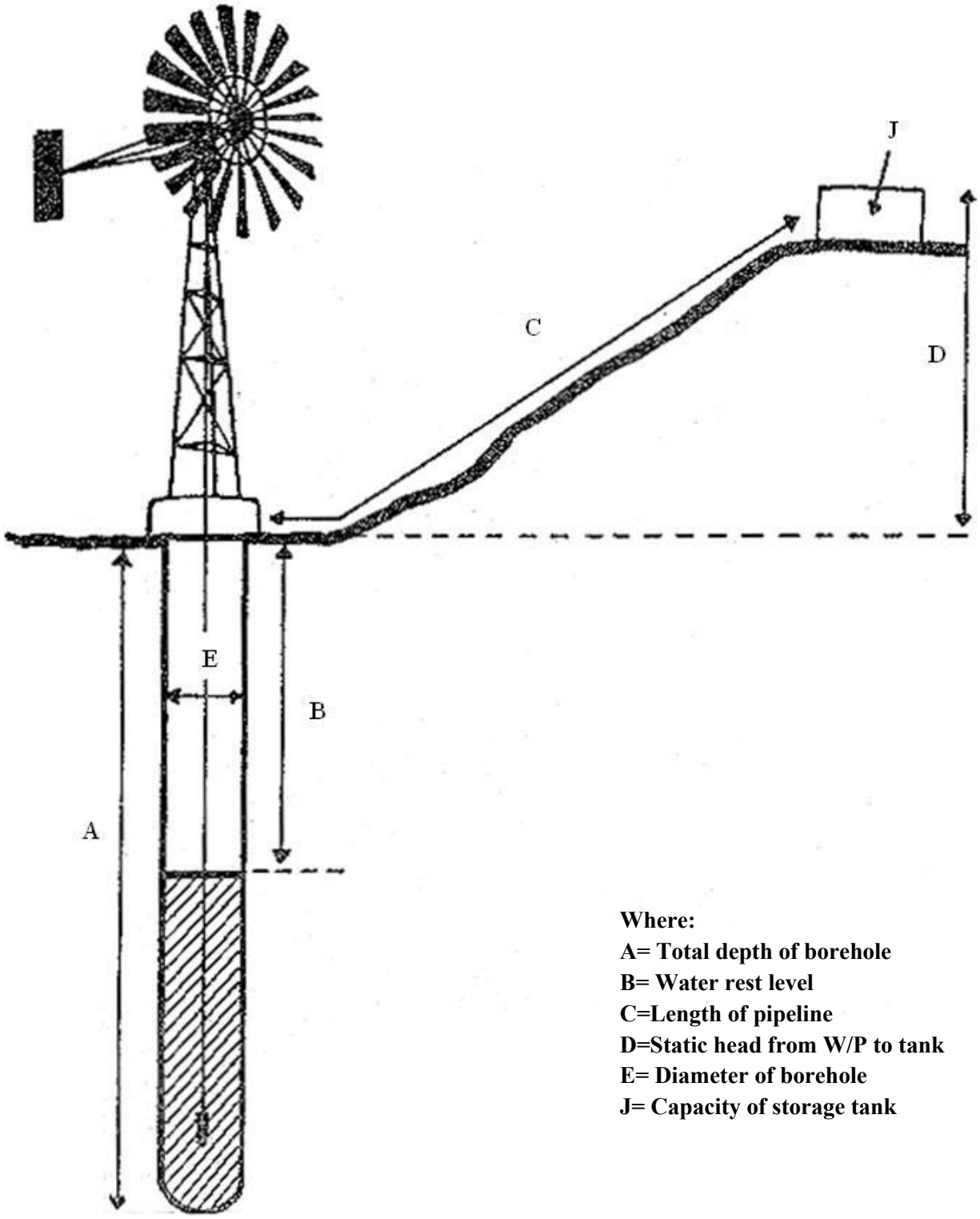
Specialised technical assistance should be sought if it is suspected that the borehole has run dry. WRMA or private hydrogeologist can ascertain if this is the case.</td></tr>
<tr><td>Review</td><td>• Why is it important for two people to work together when undertaking repairs or maintenance of the wind pump?
• What is the most important maintenance activity for the wind pump?</td></tr>
</table>

	• What has been agreed to stop children climbing on the wind tower?
Session Attachments	Attachment 1: Typical Wind pump Attachment 2: Detailed drawings for Kijito Wind pump

Attachment 1: Typical Wind pump



Attachment 2: Detailed Diagrams for Kijito Wind pumps
Diagram H12a: A "Kijito" wind pump



Where:
A= Total depth of borehole
B= Water rest level
C=Length of pipeline
D=Static head from W/P to tank
E= Diameter of borehole
J= Capacity of storage tank

Diagram H12b: Wind pump assembly

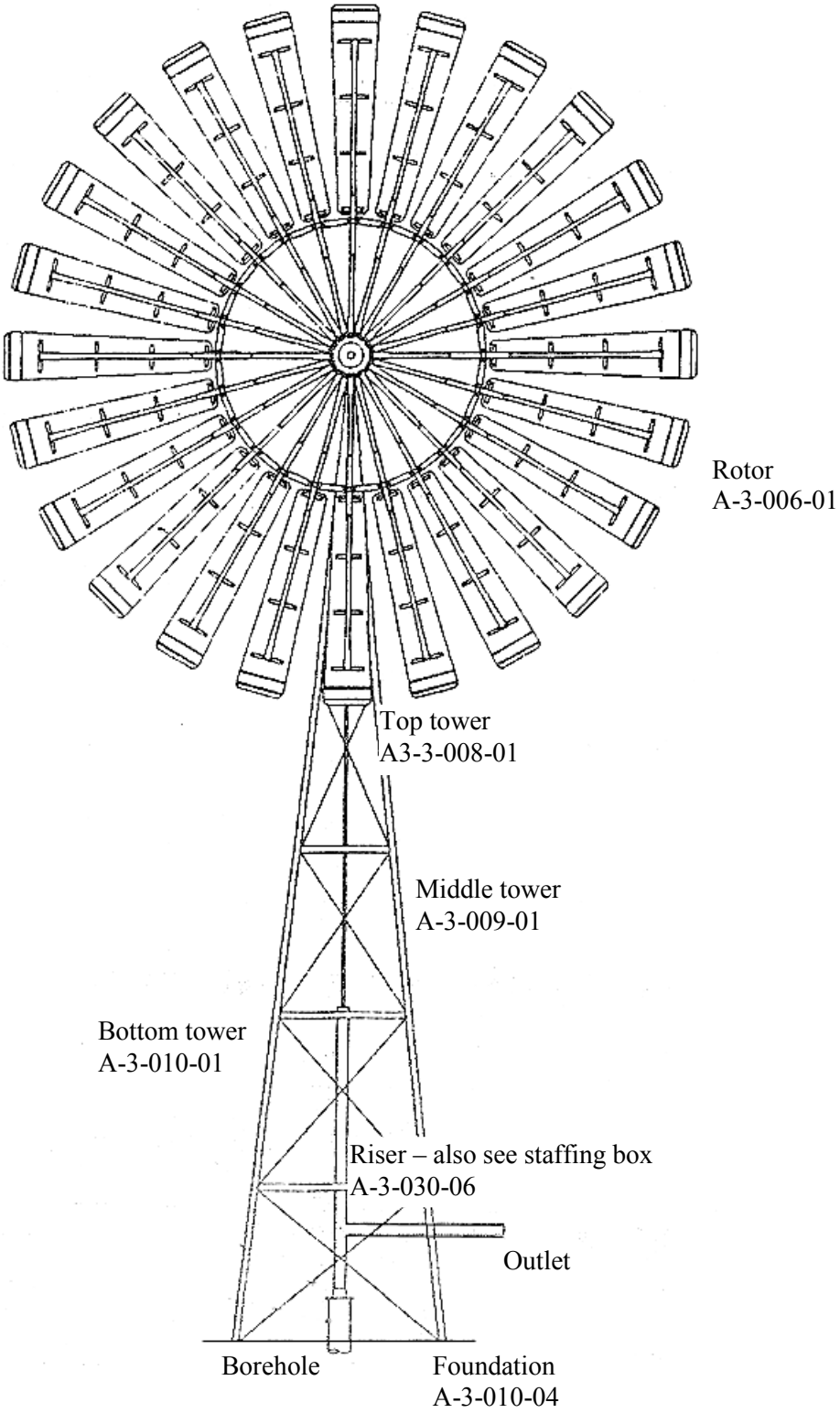


Diagram H12c: Layout of the stuffing box, non-return valve, gate valve and the air chamber.

