DRAFT

WASH TECHNICAL REPORT NO.

TRAINING GUIDE

FOR

OPERATIONS AND MAINTENANCE SUPERVISORS

OF RURAL WATER SYSTEMS

Prepared for the Office of Health
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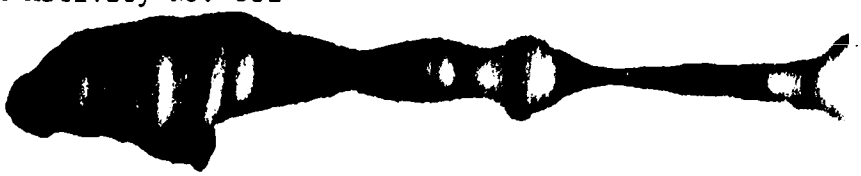

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TABLE OF CONTENTS

TABLE OF CONTENTS (continued)

FORWARD

ACKNOWLEDGEMENTS

Introduction to the Training Guide

Needs Addressed by the Workshop

The purpose of this workshop is to improve skills to plan and carry out operation and maintenance of rural water supply systems. This training guide has been developed for trainers who will conduct the workshop. It is not a guide for the participants, although it contains materials that will be handed out to them.

The workshop is intended for individuals who work in rural community settings, and who have responsibility for developing rural water supply systems. The workshop is appropriate for district water technicians, community promotors, and other district-level personnel responsible for water supply. It is not intended for community-level water committee members or caretakers.

The twelve sessions in this workshop are designed for a two week period.

Overall Workshop Goals

The workshop's central purpose is to enable the district-level water technician and community promoter to develop and support water supply systems which are operated and maintained by the community.

Given this purpose, the workshop's primary focus is on increasing understanding of the requirements of operation and maintenance of rural water supply systems, learning how to promote community participation in the early stages of development and throughout the life of a system, and on building skills that will strengthen support to community water committees and caretakers, health education and training skills in particular.

The goals of the workshop are to:

- Identify the operation and maintenance tasks that must be performed to assure that rural water supply systems deliver water according to their design, in sufficient quantity and with good quality.
- Increase awareness of the important role that community participation and health education play in the operation and maintenance process.
- Clarify roles and responsibilities of water technicians, community promoters, community water committees and water system caretakers.
- Develop strategies for community financing of rural water supply systems, the recurrent costs in particular.
- Build skills in health and user education, and in training design and delivery.

- o Describe the element of good monitoring and evaluation, identify what to monitor and evaluate in rural water supply systems, and develop approaches to doing it.

- o Develop a back home plan to strengthen the operation and maintenance process.

Trainers

The training guide has been designed for trainers who are experienced in water system development and in conducting workshops using adult learning methods. The maximum number of participants recommended for the workshop is 20. Because of the participatory training approach used in the workshop, more than 20 participants would limit the workshop's effectiveness.

For a group of 11 or more participants, a team of two trainers is suggested. At least one of the two trainers must have experience with rural water supply systems. The other trainer must be skilled facilitating groups and in conducting experiential training. One trainer could handle a group of ten or fewer, but this trainer would need both the training and technical skills.

Organization of the Training Guide

The course is divided into twelve sessions. Each session covers a specific topic and takes from three hours to two days, depending on the nature of the topic. The times for each session do not include breaks or lunch.

Each session has detailed trainer guidelines which provide instructions on how to conduct each session. Specifically, these guidelines include:

- o Session objectives.

- o Overview of the session - what is contained in the session, and why it is important.

- o Procedures - detailed instructions for conducting the training activities. (Each session has approximate times which should be adequate to complete the session.)

- o Handouts - materials for the participants.

Expectations of Supporting Agency

This training course sets forth clear designations of roles and responsibilities for government water technicians and community promoters, especially with regards to community involvement in system development, and in operation and maintenence. For the training course to meet its goals, the supporting agency must be solidly behind these designations -- in theory, as well as in practice.

Materials for Participants

The handouts for the participants appear after each session, as well as at the end of the training guide to make it easy for trainers to pull them out and have them duplicated before the workshop.

Trainers can distribute the materials in one of two ways: handouts can be distributed at the time they are covered in the training session, or the training staff can assemble complete sets of handouts and put them into participant notebooks prior to the workshop.

Workshop Methodology

This training guide is based on several key assumptions:

- Adults learn best when they are actively involved in the learning process -- doing things, discussing, analyzing, experimenting -- rather than passively listening to lectures or observing trainer-centered activities.
- Participants learn from each other as well as from the trainers, and therefore, the learning process should include small groups of participants working together.

The training guide uses the following training techniques:

- Trainer presentations
- Large group discussions
- Case study
- Small group tasks
- Individual tasks
- simulation
- role plays

Training Site

The workshop can be held in a provincial or district town. The site should have adequate meeting space and, if necessary, room and board facilities for the participants.

Materials needed for the workshop are simple. All that is needed are two flipchart easels, flipchart paper, and markers.

Preparing the Staff to Conduct the Worshop

When there two or more trainers, the training staff should meet prior to the workshop to plan and coordinate how the sessions will be conducted. Planning activities should include the following points:

- o A concerted effort to build the needed teamwork.
- o Mutual understanding of how the training program will be conducted.
- o Decisions about which trainer will do what.
- o Preparation for specific sessions.

Preparing for the Workshop

The following items are the key tasks in preparation for the workshop:

- o Obtain official approval for the workshop.
- o Select the participants.
- o Identify the training staff.
- o Select the training site.
- o Arrange for room and board.
- o Duplicate particpant handouts.
- o Prepare training staff.

Field Trip

Session 5 and Session 11 of the training guide include field trips to communities with rural water supply systems. The purpose of the first field trip is to enable participant to apply what they've learning about operation and maintenance in the first four sessions. The purpose of the second field trip is to carry out monitoring and evaluation plan.

