A training manual for accelerating self supply in Sierra Leone

Cover photo: Moving up the rural water supply ladder-ground water option

A WaterAid manual, February 2014
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Executive Summary

This manual is designed to be a guide for field staff working on self supply. Though practiced in Sierra Leone, self supply has not received the official policy support and attention in order to complement other forms of community water supply systems. Because of this, the national statistics for access to safe drinking water and sanitation is dismally low i.e. 57% and 13% respectively. It has now been recognized that incremental improvements to water sources through user investments has a huge potential to increase access to safe drinking water in the country. There is already a strong foundation for the non-subsidy concept to community development in the country. The results of the baseline survey indicate that there are more communities in Sierra Leone with 150 persons or less and these attract less government attention for basic social services than the bigger towns. Additionally, more of these small communities have achieved ODF through CLTS which remains the preferred approach to sanitation in the country. However, many ODF communities don’t have access to safe water in sufficient quantities which gives a huge opportunity for self supply to thrive since the self help concept that was used to achieve ODF status can easily be replicated to the provision of safe water.

This manual is divided into three modules each of which are further subdivided into different sessions.

Module one which is about the community and the field staff has three sessions and it deals with community entry, communication and the identification of community structures for self supply.

Module two which is about water and life has five sessions and it treats topics like water and life, water hygiene, water supply structures, systems set up, water improvement technologies and community sanitation.

Module three deals with strategic implementation of self supply divided into four sessions like gender issues in self supply, resource mobilization for self supply, accelerating self supply, advocacy and market approach for self supply.
There is an evaluation plan for the training followed by annexes which spell out technologies for self supply and upgrading of wells.

This document should be cited as: WaterAid (2014) A training manual for accelerating self supply in Sierra Leone

This document can be found in the publications section of WaterAid’s website: www.wateraid.org/publications
<table>
<thead>
<tr>
<th>Acronyms</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>WSP</td>
<td>Water Services Provider</td>
</tr>
<tr>
<td>WSS</td>
<td>Water and Sanitation Services</td>
</tr>
<tr>
<td>ACCESS</td>
<td>Accelerating Self Supply</td>
</tr>
<tr>
<td>CLTS</td>
<td>Community- Led Total Sanitation</td>
</tr>
<tr>
<td>HHWTS</td>
<td>Household Water Treatment and Storage</td>
</tr>
<tr>
<td>HHWTS</td>
<td>Household Water treatment and Storage</td>
</tr>
<tr>
<td>M&amp;E</td>
<td>Monitoring and Evaluation</td>
</tr>
<tr>
<td>MF</td>
<td>Microfinance</td>
</tr>
<tr>
<td>MUS</td>
<td>Multiple Use of water</td>
</tr>
<tr>
<td>O&amp;M</td>
<td>Operation and Maintenance</td>
</tr>
<tr>
<td>RWS</td>
<td>Rural Water Supply</td>
</tr>
<tr>
<td>RWH</td>
<td>Rain Water Harvesting</td>
</tr>
<tr>
<td>UN</td>
<td>United Nations</td>
</tr>
<tr>
<td>USAID</td>
<td>United States Agency for International Development</td>
</tr>
<tr>
<td>WASH</td>
<td>Water, Sanitation, and Hygiene</td>
</tr>
<tr>
<td>WHO</td>
<td>World Health Organization</td>
</tr>
</tbody>
</table>
Introduction

In many developing countries national objectives have been set and resources directed to providing adequate and safe water supply, sanitation and hygiene-(WASH). Yet many people in both rural and urban areas still do not have access to adequate WASH facilities. Very often small communities in remote areas are not included in national programs and initiatives for basic social services largely because of budgetary limitations. For small communities national budgets are not enough to cater for them and so financial and labor inputs for water supply and sanitation facilities must come from the communities themselves. Stimulation of communities to make an effort to improve local conditions and some expert knowledge on possible improvements is often required. Community development workers can become the needed change agents in this case.

WaterAid in Liberia and Sierra Leone is providing national governments with technical support for WASH and further doing service delivery work and advocacy to reach more people with safe Water, Sanitation and hygiene in both countries. These include the scaling up of community participation for sustainability of facilities and services gender mainstreaming, hygiene education, using simple technologies that could stimulate user investments in their water supply systems, operation and maintenance.

The government of Sierra Leone cannot singularly fund the provision of safe drinking water for every community in the country. User investments in water supply can make a tremendous difference in the WASH sector-hence the need for self supply.

Field staff form a critical mass of success in self supply. Equipping them with the right set of skills to effectively deal with issues like community mobilization, demand building and creating the necessary links to leverage product supply chains remains imperative to achieving success.

The technical information on Self Supply may need to be simplified and explained with simple participatory training methodologies. Trainers should ensure that participants internalize the teachings as much as possible.
This training manual is designed to provide self supply practitioners and other community-based workers with as much practicable information as possible to facilitate self supply. It stresses improvement to water supplies developed largely through user initiatives and financing, usually at household level with a range of technologies in rain water harvesting, spring protection, well construction and up-grading and Household water treatment and storage.

It is developed with funds from the United Kingdom’s Department for International Development-DFID through its support to the Government of Sierra Leone
How to use the Manual

The manual has been designed as a self-contained curriculum for training on community mobilization for accelerating self supply.

It is important that the staff be trained in all the topics before s/he begins work in the community.

The manual is organized into three major units or modules:

1. The Community and the Field Staff
2. Water and Health
3. Strategic Implementation of Self Supply

Each module includes the following components:

**Introduction** - this summarizes the tasks to be performed by the field staff, learning objectives, contents, and materials required.

**Methods of Training** – Trainer’s notes has been provided, time allotments suggested and the method of training deemed to be participatory, i.e., brainstorming, group work, demonstration, role-play, illustrated trainer presentation and case studies.

**Training Size** - The recommended number of participants is 20-25 per training session.

**Training Schedule**- The training can be covered in full five days or if necessary, trainers and participants can adapt it as per the need of their program.

**Teaching Aids** - The manual includes all necessary teaching aids (Posters, sample technologies of self supply etc). In addition, Simple, low-cost teaching aids such as flipcharts may be used by the trainer. Programs are encouraged to prepare some visual aids to facilitate the training.

**Evaluation**- To evaluate the effectiveness of the training, trainers should administer to participants the same test before and after sessions to be able to assess the level of knowledge tranfer. This has been outlined as pre- and post-tests. Questions on these tests should be based on the objectives of training sessions.

Trainers should explain carefully the purpose of the pre- and post-tests before administering them. Pre-tests tell trainers how much participants know before training. By comparing results of the post test with those of the pre-test, trainers can see how much participants' knowledge improved. Allocate a fixed time for completing both tests.

After the training, compare the results for each participant and the group as a whole.
Goal and Objectives of the Manual

Goal
Increased knowledge and skills to facilitate the acceleration of self supply as a service delivery model

Objectives
By the end of the training, the participants will be able to:

- Get a working knowledge and understanding of the concept of self supply
- Motivate communities to invest in their own water supplies through self supply
- Promote the concept of self supply through effective communication and advocacy
- Explain and replicate in the community the various WASH activities demonstrated during the training
- Facilitate the setting up of community-based structures for self supply

The concept of Self Supply
Given low current rates of coverage with improved (community level) sources and ambitious targets to provide access to water rapidly to all, this manual gives more emphasis to lower cost technologies and the Self Supply approach in rural areas. Existing practice is mostly centered around the digging of family wells. But levels of groundwater exploitation still remain well below their potential in most parts of the country, and there is much scope for further development.

The Self Supply initiative builds on community investment to build and improve water sources at individual household levels rather than from government. As such, government and partner’s role becomes one of establishing the rights-enabling environments for households to invest, creating the conditions to accelerate the construction of family wells, and promoting practices that make their use safe.

The idea was to make scarce funding resources go further, because as well as being relatively low-cost, most of the construction and operating costs of family wells are borne by households and not by government or its development partners. Therefore, in
reaching for universal coverage, it is unlikely that a single model of supply will be the cost effective way of serving 100% of people in any given community with widely varying patterns of settlement and hydrogeology. Consequently, it is likely that overlapping initiatives in the form of family wells and rainwater harvesting are recognized, especially where households are scattered over large or remote areas.

The key characteristics are:
- A ladder of incremental improvements in steps which are easily replicable and affordable to users, linked to micro-finance systems and/or productive use
- Official recognition of lower steps of the ladder as necessary stages towards a level (to be defined) which is recognized as contributing to human development
- Availability of low-cost technical options and information on source construction and upgrading rainwater harvesting and household water treatment
- Management and maintenance based on strong ownership by individual (or community) and local skills
- Demand built through government promotion and private sector marketing

In short, “Self Supply encourages the incremental improvement of household and community supply through user investment in water treatment, supply construction and upgrading, including small rainwater harvesting and groundwater systems”.

In accelerating Self supply, we must put the user first and provide technical and product solutions that provide good value propositions for the households, to enable them upgrade their level of service. Therefore, it is expected that agencies able to identify the right products and/or services at the right prices, while relying on public policy to support self-supply. Therefore it is also the view of this manual to equip field staff for identifying and developing low-cost consumer led products for rainwater storage, product promotion and behavior change messaging, for a sustainable supply chain.
Role of WASH Self Supply Field Staff

<table>
<thead>
<tr>
<th>Field Staff</th>
<th>With Supervisor’s Support</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Serve Eligible Community Structures</strong></td>
<td><strong>Mobilize the Community:</strong></td>
</tr>
<tr>
<td>• Identify, motivate, and recruit clients community structures for self supply</td>
<td>• Establish rapport with local leaders and the Community structures</td>
</tr>
<tr>
<td>• Provide technical information and guidance to community structures</td>
<td>• Collect baseline information on the community and identify target groups for self supply i.e., Local artisans like well diggers, advisory groups on self supply</td>
</tr>
<tr>
<td>• Identify and provide supplies as available</td>
<td>• Network and establish contact with other community development programs</td>
</tr>
<tr>
<td>• Follow-up with community structures to provide repair supplies and monitor their water quality</td>
<td>• Sensitize the community to gender issues</td>
</tr>
<tr>
<td>• Promote subsidized social marketing products as available and applicable</td>
<td>• Motivate women for their support and involvement in the program</td>
</tr>
<tr>
<td></td>
<td>• Organize local groups</td>
</tr>
<tr>
<td></td>
<td>• Mobilize community leaders, decision makers, and other Community’s Own Resource Persons to speak in favor of Self Supply</td>
</tr>
<tr>
<td></td>
<td>• Organize regular information, education, and communication activities</td>
</tr>
<tr>
<td><strong>Mobilize the Community:</strong></td>
<td><strong>Administration</strong></td>
</tr>
<tr>
<td>• Establish rapport with local leaders and the Community structures</td>
<td>• Participate in training and meetings</td>
</tr>
<tr>
<td>• Collect baseline information on the community and identify target groups for self supply i.e., Local artisans like well diggers, advisory groups on self supply</td>
<td>• Record and report service information</td>
</tr>
</tbody>
</table>

**TRAINING METHODOLOGY AND PRINCIPLES OF ADULT LEARNING**

The training:

- Uses structured learning activities: presentations, group discussions, group work, role plays, practical exercises, etc.
- Engages the participants through active involvement in exercises and small group exercises.
- Enables participants to experience the same activities they will be carrying out in their communities

Trainers who use this manual should follow the principles of adult learning during their training sessions, for example:
• Adults learn best when they are actively involved in their own training and when training builds on their own experiences and knowledge.
• How you teach is as important as what you teach.
• Adults have a broad range of experience upon which to draw and to share with others.
• While lectures are sometimes necessary, research shows that they are not the best way to teach. Adults learn best when training allows them to discover their own solutions to problem.
• Adults learn best through doing. The next best way they learn is through both seeing and hearing. People learn the least through seeing or hearing alone. If you must lecture, be sure to use visual aids so participants both see and hear what you say.
• Adults want to learn what they can apply immediately.