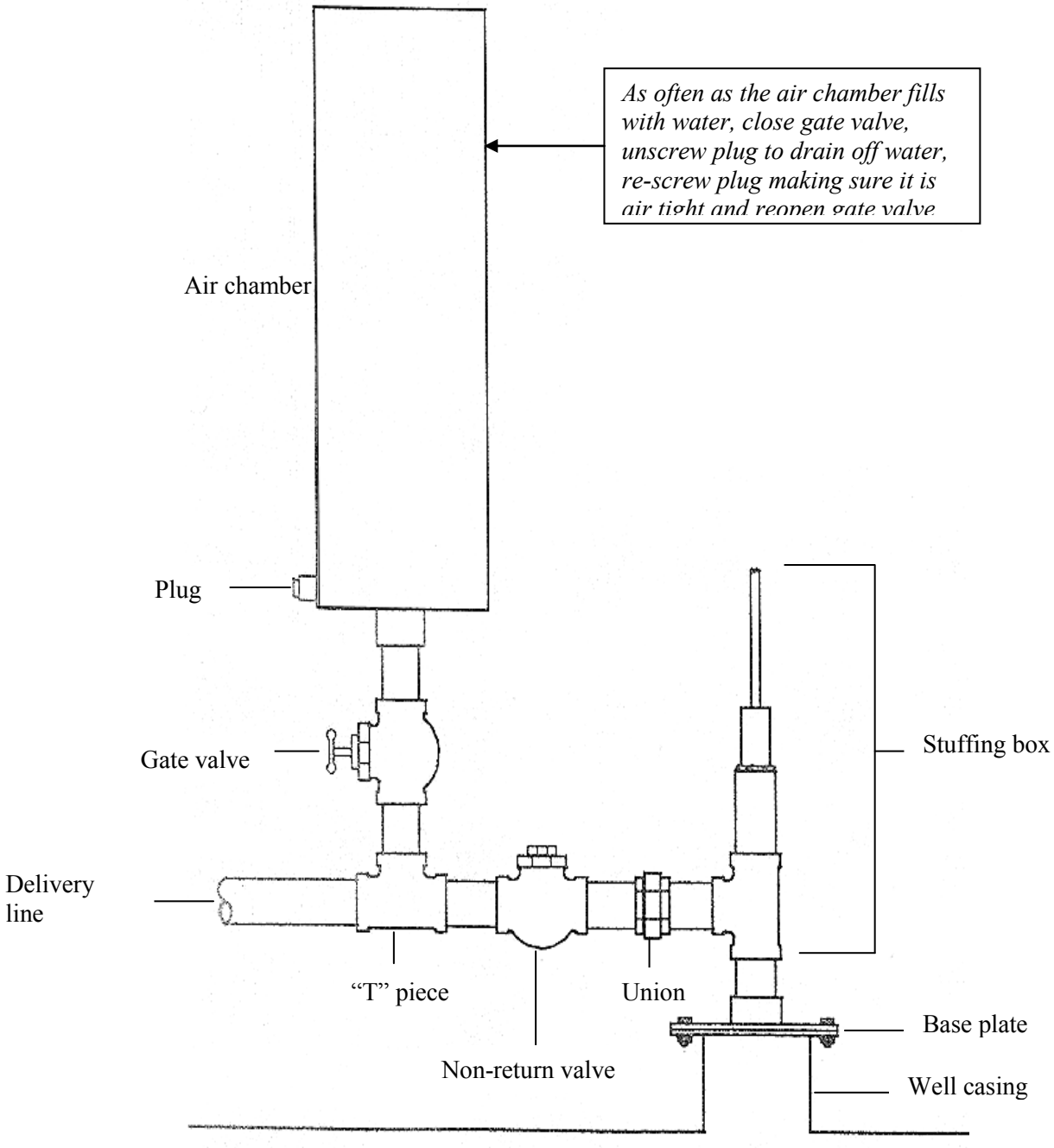


Diagram H12d: Kijito stuffing box

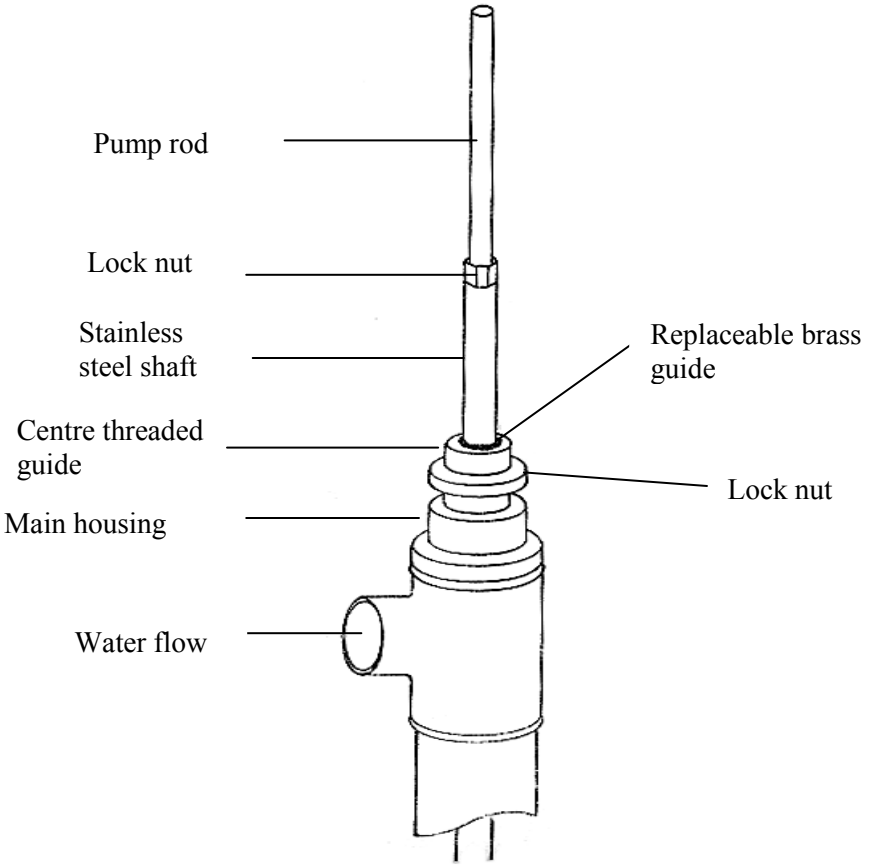


Diagram H12e: The correct way to tie up the rotor prior to servicing

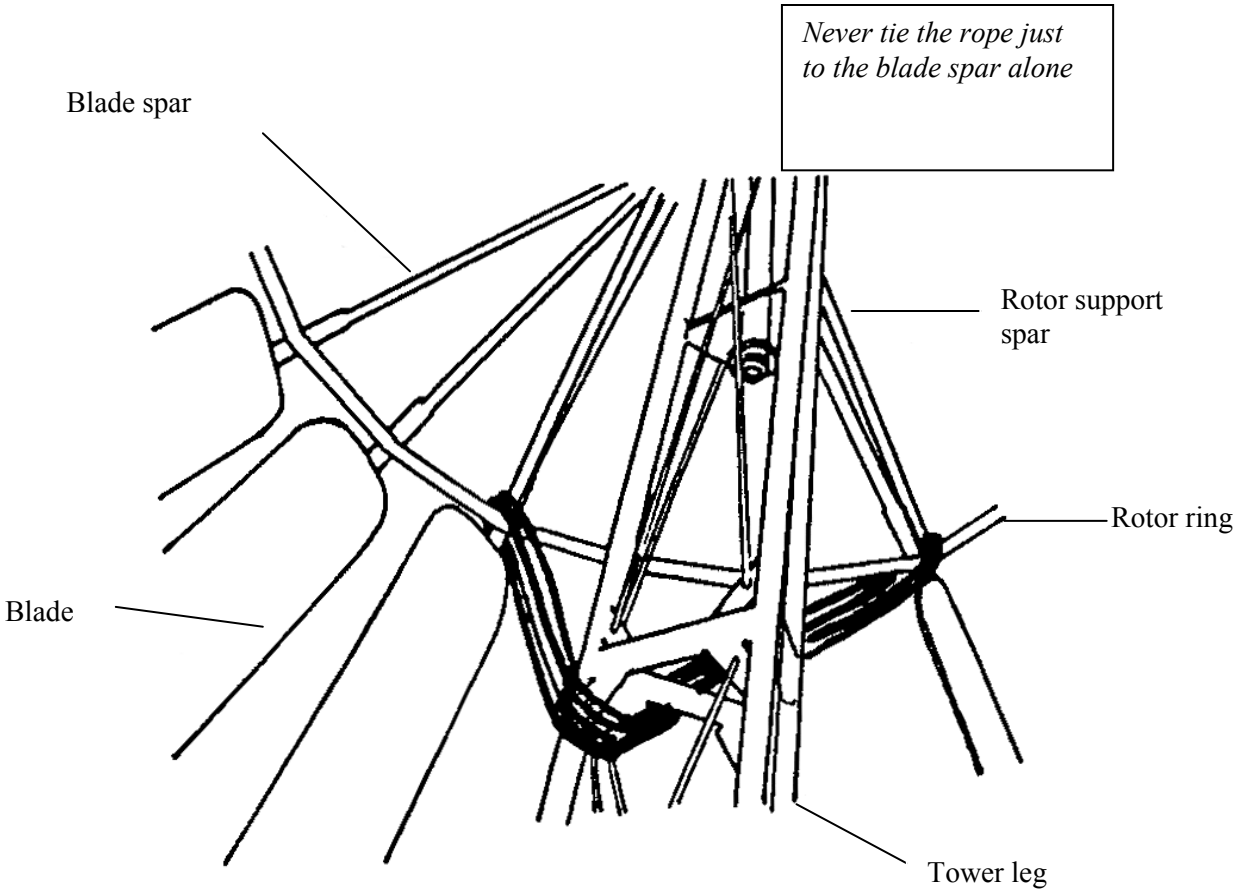
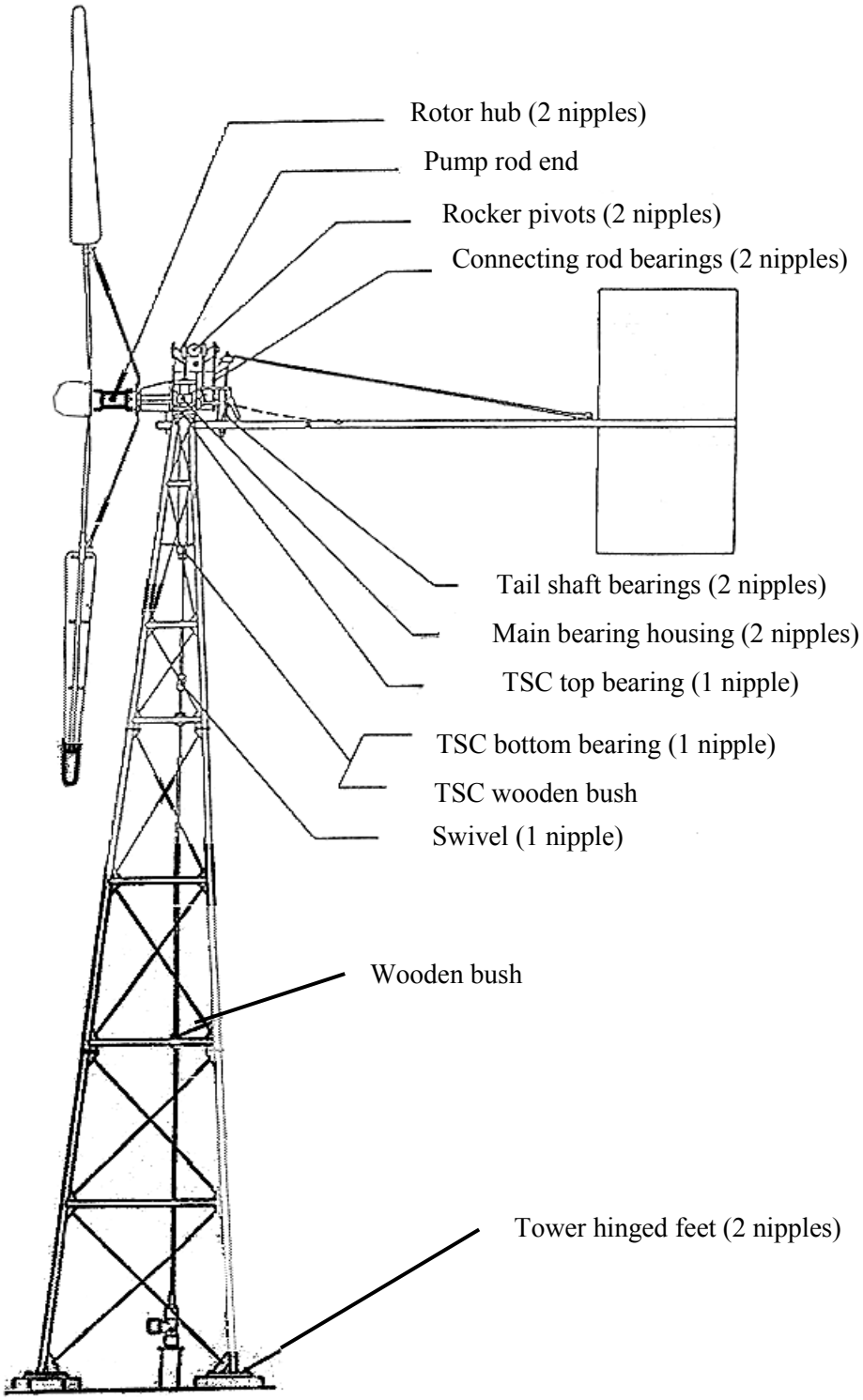


Diagram H12f: Lubrication points



<table>
<tr><td>MODULE H</td><td>OPERATION AND MAINTANANCE</td></tr>
<tr><td>SESSION H13</td><td>SOLAR POWERED PUMP SYSTEMS</td></tr>
<tr><td>Appropriate Facilitator Background</td><td>Water technician with experience in the operation and maintenance of the solar powered pumps in use within the community</td></tr>
<tr><td>Introduction</td><td>There is very little technically that can go wrong with a solar system if it has been installed correctly. The submersible pump in combination with the control unit has a number of safety features that protect it in the event of problems occurring. Whilst it is very “hi-tech”, the high level of reliability, minimal maintenance, need for spare parts and low operating costs make it appealing for rural locations. The main threat to the reliability of solar systems is human interference, from vandalism and efforts at repair.</td></tr>
<tr><td>Objective</td><td>At the end of the session, the participants will be able to:
Identify the main components of a solar powered pumping system
Recognise problems that can arise from different components
Understand the importance of paying for the water, even if the solar energy is free</td></tr>
<tr><td>Outputs</td><td>An Operation and Maintenance Plan</td></tr>
<tr><td>Timing</td><td>Session should take approximately 1 hr</td></tr>
<tr><td>Target Group</td><td>Operator/caretaker and WUA committee members</td></tr>
<tr><td>Appropriate Venue</td><td>A place within the community where training is taking place, where participants can clearly hear and participate in the discussions, and where there is easy access to the different parts of the community water project.</td></tr>
<tr><td>Methodology</td><td>The session is focused on raising awareness of the community members so that they understand the system and the importance of paying for the water. Use site walk, discussions, and question and answer sessions to raise awareness.</td></tr>
<tr><td>Materials</td><td>Flip chart, pens</td></tr>
<tr><td>Session Guide</td><td></td></tr>
<tr><td>Step 1: Overview of Solar System</td><td>Start by explaining the difference between a solar powered system and a generating set system. Explain how the water is pumped from the borehole and flows to the water points. Refer to the map.

With reference to the site walk, community map and a schematic diagram of a solar system (see Attachment 1), describe the following components:

<table>
<tr><td colspan="4">Solar panels/photovoltaic array- Converts solar energy to D.C. electricity</td></tr>
<tr><td colspan="2">Either</td><td colspan="2">Or</td></tr>
<tr><td>Inverter: D.C. to A.C.</td><td>Used for power conditioning for high power applications. Converts D.C. to A.C.</td><td>Regulator</td><td>Regulates voltage</td></tr>
<tr><td>Wires</td><td>For electrical power transmission</td><td>Belt and Pulleys</td><td>Used for turning the shaft in the rising main</td></tr>
<tr><td>AC Motor</td><td>Converts electrical output of the solar panels into mechanical</td><td>DC Motor</td><td>Converts electrical output of the solar panels into mechanical energy</td></tr>
</table></td></tr>
</table>

	Submersible Pump	Pump with an attached motor. Both pump and motor are below water level at the bottom of the borehole	Mono Pump	A rotary pump mainly with discharge head, rising main and the pump element

Allow participants to discuss the system and ask questions. It is not necessary for the participants to understand exactly how each component works. Explain how the components operate together.

Step 2: Maintenance of Solar Components

Explain and demonstrate maintenance procedures for the different components.

Caution: Solar Systems require Qualified Technicians for installation and repair.

Maintenance by unqualified technicians is a major cause of broken pumps. Only a trained electrician with prior experience of solar pumps and access to manufacturers catalogue containing the technical specification of the equipment, should be allowed to undertake repairs related to the wiring of the system or control panel. If there is a major overload or fault with the system, the control unit will fail as a protection measure to protect the pump. This is a warning that qualified expertise is required to investigate the nature of the problem. However all too often, unqualified technicians try to bypass the control unit and wire the pump directly to the power source, bypassing the inbuilt protection features. This will inevitably lead to major failure and likely destruction of the whole system.