Suggested methods:
• This form of training follows a practical oriented approach. It will therefore be very useful to organize the training close to the sources and facilities that the participants will be working with.
• Use simple, appropriate, culturally, and religiously acceptable terminology. Avoid words or phrases considered vulgar or offensive within the community.
• Use games, discussion, case studies, demonstration, simulated practice, question-and-answer sessions, brainstorming, etc.
• Move at a pace comfortable for the participants.
• Have warm up exercises in between the training sessions to boost up the participants' level of energy
• Provide positive feedback to ensure a participatory teaching and learning process.
Session Methodology and Structure

Methodology
Based on adult learning principles, each session is structured according to the following steps that incorporate the “experiential learning cycle”:
- Introducing the session (some kind of icebreaker or climate setter)
- Presenting the session’s objectives
- Offering a structured experience to the participants (such as simulations)
- Processing (talking about) that experience
- Summarizing the session and linking it to the next session

Structure
The Training guide is organized by modules and sessions. Each session has:
- A title page with session objectives
- A “session-at-a-glance” table with activities, times, and needed materials
- Detailed training instructions for the trainer
- Effective learning tips to comprehension

Certification
Upon successful completion of the training, the organization can hold a small certification ceremony for the participants. It is suggested that participants can be given certificates and a Tool Kit containing tools for repair and maintenance of hand pumps, water disinfection solutions/chemicals etc., and promotional materials for distribution to their clients.

The organization may invite a local health official and/or community leaders, e.g., the Chief Medical Officer (CMO) or the Councilor, to attend the ceremony and to give away the certificates. The graduation ceremony will publicize the arrival of the field staff in the community and boost their morale in preparation for their new roles.
Pre and Post Tests

*Tests on Module One*

Give two reasons why meetings are important to a community?

An agenda is the list of things to be discussed in a meeting  Yes or no

A meeting shall end with a plan of action  Yes or no

*Tests on Module 2*

State three uses of water

State three qualities of good water

List the three main sources of water in your community

List three qualities of a good water storage container used in your community

Give the meaning of hygiene in your own words

Define Sanitation in your own words

List three types of water related diseases common in your community

*Tests on Module 3*

Give two reasons why you need money in your community for the maintenance of the rural water supply

State two ways to raise funds for self supply

Name two management tools in self supply

Define budgeting in your own words

Have you ever discussed a budget?  Yes / No

If yes, state one difficulty you encountered

Gender means partnership between men and women  yes or no
Module 1: The Community and the Field Staff
MODULE PRELIMINARIES

TASKS TO BE PERFORMED BY THE FIELD STAFF
This chapter describes the process of communicating with the community. It prepares field staff to explore people’s views and opinions on Water, sanitation and hygiene needs and possible solutions.

As part of their activities in the communities, the trainees would be expected to:

- Educate client about the provision, maintenance and promotion of quality self supply services
- Inform community structures about new sustainable self supply products
- Provide correct and adequate information about hand washing and personal hygiene to clients
- Dispel myths and misconceptions about water treatment

Learning Objectives
This part of the manual gives ideas and suggestions on how to stimulate and guide the community:

- to identify community problems and felt needs in water supply, sanitation and health
- to decide on their priorities for self supply
- to explore feasibility of the options for self supply
- to solicit financial and/or technical external support
- to accelerate and sustain self supply initiatives

Sessions
1. Community Entry
2. Communication
3. Identifying community structures

Materials needed for the training
- Flipcharts
- Markers
- Field sites of water sources

Time required: 1 hr. 45 minutes
- Handbook

**Preparation for start of training: Welcome & Introductions**

Welcome to the training & write down participants’ expectations of the training

Ask participants their name, country, organization, & most beautiful place that the person has ever visited. Ask participants to come up with ground rules that will enhance a comfortable learning environment to all participants and allow facilitators deliver conveniently. Record their answers on a flip chart.
Session One

Entering the community

Time required: 30 minutes

Learning Outcome: Effective utilization of community structures for self supply

Learning Objective
At the end of the session the participant will be able to:

- Understand how to work with community structures in self supply initiatives
- Explore community assets and potentials for self supply

<table>
<thead>
<tr>
<th>Method of Training</th>
<th>Trainer’s Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Step 1:</strong> Stimulate participants to identify and rank whom to meet in the community for Self supply initiatives</td>
<td></td>
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<tr>
<td>Then discuss the following people in the communities and their roles in self supply</td>
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<tr>
<td>Allow participants to brainstorm how these people influence program implementation and success</td>
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<tr>
<td><strong>Formal Leaders</strong></td>
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<tr>
<td>For community workers who do not live in the community, the usual approach is to formally contact the 'leaders' first. There may be a community council or committee, a group of elders, one or more government or party representatives</td>
<td></td>
</tr>
<tr>
<td><strong>Informal leaders</strong></td>
<td></td>
</tr>
<tr>
<td>These include other generally recognized people such as religious leaders, traditional practitioners, midwives, teachers etc.</td>
<td></td>
</tr>
<tr>
<td><strong>Step 2.</strong> Ask participants to express their experiences in starting off with community programs through these structures</td>
<td></td>
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<tr>
<td>Discuss the approaches as follows</td>
<td></td>
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<tr>
<td>Ask participants to brainstorm</td>
<td></td>
</tr>
<tr>
<td>Things to be done before a meeting</td>
<td></td>
</tr>
<tr>
<td>Relevant information for inviting people to a meeting</td>
<td></td>
</tr>
<tr>
<td>How to prepare for a meeting</td>
<td></td>
</tr>
<tr>
<td>What should be done during a meeting</td>
<td></td>
</tr>
<tr>
<td>Meetings are important to a community in order to:</td>
<td></td>
</tr>
<tr>
<td>- Exchange ideas on what can be done;</td>
<td></td>
</tr>
<tr>
<td>- Work together;</td>
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</tr>
<tr>
<td>- Support each other;</td>
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</tr>
<tr>
<td>- To sensitize everybody in the community;</td>
<td></td>
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<tr>
<td>- For a particular purpose e.g. fund raising;</td>
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<tr>
<td>- To solve problems;</td>
<td></td>
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<tr>
<td>- To plan works;</td>
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<tr>
<td>- To evaluate works done.</td>
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</tr>
<tr>
<td>one or two introductory meetings with leaders is necessary to get an entry into the community and to pave the way for further contacts with leaders and other people</td>
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</table>
| Public community meetings are necessary at the
initial stage to build confidence and encourage participation
Subsequent public community meetings could be organized to report on findings of the informal talks, the progress and to get a general consensus on conclusions and actions points
Such form must be carefully planned in view of the activities of the community members such as farming, daily duties, ceremonies, funerals etc

<table>
<thead>
<tr>
<th>Step 3: Divide participants into groups of at most 6 and allow them to take community walks at different points</th>
<th>Several walks through a community are necessary to get to know the situation and to get an impression of burdens and health risks, as well as to allow people get to know who you are. Informal talks with the people met during such community walks will provide useful information. The views of all community members are important but especially the views of women, who are usually primarily responsible for matters regarding water in most communities. Some leaders may require appointments to be made for later times, as people tend to be more relaxed and more open in expressing their views when talks are held in their homes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Every participant in the group should take note of why it is necessary to walk</td>
<td>Also ask participants what they talked about with people they met along their walk ways – these should include peoples’ perceived burdens and needs or how much people know about the links between water, sanitation and disease</td>
</tr>
<tr>
<td>Allow participants to rest for 5 minutes and put their findings together for a plenary presentation by each group</td>
<td>In your discussions, ask participants about specific places they were interested in seeing and why – these should include water source(s)</td>
</tr>
<tr>
<td>In your discussions, ask participants about specific places they were interested in seeing and why – these should include water source(s)</td>
<td>Also ask participants what they talked about with people they met along their walk ways – these should include peoples’ perceived burdens and needs or how much people know about the links between water, sanitation and disease</td>
</tr>
</tbody>
</table>
Session Two

Communication

Time required: 30 minutes

Learning outcome: Improved and timely service delivery

Learning Objectives:
At the end of the session the participant will be able to:

- Discuss the characteristics of effective communication and how to improve communication
- Understand the processes for communicating with internal and external stakeholders

<table>
<thead>
<tr>
<th>Method of Training</th>
<th>Trainer’s Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Step 1:</strong> Lead the participants through a brainstorming session of the types of communication/information flows that are necessary in the management structure of an urban water and sanitation program</td>
<td>For example, what types of message would a meter reader communicate to consumers? Is written, verbal or visual communication best in each of these cases? Why? For each idea, ask the participants to choose the ‘best’ way to communicate (written, verbal, visual).</td>
</tr>
<tr>
<td><strong>Step 2:</strong> Facilitator defines communication as:</td>
<td>Communication is a mutual exchange of information and understanding by any effective means. The process by which information is intentionally or unintentionally exchanged between individuals. It also involves the building of strong human relationships.</td>
</tr>
<tr>
<td><strong>Step 3:</strong> Describe the different types of communication with examples</td>
<td><strong>Vertical Communication</strong> [Example of communicating with consumers] The goal of communication should be to enhance customer buy-in, ownership, willingness to pay, responsibility and hygienic use of water. Communication should be a two-way stream - in addition to communicating with your customers, there should be channels for them to communicate with you (to report level of satisfaction and complaints for example).</td>
</tr>
</tbody>
</table>
**Horizontal Communication**

[Example of office communication]
Horizontal communication, such as office communication, is important for coordinating activities and making sure the team is moving in the same direction, towards the same goal.