- *Submersible pump* – The submersible pump is manufactured to a very high specification and will operate on a daily basis without problem for at least 5 years, probably many more. The motor is contained within the pump and is cooled by the water passing over it. It has built in protection features, which together with the control panel ensure that it is protected from risk of overheating, drop in water level, or voltage irregularity.

- *Control unit(s)* – Depending on the system in place there may be a simple on/off control unit or a more complicated looking control panel with digital display. In the event that there is a backup power source, there may be two switches or control units. These are to protect the pump, should not be tampered with in any way and should only be installed and maintained by a qualified electrician. The most common reason for solar pumps getting damaged is because an unqualified person tried to fix it. Incorrect wiring can bypass the inbuilt protection features of the system and cause brand new equipment to be permanently and irreparably damaged. Maintenance tasks include dusting control panel on a weekly basis.

- *Solar panels* (photovoltaic modules). These have no moving parts and there is very little that technically can go wrong with them. Consequently many of them have a 20 year manufacturer's guarantee. The main risks to the panels is

<table>
<tr><td></td><td>
from theft, vandalism or children throwing stones which causes damage. Theft in particular is a major problem in most areas, so WUAs need to ensure thorough security measures are in place to minimize these threat and panels are well secured. Maintenance tasks include:

Clean solar panels weekly if they are covered with dust (in very dusty areas clean twice a week using a wet cloth)
Protect the fragile solar panels (panels and solar pump within a fenced enclosure of 40 m radius for protection and therefore the fence requires to be kept in good condition and the gate should be safely secured).
When carrying out any servicing of this equipment ensure the right qualified personnel do the work.

Motors

Some DC motors need replacement brushes; this is usually a simple operation (far simpler than, e.g. servicing a small engine powered pump). Brushes will probably need to be replaced after two years of operation.

Inverter (AC) automatic/Regulator (DC)

Install away from sunshine, it is usually affected by heat more than 20 – 25 ^{o}C. If the temperature rises more than this, the system switches off and vice versa. This switching on and off is not good.
Should be kept away from water.
It is an enclosed system and should not be tempered with.

Wires:- should be placed in conduits and buried underground and in case of replacement use the right wires (ultra-violet rays resistant)
Pulleys and belts: - check tension and replace damaged or worn out ones.
Exposed terminals (on panels or inverter):- should be checked regularly for corrosion or damage.

</td></tr>
<tr><td>Step 3: Troubleshooting</td><td>
Discuss the potential unexpected problems and what might be the cause.
<table>
<tr><th>Problem</th><th>Probable cause</th><th>Possible solution</th></tr>
<tr><td>Low or no power/slow motor (less water pumped)</td><td>Poor electrical connection due to dirt; Wet or corroded terminals; Insufficient sun</td><td>Clean, dry or replace the terminals</td></tr>
<tr><td></td><td>Dusty solar panels</td><td>Wipe out dust</td></tr>
<tr><td>System switching on and off</td><td>Inverter/regulator poorly installed</td><td>Install away from sunshine/water</td></tr>
<tr><td>Motor stops</td><td>Worn out brushes</td><td>Replace brushes</td></tr>
<tr><td>Water leaking from discharge head (mono pump)</td><td>Leaking pump gland seal</td><td>Tighten pump gland nuts slightly (do not over-tighten)</td></tr>
</table>
</td></tr>
<tr><td>Step 4: Spare Parts, Tools and Technical Assistance</td><td>
Facilitator should discuss requirements, availability and procurement for spare parts, tools, and technical assistance.

For solar powered pumps, the majority of repairs require a specialised and qualified electrician. Many of the components have guarantees that would be nullified if the
</td></tr>
</table>

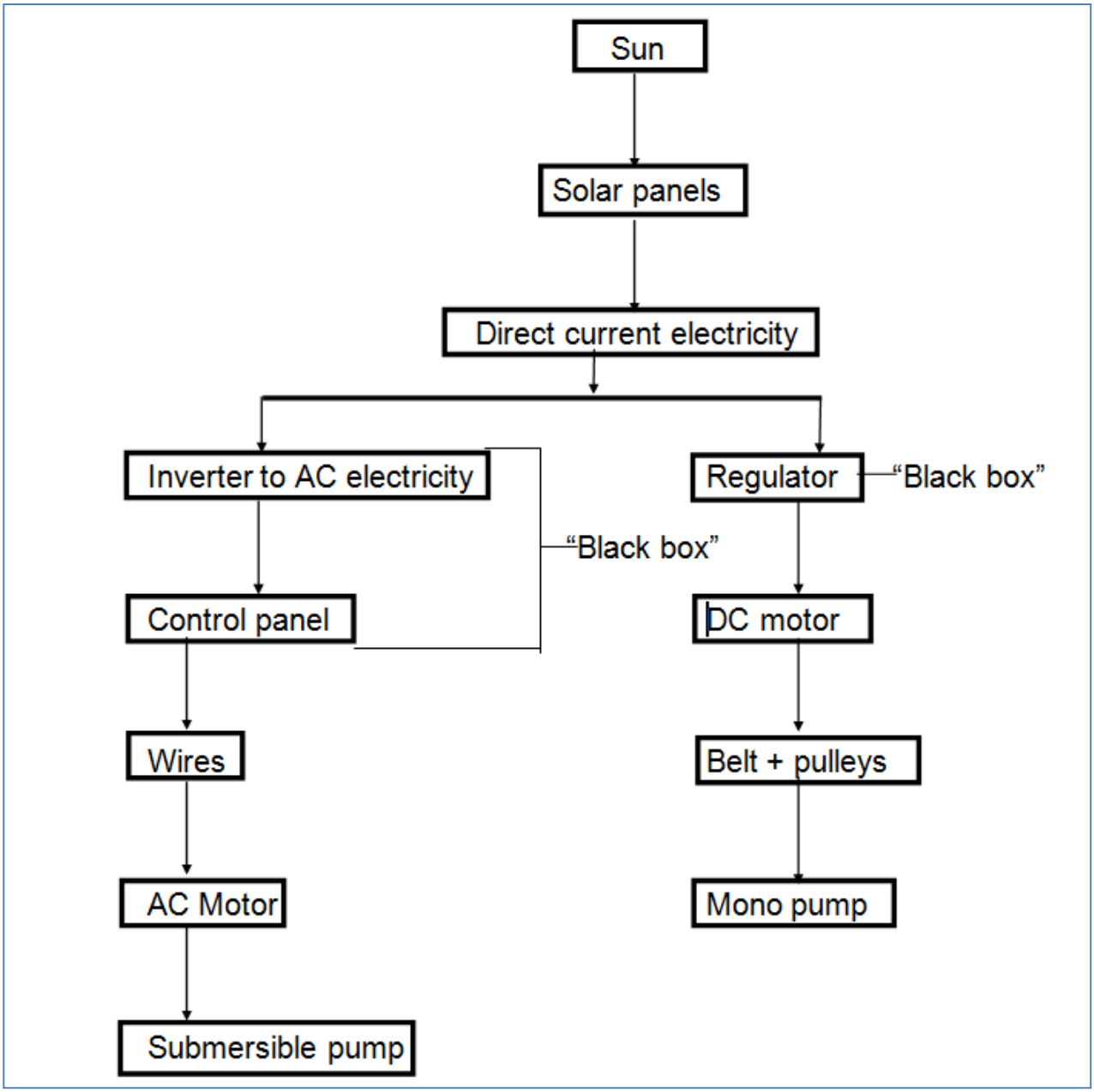
<table>
<tr><td></td><td>equipment is tampered with by unqualified personnel.

In this regard, the most important information required is the name and contact numbers for the suppliers and qualified electricians who could be called on to diagnose problems and undertake repairs.

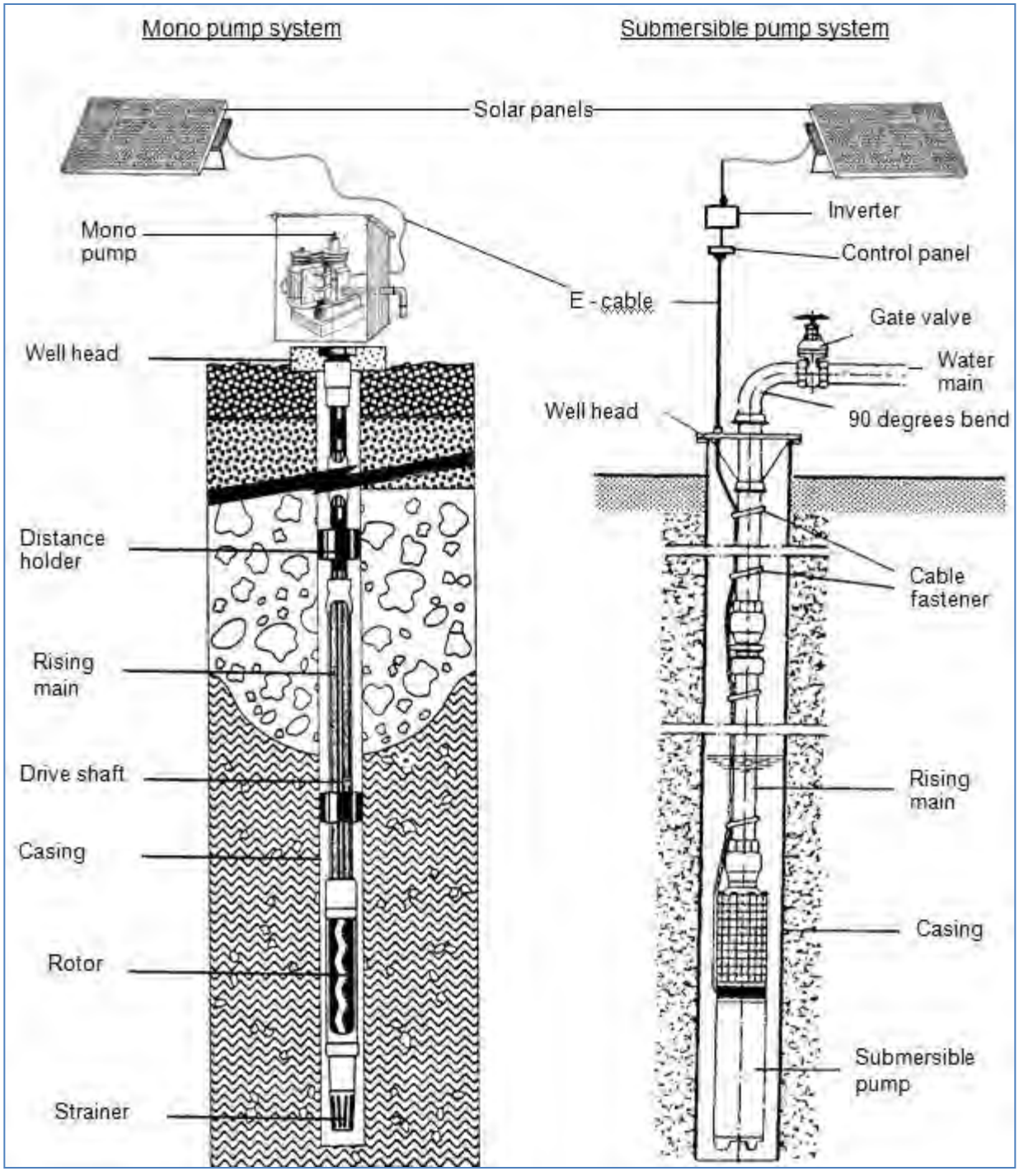
Technical Assistance Contact List

<table>
<tr><th>COMPONENT</th><th>Name of Technical Assistant</th><th>Contact Details</th><th>Back up Contact</th><th>Contact Details for Back-up</th></tr>
<tr><td>Pump Repair</td><td></td><td></td><td></td><td></td></tr>
<tr><td>Generator repair</td><td></td><td></td><td></td><td></td></tr>
<tr><td>Electrician</td><td></td><td></td><td></td><td></td></tr>
<tr><td>Water Quality</td><td></td><td></td><td></td><td></td></tr>
<tr><td>KPLC</td><td></td><td></td><td></td><td></td></tr>
<tr><td>WRMA</td><td></td><td></td><td></td><td></td></tr>
<tr><td>DWO</td><td></td><td></td><td></td><td></td></tr>
<tr><td>WSB</td><td></td><td></td><td></td><td></td></tr>
<tr><td>WSP</td><td></td><td></td><td></td><td></td></tr>
</table></td></tr>
<tr><td>Review</td><td>• What should caretaker do if there is no water?
• What steps have been agreed to keep solar panels secure?</td></tr>
<tr><td>Session Attachments</td><td>Attachment 1: Schematic Diagrams for Solar Powered Water Supply
Attachment 2: Components of a Solar Powered Water Supply</td></tr>
</table>

Attachment 1: Schematic diagram of a solar powered water supply



Attachment 2: Components of a solar powered water supply



<table>
<tr><td>MODULE H</td><td>OPERATION AND MAINTANANCE</td></tr>
<tr><td>SESSION H14</td><td>DIESEL POWERED GENERATORS</td></tr>
<tr><td>Appropriate Facilitator Background</td><td>Mechanic or technician skilled and qualified in the maintenance and repair of diesel engines.</td></tr>
<tr><td>Introduction</td><td>Diesel powered generators are used in many boreholes and water intakes to drive electrical pumps. There is a wide variety of makes, although Lister-Peter and Perkins are common. The principles of operation and maintenance are similar regardless of the make or model. Specific requirements for each make and model should be obtained from the manufacturer’s Operators Manual for the respective engine.</td></tr>
<tr><td>Objective</td><td>At the end of the session, the participants will be able to:
Identify the main components of air-cooled or water cooled diesel engines;
Start and stop the engine;
Undertake basic service the diesel engine;
Follow the safety measures and carry routine maintenance.</td></tr>
<tr><td>Outputs</td><td>An Operation and Maintenance Plan</td></tr>
<tr><td>Timing</td><td>Session should take approximately 6 hrs</td></tr>
<tr><td>Target Group</td><td>Operator and WUA committee members.</td></tr>
<tr><td>Appropriate Venue</td><td>At the pump house where the diesel engine is located.</td></tr>
<tr><td>Methodology</td><td>This is intended to be a PRACTICAL session. The components will be taught by demonstration on the system itself. The flip chart can be used to illustrate details if necessary. Reinforce the learning by allowing participants to handle components and describe their functions to each other.</td></tr>
<tr><td>Materials</td><td>Diesel engine
Fuel
5 litres of engine oil
Fuel, oil and air filters (1 of each)
Spanners
Strapper</td></tr>
<tr><td>Session Guide</td><td></td></tr>
<tr><td>Step 1: Identification of parts of the System & Diesel Engine</td><td>Facilitator starts by identifying the different parts of the pumping system and their purpose.<table><tr><th>Component</th><th>Purpose</th></tr><tr><td>Pump House</td><td>Keep engine and control safe from uncontrolled access</td></tr><tr><td>Fuel Store</td><td>Keep fuel safe from uncontrolled access</td></tr><tr><td>Diesel Engine</td><td>Turns the alternator</td></tr><tr><td>Alternator</td><td>Generates electricity</td></tr><tr><td>Control Panel</td><td>Controls the current to the pump and protects the pump from high currents</td></tr><tr><td>Electrical pump (e.g. Submersible pump in bottom of borehole)</td><td>Pumps water to tank</td></tr><tr><td>Master Meter</td><td>Measures water from the borehole</td></tr></table></td></tr>
</table>

	Now facilitator focuses on the diesel engine and explains the names and purpose of the different parts of the diesel engine.
Step 2: Operating Diesel Engines	Facilitator can ask operator to run through normal start-up procedures to see how system is currently run. Observe and discuss improvements. **Start Up Procedure** 1. Check oil level; 2. Check fuel level and fuel line is on; 3. Check water level in radiator reservoir; 4. Check for any loose wires or hoses; 5. Start engine (using crank or battery); 6. Record start time on Log Chart. **Switching Off Procedure** 1. Turn engine off; 2. Record end time on Log Chart; 3. Check for any oil leaks.
Step 3: Set Safety Rules	Facilitator should discuss safety rules **Safety Rules: General** 1. Keep fire extinguisher or bucket of sand close at hand to deal with fires; 2. No smoking in pump house or fuel store; 3. Wear protective clothing that fit well. No loose clothes that can get caught in the moving parts of the engine. 4. Never put cleaning rugs or other loose items in your pockets when you are in the pump house. It can get caught in the moving parts. 5. Wear good protective shoes. 6. Keep the floor of pump house and store clean and dry, so that you will not slip or fall.

Safety Rules: Fuel & Lubricants

1. Keep spare fuel and lubricants in secure ventilated store;
2. Do not smoke in fuel store or while re-fuelling. Ensure area is clear of any spectators or smokers;
3. Use a pump or tap to take diesel out of a drum. Sucking diesel with a hose is not good for your health.
4. **NEVER** put fuel or oil into the engine while it is running.
5. Do not use kerosene as fuel. It reduces life of engine and fuel pump.