<table>
<thead>
<tr>
<th>Step 4: Discuss the vehicles of communication, with advantages and disadvantages as follows:</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Written Communication</strong></td>
</tr>
<tr>
<td>This is useful in the following situations:</td>
</tr>
<tr>
<td>• The sender wants a record for future references.</td>
</tr>
<tr>
<td>• The receiver will be referring to it later. There may be many receivers</td>
</tr>
<tr>
<td>• The message is complex and requires study by the receiver.</td>
</tr>
</tbody>
</table>

Disadvantages:
Strategies involving written communication (like sending out a flyer), can reach a wider audience but are limited to those who can read and are interested.

Verbal Communication
Verbal communication allows for interaction between people and opportunities to ask questions or to ask for clarification.

Visual Communication
Is a very important form of communication for the following reasons:
• Most people understand things better when they have actually seen how they work - so instead of telling someone how to fix a leak for example, they are more likely to learn if you show them.
• Complex ideas can be presented clearly and quickly using visual aids or a demonstration.
• People retain information longer when it is presented to them visually.
Strategies involving both words and visuals are most effective for communicating information.
While people absorb information through all of their senses, the highest percentage of what they take in is through sight.

<table>
<thead>
<tr>
<th>Step 5. Web of communication</th>
</tr>
</thead>
<tbody>
<tr>
<td>Explain the illustration of the</td>
</tr>
</tbody>
</table>
different ways, in which these four different groups interact, to make a network of communication as it applies to Self Supply  
(Source: Adapted from Gorre-Dale et al, 1994)

TIPS ON COMMUNICATION
- Listen to customers & acknowledge their comments
- Keep customers informed in a language they can understand
- Make an effort to get to know customers and their needs
- Make sure to communicate important messages (like water shortages)
Session Three
Identifying community structures for self supply

Time Required: 45 minutes

Learning Outcome: To effect implementation, management and long-term sustainability of the self supply concept

Learning Objectives
At the end of the session the participant will be able to:

- Understand the management structure of community water supply scheme
- Understand the roles and responsibilities of different groups and individuals

<table>
<thead>
<tr>
<th>Method of Training</th>
<th>Trainer’s Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Step 1:</strong> Generate a discussion for participants on governance and management structures in any organization/agency they have worked with before Ask participants to develop a simulation organogram of their work setting Allow for a plenary presentation and allow participants to discuss the roles and responsibilities of each member in the organogram</td>
<td>Make sure to stress the importance of having a clear organizational structure. Organizations with clear roles and responsibilities and enforcement of roles and responsibilities</td>
</tr>
<tr>
<td><strong>Step 2.</strong> Allow participants to identify community structures for accelerating self supply Facilitator describes the roles and responsibilities of the following: (i) Water Management Committees This structure is designed to help ensure that community-managed WASH programs receive adequate support; are managed in a sustainable manner; and achieve transparency in operations. It is a consumer membership body comprising all residents of the Community The purpose of this committee is to strengthen consumer voice and to provide a forum for</td>
<td></td>
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</tbody>
</table>
residents to dialogue with their water services provider in discussing any water and sanitation related issues in the community. The Committee should be ‘gender-conscious’ as women are primarily responsible for obtaining water and are usually left out of the decision-making process.

**ii) Technician**  
The Technician is responsible for operating and maintaining the infrastructure. The Technician is also responsible for ensuring that household connections meet the minimum technical standards (for example that they use the right quality of pipes and that the trenches are deep enough).

The Technician’s main responsibilities include the following:
- Preventive maintenance of infrastructure
- Leak detection and control
- Connecting customers and installing meters
- Ensuring that the quality of water is safe
- Disconnecting non-paying customers and illegal connections
- Keeping an updated asset register and a log book of repairs

Other community groups in the process of community self supply
- women's groups
- cooperative(s)
- Midwives/Traditional Birth Attendants
- School children and youth clubs
- Theatre groups/local performers
- Story tellers

<table>
<thead>
<tr>
<th><strong>Step 3:</strong> Ask the participants why all residents should become a member of the committee</th>
<th><strong>Possible Answer:</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>In order to have a voice in the provision of WASH infrastructure and management in the community.</td>
</tr>
</tbody>
</table>
MODULE 2: Water and Health
MODULE PRELIMINARIES

Tasks to be performed by Field Staff

This module gives background information on the various sources of water supply and on the links between water, sanitation, hygiene and health. This information can be used in discussions with the community about health risks.

As part of their activities in the communities, the trainees would be expected to:

- Motivate communities for provision, use and maintenance self supply facilities
- Develop the capacity of community structures for proper maintenance of the facilities

Learning Outcome: To enable communities to operate, maintain, use and manage the water supply systems in a sustainable way.

Learning Objectives

- Communities understand the importance of safe water supplies
- Communities are able to deal with technical, health and social problems in relation to water in an appropriate way.

Sessions

| Water and life | Time required: 180 minutes |
| Water Hygiene |
| Water Supply Structures and Maintenance |
| Water treatment technologies |

MATERIALS REQUIRED FOR TRAINING

- Flipcharts
- Markers
- Field sites of water sources
- Handbook for field staff

Preparation for start of training: Welcome & Introductions

Welcome to the training & write down expectations of the training

Encourage participants to recap on previous sessions
Session One

Water and life

Time required: 30 minutes

Learning Outcome: Participants appreciate the relationship between water and life.

Learning Objectives:
At the end of the session the participant will be able to:

- To analyze the different uses and sources of water to a community;
- Identify the different water supply sources

<table>
<thead>
<tr>
<th>Method of Training</th>
<th>Trainer’s Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Step 1:</strong> Ask the participants to brainstorm on the phrase ‘Water is Life’</td>
<td>For the purpose of this training, ‘Water is life’ means it plays an important role to all living things - plants and animals. Water forms two thirds of the human body and the good functioning of the human body depends on water.</td>
</tr>
</tbody>
</table>
| Allow participants to list the various uses of water | Some of the uses of water should include::
| | Drinking;
| | Cooking;
| | Bathing;
| | For house chores (activities);
| | Farming;
| | For photosynthesis by plants; |
| Ask participants to discuss ‘Safe water’ according to their own perspective | Good water is:
| Allow free discussion on myths and misconceptions about water in crisis situations | Colourless- has no colour;
| | Has no smell;
| | Has no taste;
| | Free from all dirt and germs |
| **Step 2.** Ask participants to identify the sources of water | There are three major sources of water available:
| | - rainwater
| | - surface water
| | - groundwater

**Rain water**
Rain can be collected from the roof of a house that is fairly clean and run off into tanks. There is need of a clean well built roof and storage tank to collect enough water to last for long.
If rainwater collected during the rainy season is meant to be stored for use during the dry season, large storage basins or containers are required.

**Ground water**
It is the rain and surface water that infiltrates into the ground, that has been seeped through sand and soil, and is stored in "water-bearing layers". It can be collected from natural springs where the water bearing layers reach the surface, or by digging wells or drilling boreholes to reach the water bearing layers.

**Surface water**
This is water from rivers, lakes, streams and canals, and from man-made open water sources

<table>
<thead>
<tr>
<th>Step 3: Generate discussion in the term ‘Quality’ in relation to water from the different sources</th>
<th>Not all water is fit for human consumption Rainwater in itself is pure. When it is collected from roofs or from any other surface, it may be contaminated and polluted by: - bird droppings and dust containing harmful organisms; - dust from factories containing hazardous chemicals; - dust from fields and roads containing pesticides and other toxic chemicals Surface waters are almost always contaminated by people and animals who defecate in or nearby the water, thereby introducing disease causing organisms into water bodies. Surface waters are also often polluted with dangerous and toxic chemicals used in fertilizers and pesticides, or coming from factories that dump their wastes in the water. Groundwater is mostly free of contaminating organisms. The soil acts as a purifying filter retaining many harmful organisms as the water passes through. Groundwater can become contaminated from deep waste pits and latrines located too close to the well or spring</th>
</tr>
</thead>
</table>
Step 4: Ask participants to pair up and write the stages at which water becomes contaminated. **Monitor** the session to allow everybody’s participation.

Discuss in a plenary session how contamination takes place.

Ask participants to identify storage containers and discuss how to take maintain storage containers in a hygienic manner.

Although good and efficient water supply sources may be available in the village, collection and storage of water in the home is important. Clean water can become contaminated.

**During collection**
- Collecting water without washing hands;
- Allowing the fingers to dip into the water;
- Collecting water from dirty sources;
- Allowing dresses and other objects to dip into water after collection.

- during transport from source to home
  - Holding the rim of the container with unwashed hands may easily lead to contamination of the water.
  - Carrying water in dirty containers or containers without lids

- during storage.
  - Water stored in open containers is also easily contaminated.

**Water storage**
- Use clean containers covered with lids to prevent germs from entering the water;
- Remaining water after drinking should not be poured back into the container;
- Drinking water should not be kept for more than one day because it is likely that the number of bacteria in it will increase;
- The area around the water container should be kept clean;
- Place buckets on raised surfaces.

Step 5: Generate discussion on some key terms in relation to water and diseases

Ask participants what they do to make community water safe e.g testing, treatment.

**Water Quantity**
- Water quantities sufficient just for drinking and cooking are not enough for a healthy life. Water is also needed for washing and cleaning. Many diseases result from lack of water for bathing, clothes washing and home cleanliness.
- The occurrence of skin diseases, louseborne fever, and eye infections.

**Water consumption**
- The amount of water that is used per household...
could be measured at the water collection point. It is then still important to find out for which purposes the water is used, such as washing, bathing and cooking, and how housecleaning is done. Using a lot of water does not automatically mean that the water is used properly to reduce the mentioned diseases.
Session Two

**Water Hygiene**

Time required: 30 minutes

**Learning Outcome:** Improved health and reduced burden of water-related diseases

**Learning Objectives**

At the end of the session the participant will be able to:

- Appreciate the importance of maintaining safe water supply for human consumption.

<table>
<thead>
<tr>
<th>Method of Training</th>
<th>Trainer’s Notes</th>
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</thead>
<tbody>
<tr>
<td><strong>Step 1:</strong> Generate a discussion on the definition of key terms including the following:</td>
<td>This session explains the roles of human behaviour and the environment in disease transmission and how to deal with them.</td>
</tr>
</tbody>
</table>

**Some definitions**

- a) Hygiene: This is the practice of keeping oneself and the surroundings clean to prevent illnesses or the spread of diseases;
- b) Safe water: This is water that is not contaminated and has no germs;
- c) Environment: This includes air, water and the surroundings and the space one occupies;
- d) Sanitation: This is waste disposal and cleaning of surroundings.

**Story 1:**

Ngor Joe excretes and forgets to wash his hands. He picks up mangoes and some vegetables from his farm and takes them to the market. Kema buys the food and brings it to her home. She prepares the vegetables without washing them thoroughly. She eats the mangoes without washing them. Everyone in the family who ate the food was infected and had diarrhoea.

**Story 2:**

Vamboi who has diarrhoea excretes near a house. Jinna later passes around the faeces. She steps on the faeces and carries it on her feet into her house. Her child Baby plays on the floor. Baby gets some of the diarrhea germs on her hands by touching her mother’s feet and some of that rubbed on the floor.
<table>
<thead>
<tr>
<th>Step 2. Generate discussion on hygienic practices in water and environmental sanitation</th>
<th>Baby puts her hands into her mouth and infects herself with diarrhea.</th>
</tr>
</thead>
</table>
| Generate discussions on domestic hygiene practices | Personal hygiene is important to reduce and prevent water borne diseases and skin infections. To prevent this, use much water for:  
- Washing the hands with soap after using the toilet;  
- Washing the hands before preparing food and before eating;  
- Brushing the teeth at least twice a day (morning and evening);  
- Frequently washing the face and hands of children;  
- Bathing regularly or preferably daily;  
- Washing hair regularly;  
- Washing of clothes. |
| Ask participants to reflect on how water is contaminated from previous sessions and discuss water hygiene practices | Domestic Hygiene  
In domestic hygiene, preventive measures include:  
- Cleaning of water containers and cups to prevent contamination;  
- Covering of water containers;  
- Keeping kitchen clean;  
- Keeping floors of houses and the areas around clean;  
- Always sweeping away animal droppings;  
- Washing cooking pots, dishes and utensils;  
- Water from washing should be emptied into a gutter;  
- Controlling flies by covering pit latrines;  
- Safe disposal of waste.  
Safe drinking water is important for the prevention of guinea worm disease and diarrhoea.  
In preparing water for drinking:  
- Make sure that the sources are protected from pollution;  
- Clean the containers for collecting and storing water thoroughly before use;  
- Provide a good stand for the buckets near the well or the stand tap;  
- Boil water to kill germs and filter to remove particles;  
- Dig deep for a well and keep the surroundings clean; |
Generate discussion on waste water disposal

- Provide a good cover for the well.

**Disposal of waste water**
Standing water and muddy places around houses and water collection sites will attract mosquitoes. It is important to:
- Clean all drains regularly so that water can run away;
- Domestic waste water should be thrown in gutters;
- In dry areas, domestic water could be used to clean the latrine and water vegetables.

<table>
<thead>
<tr>
<th><strong>Step 3:</strong> Brainstorm on water, hygiene and sanitation related diseases</th>
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<tbody>
<tr>
<td>Discuss routes of disease transmission, highlighting examples of disease transmitted therein</td>
</tr>
<tr>
<td>Explain the measures for prevention of such diseases</td>
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</table>

**Routes of disease transmission** refers to the way diseases are transmitted.
Germs from faeces can reach the mouth through:
Faeces --------- fingers--------- mouth
Faeces --------- fingers--------- food--------- mouth
Faeces--------- flies------------- food---------mouth
Faeces--------- fingers/flies------ utensils-----mouth
Faeces-------- water---------- mouth
Water--------- mosquitoes------- body
Urine---------- water--------- mouth
Examples of diseases should include: Worm infections, Skin diseases, diarrhoea.

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<tr>
<th><strong>Step 4:</strong> Discuss burdens and health risks with self supply facilities</th>
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<tbody>
<tr>
<td>Burdens in water treatment * People boil or would like to boil water, but boiling is expensive (cost of fuel) or makes the collection of more firewood necessary. Often they dislike the taste and temperature of boiled water.</td>
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</tbody>
</table>

Health risks in water treatment
* The drinking water is not-treated at all: a health risk if source, collection and transport improvements are not (fully) effective.
* The water is not properly and effectively treated.
* The water tastes of the chemicals used for treatment; people dislike the taste and therefore they go back to traditional sources.
Boiled water is cooled down to 40-60°C before it is poured into dirty storage vessels; then the effect of boiling water is entirely gone.
* The efforts of treatment are wasted, because the water gets contaminated afterwards during storage or use.

**Household Practices**
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<tbody>
<tr>
<td></td>
<td>* Household wastewater is not drained away properly; there are muddy pools around the houses.</td>
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<td></td>
<td>* Stagnant water in wastewater pools and in clogged drains attract mosquitoes for breeding</td>
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</table>
Session Three

Water Supply Structures, Improvement and Maintenance

Time required: 45 minutes

Learning Outcomes: Improved and Sustained self supply facilities

Learning Objectives: At the end of the session the participant will be able to:

- Recognize and know the functions/importance of self supply structures
- Enhance the proper functioning and quality improvement of the self supply facilities

<table>
<thead>
<tr>
<th>Method of Training</th>
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</table>
| **Step 1:**       | To identify areas where there is a high probability of successfully drilling wells, one must first prepare a site map. Consideration must be given to each of the following seven factors which are critical in siting new water wells:  
| Ask participants to discuss critical issues to consider in siting a well |  
| Divide participants into two groups to observe two different types of wells. One group to observe/inspect a local well and the other group to observe a sanitary well. Participants should note the conditions in relation to quality of the water therein.  
| Let participants present their findings  
| Discuss minimum protective features and maintenance tips for local wells |  
|   - Subsurface conditions,  
|   - Subsurface soil types,  
|   - Vegetation,  
|   - Topography,  
|   - Surface water,  
|   - Sources of contamination  
| Accessibility to users.  
| The protective measures described here should be considered as an absolute minimum:  
| * a drain, to drain off spilt water away from the well to a soak pit or to a vegetable garden;  
| * a rim around the well to avoid the inflow of spilt water and surface runoff;  
| * a fence with a gate to keep animals away from the well; local construction techniques may avoid the use of a gate. A live fencing of thorn bush suits very well;  
| * a post with hooks to hang drawing containers so that they do not get dirty when not in use.  
| Well water should be tested to ensure that it is free from disease-causing organisms. Also, if it is not clear and good tasting, people may revert to traditional unsafe drinking water supplies. |
Ask participants to discuss how to construct and upgrade traditional wells

Therefore, avoid drilling in areas where unsuitable quality water is known to occur and keep wells as far away as possible from potential sources of pollution

Maintenance;
* daily sweeping of the well surroundings;
* daily cleaning of the drain;
* regular checking of fence and gate;
* daily thorough scrubbing of drawing containers (with soap or clean sand).

In order to increase the likelihood of completing a successful and safe drinking water well, follow the steps outlined below:
1. Determine the well location based on community involvement and technical factors
2. Drill the borehole to the desired depth (30 m (100 ft) or less where there is lots of water
3. Install a PVC casing & slotted screen to keep the borehole open and allow clean water to enter the well
4. Float-in a filter pack to keep dirt out of the well
5. Grout the annular space to keep contaminated surface water out of the well
6. Develop the well to remove turbidity from the water
7. Construct a concrete pad around the well (keep contaminated surface water away from the well and keep the area around the pump from becoming a mud-hole
8. Install a pump
9. Disinfect the well to eliminate bacteria introduced during well construction
10. Test water quality to make sure it is safe to drink
11. Maintain the pump & You can even make your own cup leathers

**Step 2:** Take participants out to see a sanitary well and discuss basic improvement options for wells that provides better and more comprehensive protection

Allow participants to observe any fault in the structure

The protective measures are:
* an apron around the well to improve drainage of spilt water, to avoid seepage and to create a clean working space;
* a low wall or 'headwall' of 75 cm high around the well to avoid inflow of spilt water and to minimize the risk of children and animals falling into the well;
* a fence, a spilt water drain and a post with hooks
as described with the simple well protection
* a cover over the well to avoid dust, leaves etc. from falling into the well when it is not in use;

Maintenance;
* daily cleaning of apron and drains;
* regular checking of apron and drains for cracks and damage;
* regular cleaning of soak pit, if this is present;
* daily scrubbing of drawing containers and cover handles;

Springs can be located in flat areas or slightly elevated location. In such cases, the protection procedures are different.

The measures for "Spring protection on a flat location" are simple:
* a fence (e.g. thorn bush) around the spring area to keep animals away;
* a channel to drain off spilt water to a vegetable/fruit garden or to a soak-pit;
* a large diameter pipe or a small diameter (0.6 m) concrete ring placed vertically in the soil at the eye of the spring, to avoid contamination of the water.
* An overflow must be provided to allow excess water to flow from the spring.
* a circular concrete apron around the spring.
* If the water level drops, the cover can be removed and the spring acts as a well. A bucket should then be used.

Correct Use
* no bathing and washing of clothes and dishes within the fenced area

Maintenance;
* regular cleaning (daily) of the apron and the area within the fence.
* daily cleaning of the drain
* checking of the fence
* daily cleaning of the drawing container

The measures for "Spring protection on a slightly elevated area"
The improvements are fourfold:
* avoiding contamination of the spring water;

**Step 3:** Ask participants to explain what they know about spring source:
- How they discovered it
- How they use it
- What they do to have safe water from it.

Take participants out in the field to observe an unprotected spring and also to a protected spring.

Allow participants to discuss areas for improvement on the facilities they have observed.
improvement of muddy unhygienic spring surroundings;  
* improvements of the yield of the spring;  
* stopping or avoiding erosion.

Open the eye - * a small trench of 2 to 5 m from the eye of the spring downhill; a pipe with small holes is placed in this trench imbedded in a layer of coarse gravel (8-20 mm) and covered with fine gravel and puddled clay. The depth will depend on the nature of the spring and subsoil.  
* a 5 cm thick layer of clay behind the retaining wall to avoid leakage;  
* a retaining wall with a hole for the pipe and a platform where people can collect the water. The size of the wall (depth and width) depends on the state of the spring and the subsoil; it should reach until stable soil. It is even better to construct the collection pipe and platform at a larger distance from the spring.  
* a drain uphill from the spring, to avoid erosion and seepage of contaminated water;  
* a drain, to drain off excess and spilt water, for instance to a vegetable garden or a place for watering cattle;  
* a fence with gate to keep animals out. If possible the fencing could be extended to better protect the groundwater.

Maintenance;  
* a daily cleaning of drain, storm water drain and platform  
* occasional check of the retaining wall for cracks which need to be repaired.