Safety Rules: During Operations

1. Keep spectators out of pump house while engine is operating;
2. Open windows and ensure pump house is well ventilated;
3. Do not open radiator cap;
4. Do not top up radiator by pouring cold coolant in hot engine. The cylinder head may crack;
5. Keep your fingers away from moving parts of the engine.
6. **NEVER** put fuel or oil into the engine while it is running.
7. Never clean the engine when it is running;
8. Do not operate the engine if the safety guard has been removed;
9. Only one person should control the engine;

Safety Rules: During Maintenance Work

1. Do not make any adjustments that you do not understand;
2. Maintenance operations to be carried out on cold engine;
3. Maintenance operations to be carried out under sufficient lighting;
4. Do not over fill engine oil in sump. This may cause engine smoking;
5. Do not use salt water or any other coolant which can cause corrosion in the closed cooling unit;
6. Disconnect the battery terminals before a repair is made to the electrical system;
7. If you are working with chemicals, such as solvents, cleaners, chlorine etc., be careful. Read the instructions on the container and follow them. Some chemicals give out fumes that are poisonous if inhaled. Some of them will burn your skin.

Step 4: O & M Specific Tasks for Diesel Engines

Discuss the tasks relevant to the operations and maintenance of the system components. Draw up O & M Schedule with participants

See attachment 5 for typical O & M Schedule for diesel engines

Step 5: Trouble Shooting

Discuss the potential unexpected problems and what might be the cause.

No	PROBLEM	Possible cause	Remedy
1	WILL NOT START (i) Engine does not turn)	Battery flat or failed	(a) Check liquid level. Fill if necessary. Recharge battery and check all cells working (b) Replace battery if failed
		Starter circuit faulty	(a) Check, clean and refit battery connections. (b) Check circuit relay and starter solenoid.
		Starter faulty	(a) Replace motor. Check starter engaging, attempt to turn engine by hand
		Lubricating oil too thick	Replace with correct grade
		Engine or alternator jammed	Inspection and remove any obstruction
	(ii) Engine turns but does not fire	(a) No fuel atomizers (b) Air in fuel system (c) Dirty or water in fuel (d) Faulty lift pump (e) Faulty injection pump (f) Injection timing wrong	(a) Check fuel available in tank, Check all fuel valves are open (b) Bleed fuel system (c) Clean or replace fuel filter (d) Check fuel lift pump (e) Check fuel injection pump (f) Reset injection pump timing
	(iii) Engine fires but fails to start	(a) Limited fuel supply (b) Faulty lift pump (c) Faulty injection pump (d) Fuel filter blocked (e) Air filter blocked (f) Worn/ dirty injectors	(a) Bleed fuel system and check right through for dirt or water (b) Service fuel lift pump (c) Service injection pump (d) Clean or replace filter (e) Clean or replace filter (f) Service or change injectors
2	Start but misfires	(a) Limited fuel supply	(a) Bleed fuel system and check right through for dirt or water

			(b) Faulty lift pump (c) Faulty injection pump (d) Fuel filter blocked (e) Worn/ dirty injectors (f) Loose or broken pipe (g) Incorrect valve clearances	(b) Service fuel lift pump (c) Service injection pump (d) Clean or replace filter (e) Service or change injectors (g) Tighten or replace (h) Reset clearances
	3	Start but loses Power	(a) All possible causes shown under 2 above (b) Air filter blocked (c) Faulty cylinder head or inlet manifold joints (d) Damaged or dirty turbocharger	Attention as shown (a) to (g) above (under item 2 above) (i) Clean or replace filter (j) Replace gasket (k) Clean or replace filter
	4	Excessive Fuel Consumption	(a) Faulty injection pump (b) Worn or dirty injections (c) Incorrect valve clearance (d) Fuel pump timing incorrect (e) Incorrect fuel (f) Excessive engine wear	(a) Service fuel injection pump (b) Service or change injectors (c) Reset clearance (d) Reset timing (e) Check fuel specification Overhaul engine
	5	Black Exhaust smoke	(a) Faulty injection pump (b) Worn/ dirty injectors (c) Air filter blocked (d) Fuel pump timing incorrect (e) Incorrect fuel (f) Damaged or dirty turbocharger (g) Excessive load (h) Long running time on light load	(a) Service fuel injection pump (b) Service or change injectors (c) Clean or replace filter (d) Reset timing (e) Check fuel specification (f) Clean or replace turbocharger (g) Reduce load as necessary (h) Run on full load for one hour period
	6	Blue/White	(a) Engine	(a) See remedy under 2

		exhaust smoke	misfiring (b) Excessive engine wear	(b) Overhaul engine
	7	Low lubricating oil pressure	(a) Low oil level in sump (b) Oil pressure gauge faulty (c) Oil filter blocked (d) Faulty relief valve (e) Oil pump worn (f) Excessive oil temp	(a) Add lubricating oil to normal level (b) Replace gauge (c) Clean or replace filter (d) Clean or replace valve (e) Replace pump (f) See problem 8 below
	8	High Engine temp	(a) Low level of coolant (b) Faulty thermostat (c) Fan belt slipping (d) Radiator matrix blocked (e) Blockage in cooling system (f) Low level of lubricating oil (g) Fuel injection pump incorrect (h) Cylinder head gasket failed	(a) refill radiator and check for any leaks (b) Check and replace if necessary (c) Adjust tension of belt (d) Clean out thoroughly (e) Drain system, flush out refill (f) Refill to correct level (g) Reset timing (h) Remove head and replace gasket

Step 6: Spare Parts, Tools and Technical Assistance

Facilitator should discuss requirements, availability and procurement for spare parts, tools, and technical assistance.

Tools - Routine maintenance requires a funnel to assist in fuelling and toping up the oil.

Spares Parts & Materials

- Lubricants - oil
- Filters - Oil, fuel and air
- Cotton waste for mopping up spills;

Supply Chain - Establish where the nearest store is that stocks spares for the diesel engine.

Spare	**Min. Required in Store**	**Name & Contact of Supplier 1**	**Name & Contact of Supplier 2**	**Expected Cost per Unit on Delivery**

Technical Assistance

Discuss who can provide technical assistance when it is required.

Component	**Name of Technical Assistant**	**Contact Details**	**Name of Back up Contact**	**Contact Details for Back-up**
Engine repair				
Electrician				
Water Quality				
KPLC				
WRMA				
DWO				
WSB				
WSP				

Review

- What arrangements have been made to keep fuel safe and clean?
- What is the purpose of the Engine Log?
- Who is authorised to service the engine?

Session Attachments

Attachment 1: Engine Log
Attachment 2: Engine Service Form
Attachment 3: Diagram of Lister TS3 Diesel Engine
Attachment 4: Photo of 9KVa Perkins Generator
Attachment 5: Preventative Maintenance of Diesel Engine

Attachment 1: Engine Log

Name of Water Supply		**Engine Type**		
Sub-Location		**GPS**	**Easting**	**Northing**
Location				
Division				
District				

	At Start		During Operations		At End					
Date	**Fuel Added (Litres)**	**Start Time**	**Voltage (Volts)**	**Current (Amps)**	**Time**	**Total Time (Hrs)**	**Kw-hrs (meter reading)**	**Water pumped (Meter Reading)**	**Comments Repairs Problems**	**Initials of Operator**

Attachment 2: Engine Service Form

Engine Make: _____ Model: _____

Date of Service: _____ Name of Mechanic: _____Tel: _____

Hours at Current Service: _____ Hours at Next Service: _____

CATEGORY	ITEM	CHECKED Tick if checked	WORK DONE	COMMENTS
LUBRICATION	Engine Oil			
	Oil Filter			
	Greasing			
FUEL SYSTEM	Fuel Filter			
	Injector/Fuel Pump (leakages)			
	Tank (leakages)			
	Fuel Lines (cracks, leaks)			
ENGINE	Belts			
	Air Filter			
	Plugs/Injectors			
ELECTRICALS	Battery			