### Step 4: Surface water protection

**Ask participants**  
- How they use surface water  
- The condition of their surface water bodies in relation to quality of water therein  
- To explain how surface water bodies become polluted  
- Identify signs of surface water body pollution  
- To explain how they have protected surface water bodies

Often the surface water is polluted upstream because people use the water for all kinds of activity such as bathing and washing. Defecation is also often done in or nearby the stream. The water does not only become dirty, but drinking this water is also a health risk. The surface water may also become unsafe for drinking because farmers use pesticides and insecticides that get into the water, or factories dump chemical waste in the stream or lake or at a site from where it may leach into the ground or surface water.
<table>
<thead>
<tr>
<th>before</th>
<th>after del.</th>
<th>Observing many dead fish floating on the surface of the water indicates that the water has been polluted with toxic substances, thereby rendering it dangerous for drinking.</th>
</tr>
</thead>
<tbody>
<tr>
<td><em>Step5. Rain water harvesting</em></td>
<td>Rain water harvesting involves low-maintenance systems to collect, filter, store, and re-use rainwater for exterior or interior use. Water from all of the downspouts of a building is piped to a central filter that separates solids. The filtered water is stored either in surface or underground storage tanks ranging from a few hundred gallons to many thousand gallons</td>
<td></td>
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<tr>
<td>Ask participants to discuss reasons for harvesting rain water</td>
<td><strong>REASONS TO HARVEST RAINWATER:</strong> Harvesting rainwater makes sense for a variety of economic and environmental reasons:</td>
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<tr>
<td></td>
<td>• Rainwater is an economical alternative to public water, especially for exterior water uses such as landscape irrigation that require minimal filtration.</td>
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<td></td>
<td>• Rainwater can supplement limited ground water resources. With reduced extraction rates, low-yield ground water wells and springs can last indefinitely. Rainwater can also supplement surface water resources.</td>
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<td></td>
<td>Rainwater collection could significantly reduce water extraction rates from rivers during critical summer months, ensuring adequate water remains to support native ecosystems.</td>
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<td></td>
<td>• Rainwater is often the only viable water source in arid regions or on islands where other water sources may be high in salt, limited in availability, or very expensive.</td>
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<td></td>
<td>• Rainwater is low in minerals, so it is ideal for laundry, dishwashing, hair washing, and car washing.</td>
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<td></td>
<td>• Rainwater is not regulated by municipal water restrictions. During periods of drought, rainwater can protect investments in landscaping, garden ponds, and swimming pools.</td>
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</tbody>
</table>
Discuss the mechanics of collecting rain water

**MECHANICS OF COLLECTING RAINWATER FROM ROOFS:** It’s possible to collect rainwater from roofs, pavement, and almost any other surface, but roofs typically yield the best quality water at the lowest cost. When rainwater is collected for interior water uses, it is preferable to use relatively inert materials such as painted metal.

Rooftop debris usually poses a greater water-quality problem than the roofing material, and water from any roof can be treated to drinking-water quality without great expense.

Gutter and downspout sizing for rainwater collection can follow standard practice.

Rainwater systems are most economical when all the rainwater is conveyed to a central site for prefiltration, storage, and pumping. Piping should be sized using conventional stormwater practice which means 4” pipe will suffice for most residential systems. A pitch of one-eighth to one-quarter inch per foot is recommended. Pipe connections should be watertight to prevent both water loss and infiltration.

**COMPONENTS OF A RAINWATER SYSTEM:** In order to be reliable and effective, each component of a rainwater system must be specifically engineered for rainwater collection since off-the-shelf water system components are rarely suitable. Rainwater system components can be functionally classified as prefiltration, storage, pumping, treatment, backup integration, and measurement and control.

**System setup**

Rainwater harvesting systems can be installed with minimal skills. The system should be sized to meet the water demand throughout the dry season since it must be big enough to support daily water consumption. Specifically, the rainfall capturing area such as a building roof must be large enough to maintain adequate flow. Likewise, the water storage tank should be large enough to contain the
Ask participants to discuss how they harvest rain water in their localities and preserve it safe for drinking

<table>
<thead>
<tr>
<th>captured water</th>
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</table>
| **Collecting rainwater**: The higher your rainwater collection area, the better, because you can use gravity to distribute water rather than pumps. Roof and garage areas work well and often already have gutters. You can collect water by building shallow ditches on contour (called swales) or with a slight slope that lead water to storage areas (ponds and wetlands, for example). You can use existing ditches to collect water. You can collect water from dew and condensation. Roof collection systems are often equipped with roof washers, which automatically discard the first few gallons of rainwater each time it rains.

**Storing Rainwater**: Rainwater can be stored in a wide range of reasonable priced water storage containers (plastic 5 gallon ‘batas’ are available for Le.5.000).

**Treating rainwater** – for most uses, it is not necessary to do any treatment for rainwater. For drinking you can use solar distillation or sand filters, UV light and wetland/living machine systems. |
Session four

Water improvement technologies

Time Required: 60 minutes

Learning Outcomes: Ensure Safe, adequate and constant water supply to communities

Learning Objectives:
At the end of the session the participant will be able to:
- Adopt corrective measures in rendering and maintaining constant supply of water to communities

<table>
<thead>
<tr>
<th>Method of Training</th>
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</thead>
<tbody>
<tr>
<td><strong>Step 1: Rain Water Harvesting</strong></td>
<td>Sierra Leone experiences frequent or seasonal rainfall. Rainwater can be collected from roofs of houses, schools and other buildings. When properly stored, water collected in the rainy season can be used in the dry season. Roofs covered with tiles, corrugated asbestos cement or galvanized iron sheets are most suitable for roof catchment. Thatched roofs (palm leaves, straw, grass) are less suitable as they will retain about half of the rainfall.</td>
</tr>
<tr>
<td>Stimulate discussion on</td>
<td>Methods of harvesting rain water</td>
</tr>
<tr>
<td>how participants harvest rain</td>
<td>1. by way of a gutter attached to the roof with a downpipe (timber, bamboo, metal or asbestos cement) that leads to a storage container or underground tank.</td>
</tr>
<tr>
<td>water in their communities</td>
<td>2. Another method is to construct drains around the house or building, leading to a storage tank.</td>
</tr>
<tr>
<td>uses of rain water</td>
<td>*Caution: It is advisable to let the first rain wash roofs, gutters or drains (first 5-10 litres, also called &quot;foul-flush&quot; is sufficient) before starting to collect the water.</td>
</tr>
<tr>
<td>quantity yield and length of</td>
<td></td>
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<tr>
<td>service</td>
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<tr>
<td>potentials for contamination</td>
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<tr>
<td>Allow participants to take</td>
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<td>field visit into the</td>
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<tr>
<td>community and observe/inspect</td>
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<tr>
<td>roof gutters for rain water</td>
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<tr>
<td>harvesting. Let them identify</td>
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<tr>
<td>defects in the mechanism</td>
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<tr>
<td>Discuss with participants how</td>
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<tr>
<td>the defects can be corrected</td>
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<tr>
<td>and improved for high yield</td>
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<tr>
<td>collection</td>
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<td>Let participants suggest other</td>
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<tr>
<td>sustainable means of harvesting</td>
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<tr>
<td>rain water in their communities</td>
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<tr>
<td>e.g. ‘Tripod’</td>
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<tr>
<td><strong>Step 2: Surface water</strong></td>
<td>Water can be abstracted from a river or stream and stored in a natural or man-made infiltration basin. This process serves two purposes: the water</td>
</tr>
</tbody>
</table>
stored in periods of high flow can be used in periods when the river runs dry, and the river quality will be greatly improved by the filtration process. Thus, the infiltration basin may be a good option to provide safer water throughout the year.

Method
Intake by gravity or pump
The water may be abstracted from the river via a pipe or a channel and flow to the infiltration basin by gravity flow. In other cases a pump may be required.

Pretreatment
Caution: Very muddy river water will quickly clog the surface of the infiltration basin. This problem can be solved in two ways:
1. Sedimentation basin
   The size of a sedimentation basin depends on the volume of water that passes through and the amount of silt present in the surface water. The more silt, the longer the water should remain in the basin, and therefore the larger the basin. The surface area (m²) should be about 5% of the amount of water (ra³/day) to be treated.
   Best is to build two similar basins. Whilst water is passed onto one section, the other section is allowed to dry. After removing the dried silt, which can be done manually, water is passed to the cleaned section and the other is allowed to dry.
2. Horizontal roughing filter
   Before the water reaches the infiltration area it can be passed through a roughing filter. That is a basin filled with two or three types of gravel placed after each other, decreasing in size. Most of the mud present in the raw water will deposit on the gravel. The out flowing water will be much cleaner and clogging of the infiltration surface will occur at a much lower rate.
   The disadvantage is that the gravel needs to be taken out at regular intervals (per half year to one year, depending on silt load of surface water) to be washed to remove the deposits.

| Step 3: Underground Water supply | Digging of wells |
| Discuss key consideration in | Wells in loose and sandy soils tend to cave in and may need a lining made out of bricks, stones or |
provision of ground water to ensure adequate and constant supply, with emphasis on upgrading traditional wells for self supply

Ask participants to give reasons why traditional wells are unsatisfactory

Let participants discuss how water in traditional wells can be made safe for human consumption

Concrete.

Location of wells
Most often, people may have different reasons for their choice of locating wells. In any case the selected site should ensure qualitative and quantitative reliability of water supply. Appropriate sites are supposed be tested for availability and depth of groundwater, and nearby pollution sources.

Many traditional wells are unsatisfactory because ...
- They are near pit latrines, rubbish dumps, or animal pens, which pollute the groundwater that is the source for the well.
- They are not deep enough, so water is inaccessible in dry weather when the groundwater level is low.
- People may enter the well to collect water, making it dirty and increasing the risk of spreading water related disease in areas where it is endemic.
- The sides collapse, reducing the amount of water that can be collected and allowing surface water to get into the well from the top.
- The top is open, so polluted water and dirt falls in, polluting the well water, and there is a risk of shoes, animals, and children falling in.
- Dirty buckets and ropes are used for drawing water, thereby polluting the well.

How to upgrade traditional wells
A well should be situated at least 25m away from latrines, rubbish dumps and animal pens.
Deepen the well so that the bottom reaches the groundwater during dry weather.
Improve the well so that people and animals cannot get in by:
- lining the well
- providing a cover or a parapet wall (extensions of the wall lining about a metre above the top of the apron).
- installing water drawing technology (a windlass, rope or handpump)
- provide a drain (that takes spilled water to a soakage pit, an animal-watering trough, or a vegetable garden)

Number of wells
The number of wells to be constructed in a community largely depends on the quantity of water that can be safely withdrawn from a well, resulting in numbers of people that can use the well, and the longest distance that is convenient for people to collect water. One well per 250 to 400 people is UNICEF accepted guideline, with a reasonable maximum distance of 500 m.

<table>
<thead>
<tr>
<th>Step 4: Water Lifting</th>
<th>Pulley</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ask participants to list water lifting methods in their community</td>
<td>A pulley makes drawing water from a well easier. Rope and bucket are permanently fixed to the pulley. After use, the well is properly covered and the bucket should not remain hanging in the water. A hook fixed to one of the supporting posts must be provided on which to hang the rope and the bucket.</td>
</tr>
<tr>
<td>Discuss the following water lifting methods, stressing on any means of contamination and maintenance</td>
<td>Double bucket rope system</td>
</tr>
<tr>
<td>It will be good to take participants into the field to see some of these methods available.</td>
<td>Only one person at the time can draw water using the pulley. This may increase waiting times if people are used to drawing water from the well with more than one person at the same time. This drawback can be partly solved by attaching a bucket at both ends of the rope. While one bucket is lifted, the other one goes down. Rope and buckets are permanently fixed and cannot pick up dirt from the ground.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Shaduf</th>
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</thead>
<tbody>
<tr>
<td>Water lifting is made considerably lighter with a &quot;shaduf&quot;. A counterweight at the end of a pole that acts as a lever, reduces the weight of the full bucket. The shaduf can be constructed of bamboo or wood and used for any kind of well, covered or uncovered.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Industrial Pump</th>
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</thead>
<tbody>
<tr>
<td>Whether a pump can be bought to lift water from a well will depend on the financial situation and on the availability of pumps in the area.</td>
</tr>
</tbody>
</table>
Moreover, industrially produced pumps require regular maintenance for which skills, tools and spare parts are necessary that may not yet be available in a community. Proper operation and maintenance requires thorough training of female or male pump attendants and the set-up of a maintenance system before installing an industrial pump in the community.

**Chain Washer/Rope Pump**
The chain washer/rope pump is a water lifting system that can be made locally or by a national industry and does not require very sophisticated production and maintenance equipment, moreover it can be easily maintained locally.
The principle is simple: a chain made of rope with washers at regular intervals is pulled through a pipe that reaches into the well water. On its way up through the pipe the washers lift water: the water is "caught" between the washers. The chain washer/rope pump is suitable for any kind of dug well. New models are even used on drilled wells; the water production is better in shallow wells. *(see the annex to this module on rope pump)*

**Step 5: Water Transport Improvement**
Discuss with participants the means by which people carry water in their communities.
Allow them to identify potentials for contamination of the water carried.

Often, water transport containers have no lids or other types of cover. Covering containers during transport is an important necessity to prevent contamination.

**Improvement of path to water source**
Sometimes simple improvements to the road or path leading from the water source to the houses could contribute to the ease of water transport.
The measures to be taken will depend on the circumstances:
* if the paths are steep: cut steps, construct stone or concrete steps, provide rail of rope, bamboo or wood;
* if the paths are slippery: construct simple pavement.

**Yoke or shoulder carrier**
A yoke or shoulder carrier facilitates water carrying and causes less physical discomfort than carrying containers on one's head or back. A yoke can be
used for most types of transport containers, though sometimes the containers may have to be adapted, for instance by providing handles.

**Wooden Cart**
If the water transport route is flat, the construction of carts could be considered. Several water containers could be transported per cart, depending on the size of containers and cart. A cart not only makes water transport less strenuous, it can also make transport of more water per trip possible.

<table>
<thead>
<tr>
<th>Step 6: Water Storage Improvements</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ask participants to discuss water storage methods in their homes, making emphasis on any potentials for contamination.</td>
</tr>
</tbody>
</table>

Small containers can be used for water storage at home. The storage time will depend on the size of the container and the water use. The longer the storage time, the greater the risk of contamination.

**Protection during storage**
To limit the contamination, the following measures are essential:
* containers should be placed out of direct reach of small children. Children must be taught to hygienically draw water from the containers;  
* a fixed ladle should be used to draw water from the containers and it should be returned at a clean place after use;  
* containers and covers should be cleaned regularly, preferably each time new water is poured into them. If large containers are filled up when they are not yet empty, the sediment settled at the bottom should regularly be removed.

**Types of storage containers**
For any type of container used for storing drinking water, use of covers are very necessary

1. Bottles and glassware pots are excellent storage containers, especially those with tight fitting lids. They can be easily cleaned with hot water and possibly soda. However, bottles that were used for chemicals of any kind, including medicine, are better not used.
2. Earthenware pots have the advantage of cooling the water during storage due to evaporation through the porous walls, although it cannot be cleaned effectively due
3. Petrol drums can be big, strong containers. It can be painted to prevent rust.

4. Large storage containers are mostly meant for seasonal storage of water, and can be located outside the homes, in permanent position. They may range in size from 1 to 10m, depending on the number of households required to serve, and the available sources of water the storage capacity. In cases of rainwater harvesting, it may need to be sufficient to supply water at the end of the dry period.

**Maintenance of large containers:**
- once a year the container needs to be cleaned and washed out;
- a check for water tightness needs to be made and cracks must be repaired;
- covers and tubings have to be checked and if necessary repaired;
- if a filter is provided this needs to be cleaned as well.

<table>
<thead>
<tr>
<th>Step 7: Water Treatment</th>
<th>Biological Treatment</th>
</tr>
</thead>
</table>
| Ask participants to discuss various methods of water treatment for human consumption, highlighting the risks in treatment method. | **Small scale slow sand filter**  
In a slow sand filter, water is passed through a bed of sand. Impurities in the water will be retained on top of the sand bed. After some days a slime layer will develop on the sand surface which will contain many organisms which will feed on harmful bacteria and viruses that enter the filter. A properly operated slow sand filter with a continuous water flow will produce water that is virtually free from disease causing organisms. A small-sized unit can be made out of three empty oil drums. |

**Chemical water treatment**
Chlorination  
Disinfection of the water at the source should be considered as a temporary emergency measure, for instance in case of a disaster. Chlorination could be additional, but should never come instead of source protection and efforts to improve hygiene practices. Chlorination will give the water a distinct taste which the consumers sometimes dislike or reject entirely.
Boiling
Boiling kills the disease-carrying organisms in water. Just bringing water to the boiling point is not sufficient to kill all micro-organisms that may be present in the water. To be totally safe for consumption, water must boil for twenty minutes! Of course boiled water must cool down before it can be drunk. It is important to avoid re-contamination. The safest method is to let the water cool in the same pot in which it was boiled, and use this as a storage container. Second best is to pour the water into a clean storage container immediately after boiling.

Solar Treatment
The rays of the sun have a purifying effect: they can kill all or most micro-organisms present in the water. The rays of the sun can only get to the water if it is stored in non-coloured glass or transparent plastic containers. These should be covered or closed, and placed on a sunny spot, in such a way that they do not cast shadows on each other.

Sustainable Self Supply Technology: The Rope Pump

Background
Being one the ancient days water supply technology, the rope pump, with increasing innovations on new materials and designs, is a very effective and low cost pump option. They are used by families and small communities. Compared to other low cost hand pumps, the rope pump has a high pump capacity, and can pump from shallow to very deep hand dug wells or boreholes. If properly produced, installed and maintained, over 90 percent of the facilities are sustainable for many years after installation.
Experience in Nicaragua has shown that initial social acceptance of the rope pump was high due to two important factors. Firstly, it served dual purpose to make clean water available to rural populations, and farmers and cattle holders also saw it as an opportunity for irrigation and, more importantly, for watering of their livestock, thus making its production economically feasible. Second, the product can be manufactured and marketed by private local artisans, thus making the cost within reach of even the poor (though not the poorest), and people themselves at hardly any cost can repair the pumps because of the simplicity and availability of spare parts.

**The Idea of the Rope Pump**

The principle of the Rope pump is old and in the Middle East it was known as the Noria Pump. In the 70s this effective pump principle was “rediscovered” by Mr. R van Tijen of the Dutch Demotech organisation, who started to use PVC pipes and car tires for the wheel. As Rope and washer pump it was introduced in Africa among others by ITDG, as a low lift pump for irrigation and family wells. A technical improvement has made this modern affordable technology a commercial success via sales to the private sector.

**The Rope pump and communal water supply**

There are different opinions on this since the Rope pump is a semi open pump and requires frequent maintenance. In Nicaragua Tanzania and other countries rope pumps are used in communities and schools. The recommended maximum number of people for one Rope pump is 150 (30 families), but there are examples that well produced and installed Rope pumps are used by 400 people for 10 years or more. In all cases training of the users in maintenance (oiling the bushings etc.) and training of the local producers in repairs, of pump pipes rope etc. is essential.
Water safety with the rope pump

In general water from protected wells and deeper water layers is safe to drink. A pump does not change quality of the water but just pumps it up. Investigations in Tanzania and other countries indicate that, if installed well, water from rope pumps has a similar quality as pistons pumps. (ACCRA study Tanzania 2012). In case of doubt it is recommended to treat the water at the Point Of Use, with disinfection options or household filters or any other low cost treatment options (Annex 1)

The Mechanism and basic design rules of the Rope pump

- Diameter of pump pipe
- Rope speed between 1.5 and 2.5 m / sec.
- Clearance in bushings of 0.5 mm, wheel with V belt shape.
- Good quality guide box, rope not too tight
- Handle at height of the belly button. If higher a platform is needed
- If corrosion is a problem use of galvanised pipes for the structure.

Description of the technology

The pumping elements of the ropepump are the pistons and the endless rope, which pull the water to the surface through the pumping pipe made of PVC or plastic. The rotation of the wheel, moved by the handle, pulls the rope and the pistons. The pistons, made of polypropylene or polyethylene injected into moulds, are of high precision to prevent hydraulic losses. The structure is basically made out of angle iron, piping and concrete steel. The pulley wheel consists of two internal rings cut out of lorry tires, joined by staples and spokes. A guide box at the bottom of the
well leads the rope into the pumping pipe. The guide box is made out of concrete with an internal glazed ceramic piece to prevent any wear. It is a high efficiency and low cost technology, but includes some pieces of high precision and high quality. Rope pumps are installed on handdug wells and on drilled wells or boreholes. There is no need for the pumping pipe to be installed vertically, which means that rope pumps can be installed as well near riverbanks or dams for irrigation.

The type of rope pump differs according to its application, and its cost is in the range of 30 to 100 US$ depending on the model. The least expensive and simplest model will do for domestic use or irrigation at the household level. However, all can be fitted with the same spare parts. Maintenance costs are minimal in the range of 0 to 5 US$ per annum for the family well pump and up to around 10 US$ for the very intensive used community pump.

**Field performance**

The maximum standard depth reached by the rope pump is 40 m. This can be increased to 60 m with adjustments and a double crank.

The minimum water depth in a well required for a rope pump is only 10 cm. The guide box is positioned on the bottom of the well, as sand does not affect the functioning of the rope pump, which normally happens with other brand pumps. During the dry season, when the water table goes down, the rope pump will keep on working until the well really dries up: an important factor related to social acceptance.