COMMENTS: _____

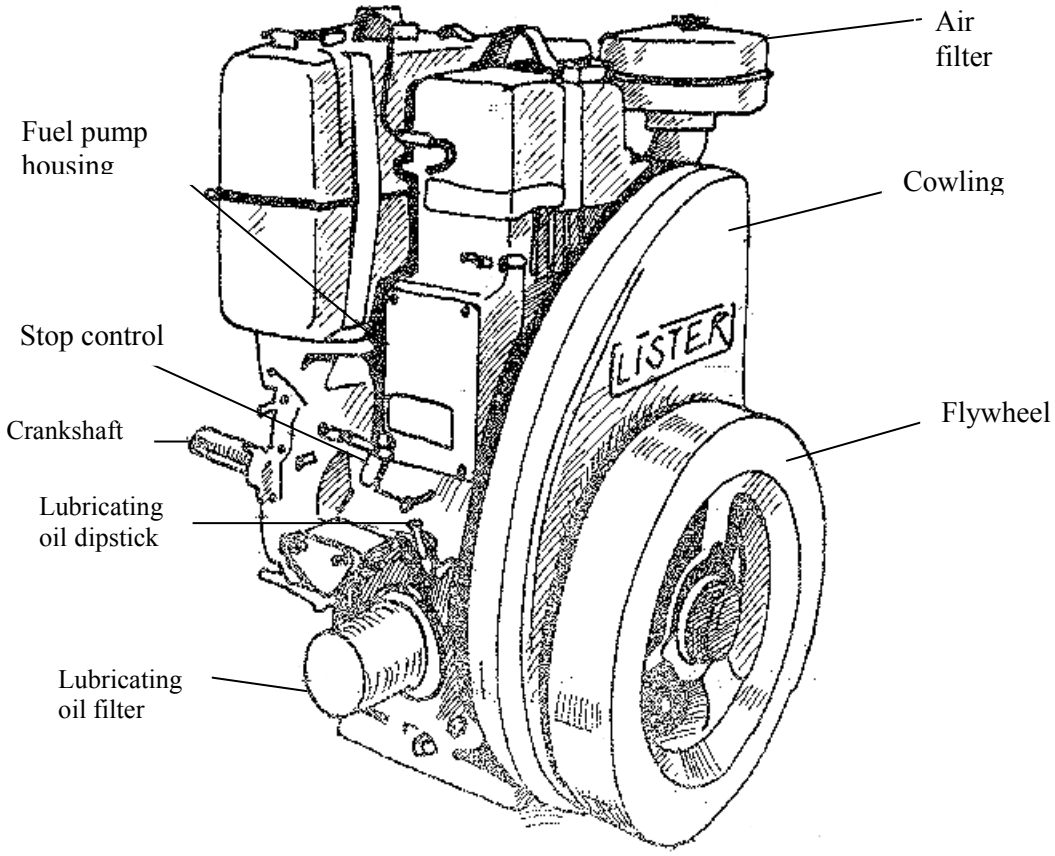
_____

Signature: _____

Signed by (Name): _____

Attachment 3: Diagram of Lister TS3 Diesel Engine

Lister-Petter Air Cooled TS3 Diesel Engine



Attachment 4: Photo of 9KVa Perkins Generator

Attachment 5: Schedule of Preventative Maintenance for Diesel Engines

Daily operation or every 8 hours (To be undertaken by operator/caretaker)

- Check fuel and engine oil levels, top up if necessary
- Check water level in radiator & top up if necessary and secure the cap
- Check tension of alternator drive belt, check battery condition/water level
- Check the lubricating oil pressure at the gauge
- Check for loose nuts and bolts, check and correct any leaks or engine damage
- In very dusty conditions clean air cleaner element, drain and clean dust bowl
- Check exhaust pipe
- Check foundation bolts

Every 100 hours or 3 months (To be carried out by skilled mechanics)

- As for daily services.
- Renew engine lubricating oil
- Renew engine oil filter
- Drain water from fuel filter and pre-filter
- Check the condition of the battery fitted
- When moderately dusty, empty bowl and clean or replace the air cleaner element
- Clean the compressor air filter
- Check and adjust idle speed

Every 200 – 250 hours or 6 months (To be carried out by skilled mechanics)

- As for previous servicing
- Change the engine oil and oil filter element
- Clean fuel strainer, fuel tank breather. Renew fuel filter canister
- Clean battery terminals

Every 400 hours or 12 months (To be carried out by skilled mechanics)

- As for previous servicing
- Replace air cleaner element
- Renew fuel filter element
- Check concentration of coolant
- Check the battery charging system. Check alternator drive belt for wear, Check wiring harness & connections and tighten if required
- Check injectors for performance

After 600 hrs or 18 months (To be carried by skilled mechanics)

- As for 200 hour servicing and maintenance
- Renew coolant
- Renew alternator drive belt
- Tighten cylinder head
- Check and adjust valve clearances
- Check electrical system
- Check all nuts and bolts for tightness
- Check engine mountings

RESOURCE MATERIALS

Action Contre La Faim. 2005 *Water Sanitation and Hygiene for Populations at Risk*. Hermann, Paris.

Behrndt R. and Strasser, J. 1990 *The Afridev Handpump: Installation & Maintenance. Special Energy Programme*. GOPA Consultants, KIE and GTZ.

Bob Harries Engineering Ltd. Undated. *The Minimal Maintenance of Kijito Wind pump*. Thika.

Boot M. T. and Cairncross, S. (Eds.). 1993 *Actions Speak: The study of hygiene Behaviour in Water and Sanitation*. IRC International Water and Sanitation Centre and London School of Hygiene and Tropical Medicine.

Brikké, F. 2000 *Operation and Maintenance of rural water supply and sanitation systems: A training package for managers and planners.* WHO, Geneva, Switzerland.

Brikké, F. and Bredero, M. 2003 *Linking technology with Operation and Maintenance in the context of community water supply and sanitation: a reference document for planners and project staff.* WHO, Geneva, Switzerland.

Camel Bell Ltd. Undated. *Community Driven Development Manual*. Arid Lands Resource Management Project.

Castro, V.; Msuya, N. and Makoye, C. 2009 *Sustainable Community Management of Urban Water and Sanitation Schemes: A training manual*. Water and Sanitation Program-Africa, Nairobi

CDN WQ; Muller, K. 2010 *Draft of CDN's deflouridation experiences on a household scale*. CDN, Nakuru.

DANIDA. 1990 *Training of Self Employed Mechanics for Village Based Hand Pump Maintenance: Part 1 & 2, Training and Maintenance Division*. Danida Project Directorate, Bhubaneshwar.

DANIDA. 1992 *India Mark III Handpump.* Training and Maintenance Division, Danida Project Directorate, Bhubaneshwar.

Davis L and Lambert R. 2002 *Engineering in Emergencies: A practical guide for relief workers*. ITDG Publishing.

Davis, J. and Brikké, F. 1995 *Making your water supply work: Operation and maintenance of small water supply systems*. Occasional Paper Series No. 29, IRC International Water and Sanitation Centre, The Hague, Netherlands.

DTU. 2001 *Recommendations for designing Rainwater Harvesting System Tanks.* DTU, United Kingdom.

Federal Ministry of Agriculture and Water Resources, National Water Resources Institute and UNICEF (Nigeria). 2008. *Installation and maintenance of RUWATSAN1 handpumps*. Nigeria.

Federal Ministry of Agriculture and Water Resources, National Water Resources Institute and UNICEF (Nigeria). 2008. *Installation and maintenance of RUWATSAN2 handpumps*. Nigeria.

Federal Ministry of Agriculture and Water Resources, National Water Resources Institute and UNICEF (Nigeria). 2008 *Construction of drains and platforms for handpumps*. Nigeria.

Federal Ministry of Agriculture and Water Resources, National Water Resources Institute and UNICEF (Nigeria). 2008 *Preventive maintenance of RUWATSAN1 and India Mark II handpumps*. Nigeria.

Fonseca, C. and Bolt, E. 2002 *How to Support Community Management of Water Supplies: Guidelines for managers.* Technical Paper Series No.37. IRC International Water and Sanitation Centre, Delft, The Netherlands.

Gosling, L.and Edwards, M. 1993 *Assessment, Monitoring, Review and Evaluation: Toolkits*. Overseas Information and Research; Save the Children.

Gould, J. and Nissen-Petersen E. Undated. *Rainwater Catchment Systems for Domestic Supply: design construction and implementation.*

Harvey, P.A. and Reed, R.A. 2006 Community-managed water supplies in Africa: sustainable or dispensable. *Community Development Journal*, Oxford University Press.

Hope A and Timmel S. 1984 *Training for Transformation: A Handbook for Community Workers.* Mambo Press, Zimbabwe.

IIRR and Cordaid. 2007 *Building Resilient Communities: A training manual on Community Managed Disaster Risk Reduction*. Unknown Publisher.

Inversin A. 1985 *Hydraulic Ram*. Volunteers in Technical Assistance (VITA), Virginia, USA.

Kar, K. and Chambers, R. 2008 *Handbook on Community-Led Total Sanitation*. PLAN UK, London.

Lammerink, M.P. and Bolt, E. 2002 *Supporting Community Management: A manual for training in community management in the water and sanitation sector.* Occasional Paper Series No. OP34 E, IRC International Water and Sanitation Centre, Delft, The Netherlands.

Livestock Emergency Guidelines Project. 2009 *Livestock Emergency Guidelines Handbook*.

Maji/Danida Water Project Village Follow Up Program. 1995 *Maintenance Course: Gravity Schemes and Handpump; Participants Manual*.

Maji/Danida Water Project Village Follow Up Program. 1995 *Maintenance Course: Gravity Schemes and Handpump; Trainer's Manual*. Draft.

Maji/Danida Water Project Village Follow Up Program. 1995 *Orientation Course: Participant Manual*.

Maji/Danida Water Project Village Follow Up Program. 1996 *Financial Management Course: Participant Manual.*

Maji/Danida Water Project Village Follow Up Program. 1996. *Financial Management Course: Trainer's Manual*.