A 4-inch casing is normally the minimum diameter for drilled wells to install standard rope pumps. However, if necessary this can be reduced to 2 inches, and a rope pump with a small diameter guide adapted.
Pumping capacity of the rope pump according to depth

<table>
<thead>
<tr>
<th>Depth (m)</th>
<th>Adult (L/min)</th>
<th>Child (L/min)</th>
<th>Time needed for an adult to fill a 200 litre barrel (min)</th>
</tr>
</thead>
<tbody>
<tr>
<td>10</td>
<td>41</td>
<td>19</td>
<td>5</td>
</tr>
<tr>
<td>20</td>
<td>20</td>
<td>10</td>
<td>10</td>
</tr>
<tr>
<td>30</td>
<td>14</td>
<td>6.5</td>
<td>15</td>
</tr>
<tr>
<td>40</td>
<td>10</td>
<td>4.8</td>
<td>20</td>
</tr>
</tbody>
</table>

Cost of a Rope pump
30 to 200 US$ Depending on model, cost of materials, cost of labour and production efficiency. In projects the cost of a Rope pump often is higher since it includes cost of installation, training of users, time to form water committees, monitoring etc

Scaling up Rope Pump Uptake
1. Create awareness regarding new small-scale options through local Artisans
2. Give communities choices, involve the users from the very beginning to attain “strong and genuine ownership”
3. Involve the local private sector to reach a “profit based sustainability” in production, distribution, sales and repair

Challenges with Government and NGOs
Some mayor reasons why community water supply service providers are reluctant in the uptake of the Rope Pump includes:
- It is a semi open pump so perception is that the rope can contaminate the water in the well
- Wrong examples because of lack of follow up, lack of ownership and technical errors in construction and installation so many unnecessary breakdowns
- Lack of awareness on both technical and social improvements.
In addition, frequent problems of the rope Pump includes:
• Wearing of the bushings because of misalignment. clearance to big, lack of oiling or use of grease (new oil is needed, not grease). Bushings should be clean, not black.
  If well produced and oiled, metal bushings last for 15 years or more
• Breaking of the rope, often because of wrong alignment or errors in the guide block
• Braking of handle or other part. Main reason is construction errors in welding.
• Rope gets stuck or rope starts slipping on the wheel.
• Pump handle is high so loss of energy with pumping. Pump handle should be on the height of the belly button of the average person pumping. If it is higher, then a platform is needed.

Despite all this many NGOs like UNICEF, Water Aid, Care and others are using Rope pumps in their programmes with quality in production, installation and maintenance.
Session Five

Community Sanitation

Time required: 15 minutes

Learning Outcomes: Promote clean and healthy environment

LEARNING OBJECTIVES

At the end of the session the participant will be able to:

- Adopt corrective measures in rendering and maintaining a clean and healthy environment

<table>
<thead>
<tr>
<th>Method of Training</th>
<th>Trainer’s Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Step 1:</strong> Community actions that lead to water contamination.</td>
<td>In many communities, not all people have a latrine, so they use the forest, bush, beach, river etc.</td>
</tr>
</tbody>
</table>
| Allow participants to discuss the risks and health dangers behind each method in relation to water contamination | **Water source contamination**  
* Defecation in or nearby rivers, streams and ponds causes contamination and may endanger the health of the Community through the spread diseases.  
**Field contamination**  
Defecation in or close to vegetable gardens, rice fields or other fields may pollute the food crops and may thus cause diseases, or may contribute to the spread of diseases such as schistosomiasis and worm diseases.  
**Burying faeces**  
Burying faeces is a matter of digging a small hole and closing the hole again after "use". When faeces are buried, flies cannot get to the faeces, although it will not fully prevent the spread of diseases such as hookworm and roundworm which need soil for development. |
| **Step 2:** Waste water removal | Drains and soak-pit  
Each household produces wastewater. Dirty water from cooking, washing up, cleaning floors, hand-washing and bathing, and laundry must be drained away properly. The construction of a wastewater drain could take care of this. The drain should lead to a soak-pit. From this soak-pit the water will seep |
Rainwater could be led to vegetable gardens or to a soak-pit. A drain around the house, which will also drain away rainwater from the roof is a necessity.

**NOTE:**
* Wastewater drain and soak-pit must be located at least 30 m from any water source, such as wells and springs.
* sweep and clean the drains regularly;
* immediately remove anything that could cause a blockage in a drain;
* clean the soak-pit regularly.

<table>
<thead>
<tr>
<th>Step 3: Hand Washing</th>
<th>Hand-washing</th>
</tr>
</thead>
<tbody>
<tr>
<td>Discuss hand washing in relation to transmission of water related diseases</td>
<td>Washing hands after defecation is preferably done with water and soap to remove the germs which otherwise may cause diseases. If soap is not available, sand and ash may be used. If there is no water available, hands should be washed at the earliest opportunity, for instance when coming home or when passing a river, stream or other water sources.</td>
</tr>
<tr>
<td>Allow few participants to practice proper hand washing while other observe</td>
<td></td>
</tr>
</tbody>
</table>
MODULE THREE: Strategic Implementation of Self Supply
Module Preliminaries

Tasks to be performed by Field Staff

This module gives background information on specific self supply implementation strategies.
As part of their activities in the communities, the trainees would be expected to:
- Identify contemporary issues in accelerating self supply
- Adequately handle and deal with critical issues of management and product promotion.

Learning Outcome: To adequately manage a sustained self supply program

Learning Objectives
- Participants understand cross cutting issues in accelerating self supply
- Participants able to handle self supply program and manage community assets conveniently.

Sessions Time

<table>
<thead>
<tr>
<th>Gender Issues in Self Supply</th>
<th>Time required: 60 minutes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Resource Mobilization for self supply</td>
<td></td>
</tr>
<tr>
<td>Self supply sustainability</td>
<td></td>
</tr>
<tr>
<td>Financial Management in Self supply</td>
<td></td>
</tr>
</tbody>
</table>

MATERIALS REQUIRED FOR TRAINING
- Flipcharts
- Markers
- Field sites of water sources
- Handbook for field staff

Preparation for start of training: Welcome & Introductions
Welcome to the training & write down expectations of the training
Encourage participants to recap on previous sessions
**Session One**

**Gender Issues in Self Supply**

**Time required:** 15 minutes

**Learning Outcome:** Empower women, men, and vulnerable groups through ensuring equity in access and control of water resources within the self supply concept

**LEARNING OBJECTIVES**
At the end of the session the participant will be able to:

- Create awareness on the importance of all categories of people in the community to participate in Self supply initiatives.
- Improving opportunities for men, women and other disadvantaged groups to access water facilities and to participate in their management
- Integrating a gender perspective in the planning, implementation, monitoring and evaluation of the self supply concept

<table>
<thead>
<tr>
<th><strong>Method of Training</strong></th>
<th><strong>Trainer’s Notes</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Step 1:</strong> Introduce the topic of Gender mainstreaming in self supply</td>
<td>Although water supply schemes are developed by human beings to be used by them, yet the responsibilities, power and interest of the people concerned are not all the same. It is therefore important for all categories of people to participate in operation and maintenance of self supply initiatives.</td>
</tr>
<tr>
<td>Brainstorm gender roles in water collection, use, quality improvement and source protection</td>
<td>Sound management and sustainable utilization of water resources for the present and future generation can only be accomplished with understanding and addressing the unequal power relations and the different roles, responsibilities, capabilities and needs of women, men, girls, boys and other vulnerable groups in the development process.</td>
</tr>
<tr>
<td>Allow participants to brainstorm on gender, gender balance and their importance in self supply.</td>
<td>Gender focuses on men, women and children, and has to do with socially defined roles and responsibilities of men, women and youths, which vary. So for self supply initiatives to be sustainable, women, men and youths should participate equally in its operation and maintenance</td>
</tr>
</tbody>
</table>
Discuss few considerations regarding gender and gender balance in self supply

Allow participants to suggest guidelines that will ensure appropriate planning and implementation of gender mainstreaming in the self supply concept.

It is important to ensure that all members in a community have a say in their development efforts. The diverse experiences, perceptions, strengths and weaknesses of Men, women, youths, poor and old will enhance more participation in the program. These are all required to optimize the use of water resources to improve on their situation.

To ensure the participation of all in decision making, control over resources and participation in operation and maintenance of facilities, the following considerations should be made:

**Participation**
Place and time set for holding a meeting shall be convenient to all;
Discussions shall be in the language understood by the majority of the villagers e.g. the mother tongue;
The sitting arrangement during meetings is important so that everybody is free to talk.

**Decision-making**
Give all categories of people the opportunity to share responsibilities
Contributions and levies shall be adjusted to the level of income of individuals;
All categories of people shall be included in decision making;
Everyone should be accorded the opportunity to be trained.

**Access to and control of water**
The potential users should be heard and their opinions taken into account; so that the best choices are made;
Session Two

Resource Mobilization for self supply  

Time required: 15 minutes

Learning outcome: To empower communities carry out an effective and sustained self supply initiative

LEARNING OBJECTIVES

At the end of the session the participant will be able:

- To identify the methods of raising and managing resources for self supply initiative

<table>
<thead>
<tr>
<th>Method of Training</th>
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</tr>
</thead>
<tbody>
<tr>
<td><strong>Step 1:</strong> Ask participants to brainstorm</td>
<td>Resources are vital for operation and maintenance of a self supply. Resources include:</td>
</tr>
<tr>
<td>- types of resources needed in self supply</td>
<td>1. Financial resources</td>
</tr>
<tr>
<td>- their sources.</td>
<td>2. Material resources</td>
</tr>
<tr>
<td>- How to generate them</td>
<td>3. Human resources</td>
</tr>
</tbody>
</table>

Money is therefore needed in the form of cash to buy things that are not available in the village or to pay the caretakers. Material resources can be provided by the community in kind

There are two main sources of raising resources

**Internal sources**

a) These are resources raised from contributions made by people living in the village;
b) These are resources raised from people of that village living out of the village.

**Ways of raising internal resources**

1) Through levies. These are resources that must be given by women, men and youths living in and out of the village, interest from community savings;
2) Through Bazaars: A day is set aside. The village can set aside one day every year for fund raising. On this day dances can be organized where people pay to attend;
3) From village development associations anywhere in the country. They have to contribute to all development schemes in the village.

**External Sources**
Ask participants to identify groups of stakeholder in the introduction of a new approach such as Accelerated Self Supply.

These are resources raised from outside the community to realise a scheme. E.g. from Non Governmental Organizations (NGOs), Embassies, Government Ministries

Firstly there is government who will be the main drivers of the approach, through the ministry of Water Resources, but with necessary links to other sectors such as health and agriculture.

Private sector stakeholders include:
• traders who sell pumps, ropes, storage containers, well construction and water treatment consumables and equipment;
• small enterprises/ artisans in well, sanitary facility and ground storage construction, well head protection, drilling and masonry;
• mechanics who produce or maintain handpumps or mechanised pumps; and
• micro-credit banks and savings organisations.

Finally but most importantly there are the end-users (households) themselves who form the primary market and are the investors in and managers of supply improvement.
Session Three

**Accelerating Self Supply**

**Time required:** 15 minutes

**Learning outcome:** To empower communities with the management, technical, financial and institutional skills to manage their WASH facilities in an effective and sustainable manner

**LEARNING OBJECTIVES**

At the end of the session the participant will be familiar with:

- The concept of self supply sustainability
- Stimulating demand for self supply
- Strengthening supply chains for self supply products

<table>
<thead>
<tr>
<th>Method of Training</th>
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</tr>
</thead>
</table>
| **Step 1:** Ask the group to discuss the word 'sustainability' as is often used or according to their understanding. Allow participants to write why is sustainability important? | A system is said to have achieved sustainability when:  
- It is functioning and being used;  
- It is able to deliver an appropriate level of benefits (related to quality, quantity, convenience, comfort, continuity, affordability, efficiency, equity, reliability, health);  
- It continues over a prolonged period of time (which goes beyond the life cycle of the equipment);  
- Its management is institutionalized (goes beyond the key people involved now and will continue once those people are not involved);  
- Its operation, maintenance, administrative and replacement costs are covered at local level (through user fees for example);  
- It can be operated and maintained at the local level with limited but feasible external support (for technical assistance, training and monitoring); an  
- It does not affect the environment negatively.                                                                 |
| **Step 2. Creating the enabling environment for self supply**  
Ask participants to identify key elements for good environment for self supply. | To accelerate progress, there is therefore both a need to make it easier for people to reach further up the technology ladder but also a need for demand creation to trigger action among those who at present see no reason or no way to get started. |
Step 3: Divide participants into groups of at least 6 to identify those factors which influence sustainability of community initiatives.

Facilitator observes each group to ensure everyone contributes ideas.

Allow the groups to make write-ups on flip charts, and to have volunteers report in a plenary session afterwards.

Project and discuss the figure below on factors which influence sustainability

Step 4: Stimulating demand for self supply
Ask participants to discuss areas of support, which are all needed

Allow participants to discuss demand creating strategies at various levels

End-user demand
Triggering demand is a process more familiar to marketing professionals than water engineers, but it has recently become more accepted and understood through the growth of CLTS in the
sanitation field. These added values can be used to trigger demand from households through giving examples of the changes, but perhaps most effectively in the early stages – getting those who have succeeded to meet and explain to those who are apathetic or interested, but who feel that the obstacles are too great. The pattern of copying from one’s neighbour and the local spread of technologies shows that if a critical mass of change is established, the spread to others becomes self-sustaining.

Attitude of sector professionals
Introducing a new approach which requires government leadership and backing, especially in the early stages, will not be successful if government personnel are not themselves convinced that the approach can work and can lighten their workload, without putting them out of a job.

Private sector
The private sector is the key to sustainable Self Supply and so needs to be fully convinced of the potential market and equipped both to expand that market and satisfy its needs.

Exchange visits
There are examples of excellence and of outstanding initiative at household and community level which could inspire others to copy their example. Showing this to people demonstrates the pride in and power of ownership and what this can achieve; is often the most effective starting point for awareness raising.
Session Four
Advocacy and Marketing approach for Self supply

Time required: 15 minutes

Learning outcome: Optimize available benefits in accelerating self supply through market-based solutions

LEARNING OBJECTIVES
At the end of the session the participant will be able to:
- Recognize consumer participation in the designing, planning, and production of self supply products and services
- Explore existing distribution channels for promotional activities that stimulate consumer needs
- Create awareness on the importance of all categories of people in the community to participate in self supply initiatives.

<table>
<thead>
<tr>
<th>Method of Training</th>
<th>Trainer’s Notes</th>
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</table>
| **Step 1:** Distribute participants into small groups to elucidate consumer satisfaction parameters in water supply facilities | Consumer satisfaction for self supply initiatives:  
- Relative cost of uptake of initiative  
- Ease of provision  
- Maintenance implications  
- Adaptability  
- Appropriateness of technology to local resources  
- Availability of local artisans for construction |
| Ask participants to explore possible motivations for self supply initiatives | |
| **Step 2:** Participants identify self supply promotional ventures that will enhance uptake of initiatives on wider scale | The survey showed that people had normally raised funds for supply improvements by selling assets, usually agricultural produce or more rarely animals, and using savings.  
Availability of loans seems to act as an incentive for faster up-take, even where no substantial subsidy is involved. If the loans are to revolve, there is a need for the initial investment in seed money to start them off, but they can then be self-sustaining. |
| **Step 3:** Participants identify influential community persons | Influential and advocacy resources persons includes, but not limited to the following: |
| persons/resources who will contribute to self supply initiatives promotion | • Local authorities  
• Traditional leaders  
• Group leaders  
• Teachers  
• Religious leaders  
• Political leaders  
• Local councilors |
Training Evaluation

Please tick, where applicable

1. What do you think about the overall length of the course?
   Far too long
   Too long
   Just right
   Too short
   Far too short

2. What do you think of the allocation of time for the different components of this training?

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<thead>
<tr>
<th></th>
<th>Far too much</th>
<th>Too much</th>
<th>Just right</th>
<th>Too little</th>
<th>Far too little</th>
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<tbody>
<tr>
<td>Presentations</td>
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<td>Discussions</td>
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<td>Individual works</td>
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<td>Any other comment</td>
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</table>

3. How would you grade the relevance of the training to your needs?
   Excellent
   Good
   Reasonable
   Poor
   Not relevant

4. What can you say about the discussions and practical sessions?
   Far too much presentation sessions
   Too much presentation sessions
   Just right
   Too much field practices
   Far too much field practices

5. How did you find this training in general?
   Too difficult
   Difficult
   Just right
   Easy
   Too easy
6. Did the training meet you expectations, which you had when joining the training?
   Completely
   Largely
   Partly
   To some degree
   Not at all
   Which areas did you like most from the training?

7. Which areas do you feel you need further training?

8. How do you think the training can be improved?
ANNEX 1. Technologies for Self supply

The following are a range of conventional and new low cost Technologies for Self supply

Wells
A Improving existing Wells.
1. Provide lining, well rings
2. Do underlining
3. Provide well tube
4. Provide well cover with well reducer ring
5. Dig soak away pit for waste water

B Making new wells
1. You can make hand dug well
2. Another option is small diameter wells. max 90cm
3. provide well ventilation
4. Make well lining
5. Make underlining
6. Provide well tube
7. Provide well cover with well reducer ring
8. Dig soak away pit for waste water

Manual drilling
1. Augering/ Rope Bailing  ( quick -----Flo-flo)
2. Punching / Tube Bailing (Rope or Tube bailing)
3. Sludging / percussion    (Rota sludge, Baptist, SHIPO)
4. Jetting /percussion      (EMAS , machine jetting)

Pumps
1. Suction pumps (Treadle) max 7 m
2. Piston pumps (Mark 5 / Canzee max 20 m
3. Piston pump EMAS pump max 35 m
4. Rope pump 2 models (Pole, A frame) max 35 m

Rainwater harvesting/ Storage
1. Ghana gutter
2. Wire cement tank
3. Ferro cement tank
4. Well recharge
5. Tube recharge

Treatment
1. Boiling
2. Biosand
3. SODIS
4. Table top filters (Berkefeld. Stefani, Tulip)
5. Siphon filter (Tulip)
6. Membrane filter (Sawyer. Tulip)
4. Chlorine (point of tap dispenser/ At Household levels)

Annex 2: UPGRADING WELLS

Seven steps to be taken to improve on existing well:
1. Deepening the well and thoroughly clean it
2. Lining the well from top to bottom with bricks or concrete rings
3. Raising the well lining above ground level
4. Fitting a concrete well cover slab
5. Building a raised collar on the cover slab
6. Making a strong concrete apron to surround the well
7. Making strong concrete water runoff channel to lead waste water away

- Deepening can be best done during the months of February and March when the ground water level (aquifer) is at its lowest
- It is possible to improve the well further by fitting a hand pump

CARE OF THE UPGRADED WELL
The following points are important:
1. Keep the bucket clean and off the ground
2. Hang the bucket on a stick or upside down on the lid when not in use
3. Keep the apron, runoff and seepage area clean
4. Always use one bucket in the well
5. Repair damage to the well as soon as possible
6. Grease rubber bearings regularly
7. Keep the chain wrapped around the windlass

Minimum Separation Distances from Contaminant Sources Distance (m) Possible Source of Contamination
100m Garbage dumps/refuse piles, car repair or fuel (petrol) sales outlets, industrial operations/storage facilities etc.
50m Seepage pit or cesspool
30m Pit toilets, animal pens, barns, fields fertilized with dung
15m Septic tank, surface water body
7m Drain, ditch, house
## Manuals reviewed

<table>
<thead>
<tr>
<th>No</th>
<th>Author/Year</th>
<th>Title</th>
<th>Type of Manual</th>
<th>Agency</th>
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<tbody>
<tr>
<td>1</td>
<td>WHO Collaborating Center, The Hague, Netherlands</td>
<td>Community Self Improvement in Water Supply and Sanitation</td>
<td>Training Series 5</td>
<td>IRC International Water and Sanitation Center</td>
</tr>
<tr>
<td>4</td>
<td>Academy for Educational Development 1825 Connecticut Avenue, NW Washington, DC 20009-5721</td>
<td>Water, Sanitation, and Hygiene Improvement Training Package for the Prevention of Diarrheal Disease</td>
<td>Guide for training outreach workers</td>
<td>USAID Hygiene Improvement Project (HIP)</td>
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<td></td>
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<td>Title</td>
<td>Publisher/Provider</td>
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<td>6</td>
<td>FUREY S. G. &amp; DANERT K.</td>
<td>Improving documentation in the WASH sector for policy, programmes and publication: a writing course for WASH professionals</td>
<td>WASH writing course: Facilitators' Manual and Hand-outs RWSN/SHARE/Water Aid/Skat</td>
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<td>7</td>
<td>Helvetas Cameroon, June 2003</td>
<td>Water Management Committee Training Manual</td>
<td>Cameroon Association of Rural Development (CARD)</td>
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<td>Peter Morgan 1995</td>
<td>Upgraded well Manual for Field Workers</td>
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IRC International Water and Sanitation Centre, website: http://www.irc.nl/page/7584


Water for life-The UK’s only major charity dedicated exclusively to the provision of safe domestic water, sanitation and hygiene to the world’s poorest communities.

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