Maji/Danida Water project Village Follow Up Program. Undated. *Orientation Course: Trainer's Manual*.

Mason, L.J.; Adil, L. and Shamal, S. 2005 *Well Construction Course training module: Water and Sanitation Programme Human Resource Development Unit.* DACAAR, Kabul, Afghanistan.

Mathew, B. 2005 *Ensuring Sustained Beneficial Outcome for Water and Sanitation Programmes in the Developing World*. Occasional Paper Series No. 40, IRC International Water and Sanitation Centre, Delft, Netherlands.

Mc Sorley, B. 2006 *Toolkit for Training Water Management Committees in Kenya*. Oxfam GB (Draft).

Mefalopulos, P. 2008 *Development Communication Sourcebook: Broadening the Boundaries of Communication*. World Bank.

MENR. 2002 *Management Training Manual for Application in Community Training in Water and Sanitation.* MENR.

Ministry of Resources Management and Development and PARTPRO. 2003 *Community Training Manual for Integrated Water Resource Management.* Kenya.

MLRRWD/ASAL Kajiado and KEWI - GTZ – AMREF. Undated. *Borehole Operators Course: Kajiado District*.

Moojiman, A.; Snel, M.; Ganguly S. and Shordt, K. 2010 *Strengthening Water, Sanitation and Hygiene in Schools: A WASH guidance manual with a focus on South Asia*. IRC International Water and Sanitation Centre, The Hague, Netherlands.

Mutiso G-C. M and Thomas D.B. Undated. *Where there is no water: a story of community water development and sand dams in Kitui District*. Kenya.

Narayan D and Srinivasan L. 1994 *Participatory Development Tool Kit: Training Materials for Agencies and Communities*. The World Bank.

NETWAS. Undated. *Trainees Community Management Manual.*

Ngugi, S. 2003 Rainwater *Harvesting for Improved Food Security: Promising Technologies in the Greater Horn of Africa.* Greater Horn of Africa Rainwater Partnership (GHARP) and Kenya Rainwater Association (KRA), Nairobi, Kenya.

Nissen-Petersen, E. 2006 *Water from Dry River Beds*. ASAL Consultants Ltd, Nairobi.

Nissen-Petersen, E. 2006 *Water from Rock Outcrops: A handbook for engineers and technicians on site investigations, designs, construction and maintenance of rock catchment tanks and dams*. DANIDA.

Nissen-Petersen, E. 2006 *Water from Small Dams: A handbook for technicians, farmers and others on site investigations, designs, cost estimates, construction and maintenance of small earth dams*. ASAL Consultants Ltd, Nairobi.

Nissen-Petersen, E. 2007 *Water Supply by Rural Builders*. ASAL Consultants Ltd, Nairobi.

Nissen-Petersen, E. Undated. *Water from Sand Rivers: a manual on site survey, design, construction and maintenance of seven types of water structures in river beds*. ASAL Consultants.

Nissen-Petersen, E.; Madsen, B. and Katui-Katua, M. 2006 *Water for Rural Communities- How Kenyan communities can create their own water supplies with assistance from the Water Services Trust Fund*. ASAL Consultants Ltd, Nairobi.

Oxfam GB. 2010 *Minimum requirements for WASH Programmes*. Oxfam.

Pacey, A. and Cullis A. Undated. *Rainwater Harvesting: the collection of rainfall and runoff in rural areas.*

Pickford, J. 1991 *The Worth of Water*. London: ITDG Publishing.

Practical Action Undated. *Rainwater Harvesting: Technical brief*. Practical Action, United Kingdom.

Practical Action. 2011 Ed. *Humanitarian Charter and Minimum Standards in Disaster Response.* The Sphere Project, Practical Action Publishing, Rugby, UK.

Programme Support Unit/Water Aid Uganda. Undated. *The Gravity Flow Water Supply System: Mechanics Manual*. Kampala.

Rural Focus Ltd. 1998 *Trainer of Trainer's Course in Water Supply Management: A Facilitator's Manual*. Drought Preparedness, Intervention and Recovery Program.

Rural Focus Ltd. 2000 *Community Training in Water Supply Management: A Trainer's Manual*. USAIDOFDA Capacity Building in Water Resource Management, Mandera, Kenya.

Rural Focus Ltd. 2003 *Kathita Kirua Water Project Training Handbook.* (Unpublished).

SKAT. 2007 *Installation and Maintenance Manual for the Afridev Handpump*. SKAT, St. Gallen, Switzerland.

Srinivasan, L. 1990 *Tools for Community Participation: A Manual for Training Trainers in Participatory Techniques*. Prowwess/UNDP Technical Series involving Women in Water and Sanitation. UNDP.

UNDP. 2003 *Mainstreaming Gender in Water Management: A practical journey to sustainability-A resource guide*. UNDP, New York, USA.

UNICEF. 1999 *Towards better programming: A Water Handbook.* Water, Environment and Sanitation Technical Guidelines Series No. 2, UNICEF, New York (ID No, PD/WES/99/1).

UNICEF. 2009 *Trainer's Manual: Guidelines for Community Based Management of Handpumps and Motorised Pumps*. UNICEF.

UNICEF. 2009 *Trainers' Manual for Maintenance of Afridev Handpumps*. UNICEF.

UNICEF. 2010 *Government of the Netherlands, Acceleration of WASH Access Rwanda-Program Review Mission 2010 Draft Report*. UNICEF.

UNICEF. 2010 *Government of the Netherlands, Programme on Water Supply, Sanitation and Hygiene Promotion- Mozambique "One Million Initiative" 2010 Draft Report*. UNICEF.

UNICEF. 2010 *Trainers' Manual for Maintenance of Afridev Handpumps*. UNICEF

Unified Local Government Service of Botswana. 1990 *Handbook for Village Water Supply Operators*. ULGS, Gaborone.

USAID Hygiene Improvement Programme (HIP). Undated. *Monitoring and Evaluation indicators for tracking WASH activities in HIV programs.*

Van Wijk-Sijbesma, C. 2001 *The Best of Two Worlds? Methodology for Participatory Assessment of Community Water Services.* IRC Technical Paper Series No. 38, IRC International Water and Sanitation Centre.

Wanjihia, C.W. and Nissen-Petersen, E. 2006 *Water Surveys and Designs: Explains survey techniques and gives standard designs with average costs on water supply structures*. ASAL Consultants Ltd, Nairobi.

WASH UNICEF KCO. 2009 *Case Studies in Community Management of Drinking Water Supply Systems in Kenya*. UNICEF, Nairobi.

WASH UNICEF KCO. 2009 *Improving Sustainability of Water Supply Systems in Kenya through Community Management: A Concept Note*. UNICEF, Nairobi.

WASH UNICEF KCO. 2009. *Supply and Maintenance Networks for Water Supply Systems in Kenya*. UNICEF, Nairobi.

WASH UNICEF KCO. 2009 *Trainers' Manual for Water Supply Systems: Guidelines for Community Based Management of Handpumps and Motorized Pumps*. UNICEF, Nairobi.

WASREB. Undated. *WASREB Tariff guidelines*. Kenya.

Waterlines. 1997 *Training*. Technical Brief No. 53, Vol. 16 No. 1, London.

Waterlines. 1997 *Water, Sanitation and Hygiene Understanding*. Technical Brief No. 51, Vol. 15 No. 3, London.

Wekessa M and Karani I. 2009 *A Review of the Status of Emergency Water Trucking in the Arid and Semi Arid Districts of Kenya (Draft)*. FAO-Kenya.

Whelan, M. 1997 *10 Top Secrets to Powerful Writing*.

Wood S, Sawyer R, Simpson-Herbert, M. 1998 *PHAST Step-by-step guide: a participatory approach for the control of diarrhoeal disease.* (unpublished document WHO/EOS/98.3). WHO, Geneva, Switzerland.

World Bank. 2007 *Citizens Report Card on urban water, sanitation and solid waste services in Kenya*. Summary of results from Nairobi, Kisumu and Mombasa. Prepared by: Ministry of Water and Irrigation, Kenya Residents Association, SANA International, Ilishe Trust, Water and Sanitation Program, World Bank.

World Bank. Undated *Improvement and Maintenance Management of Public Toilets: A study prepared for The World Bank*. World Bank.

World Bank. Undated. *Information and Training for Low Cost Water Supply and Sanitation*; *Unit 3.1: Health Aspects of Water Supply and Sanitation*.

WSTF. 2007 *Community Project Cycle Guidelines*, WSTF.

WSTF. 2008 *WSTF WRUA Development Cycle Guidelines*. WSTF.

Websites

www.irc.nl/publications

http://www.scribd.com/doc/52470725/Domestic-DeFluoridation-in-Lao-WEDC)

http://www.infonet-biovision.org-water storage

www.cdnwaterquality.co.ke

www.undp.org/water/genderguide