Prior to the conducting the field trips, at least one trainer will need to visit the field trip sites to assure that the visits are acceptable to the community leaders, and that community members will be available for interviews.

SESSION 1: INTRODUCTION TO THE WORKSHOP

Total Time: 2 hours

OBJECTIVES

By the end of the session, the participants will have:

- Become aquainted with one another, and with the trainers.
- Received orientation on the workshop goals and schedule.
- Exchanged perspectives on what they expect from the course, and how they are going to benefit from it.
- Agreed on workshop norms.
- Obtained information about the methodology of the course.

OVERVIEW

The purpose of this session is to open the workshop, including any official ceremonies that may be necessary, and to help participants get to know one another and the trainers. The participants will also compare their expectations with the workshop goals and schedule, and become familiar with workshop norms and methodology.

PROCEDURES

1. Welcome — Time: 15 minutes

Introduce yourselves and welcome the participants. If there are any official representatives of the agency or government department sponsoring the workshop, this is an appropriate time for opening remarks.

2. Introductions — Time: 10 minutes

Ask workshop participants to introduce themselves, giving the following information:

- name
- what they do
- where they work

3. Ice Breaker — Time: 30 minutes

Say that this next activity is designed to help us get to know one another better, and to begin to get us thinking about operation and maintenance of rural drinking water systems.

Explain that it is a projection game, and that a series of symbols on sheets of paper (drawn by the trainers before the session) have been placed in the four corners of the room. Say that there are two sets of drawings, and that we will be doing two rounds in this exercise.

Note: In the first round, the four drawings are of animals -- a donkey, an elephant, a hen and a dog. In the second round, the four drawings are of fruit -- a banana, an apple, grapes, and strawberries.

Give the following instructions to the group (on flipchart paper):

Round One

- Go to the drawing that most closely represents your idea of the current situation in operations and maintenance of rural drinking water systems.
- Introduce yourself to the people that you do not know in the group; then discuss with the group the reason you chose this symbol.
- Take 10 minutes.

At the end of Round One, ask each group to share with the large group its reasons for choosing the symbol that it did. Remove the set of animal drawings to expose the fruit drawings, and give the instructions for Round Two:

Round Two

- Go to the drawing that best represents the hoped-for status of operations and maintenance in rural drinking water systems one year from now.
- Introduce yourself to the people that you do not know in the group; then discuss with the group the reason you chose this symbol.
- Take 10 minutes.

At the end of Round Two, ask each group to share with the large group its reasons for choosing the symbol that it did.

4. Expectations — Time: 40 minutes

Each participant will have his or her own expectations of what the workshop will be like and what will be learned from it. In this activity, participant share and discuss their expectations, and the trainers clarify which expectations will likely be met and which ones will not.

Write the following question on a flipchart or chalkboard, and give participants five minutes for individual reflection.

"What are the two most important things that you hope to get out of this workshop?"

Ask participants to break into four small groups, and give them the following small group task:

Small Group Task

- o Share your expectations with other members of the group.
- o Reach consensus on the group's four most important expectations.
- o Record on flipchart paper.
- o Select a spokesperson to present to the large group.
- o Take 20 minutes for this task.

When the small group task is finished, ask small groups to present their expectations. Compare and contrast presentations.

5. Workshop Goals — Time: 10 minutes

Present the goals of the workshop on flipchart (Handout 1.1), and go over them with participants. Compare them with the participants' expectations. Look at each item on the list of expectations, and identify where it is covered in the goals. Note any items on the participants' list that will not be covered in the workshop. Participants will usually accept that some expectations will not be met as long as they are clear about it from the start.

6. Workshop Schedule and Methodology — Time: 25 minutes

Pass out Handout 1.2 (Workshop Schedule). It is important to have this schedule on flipchart and posted, so that it can be referred to throughout the course.

Go over the schedule and explain how the training activities are arranged to meet the workshop goals.

Briefly explain the methodology to be used. Mention that the course will be a participatory workshop and that the emphasis will be on learning through doing. The methodology will use lecturettes, small group work, large group discussions, individual planning, and field activities.

Say that the role of the trainer in this methodology is to facilitate learning within the group, which means that the trainer is not a teacher, nor is he or she the only information source. The participants, as adults, are of equal status to the trainer and are responsible both for learning and for sharing what they learn with the other participants.

Present the role of the trainer and the role of the participant on flipchart:

Role of the Trainer

- o To organize the information.
- o To guide the learning process.
- o To design the sessions.
- o To be in charge of the workshop.
- o To share concepts and skills.
- o To monitor the learning process and guide each participant toward being responsible for his or her own learning.
- o To facilitate the learning process, using the experiential methodology.

Role of the Participant

- o To participate actively.
- o To share experiences.
- o To take responsibility for his or her own learning process.
- o To use good judgement, and not expect the trainer to be the only information source.
- o To study and learn in a positive manner.

Say to participants that each session will include the following components:

- o Presentation of session objectives.
- o Interactive lecturettes and activities related to the topic.
- o Conclusions and generalizations.
- o Projections of future uses for the knowledge acquired in the session.

7. Norms Time: 10 minutes

Since the group will be working together for two weeks, it is important make clear and discuss how everyone will work together. Present the following list of workshop norms on flipchart, and add additional norms agreed to by the group.

Workshop Norms

- o Attendance at all sessions
- o Starting and ending sessions on time
- o Active participation in all sessions
- o Open environment for questions, comments and new ideas
- o Others?

8. Wrap-Up Time: 10 minutes

Briefly cover workshop logistical and administrative matters. Refer back to the session objectives to see if they were met.

MATERIALS NEEDED

Handout 1.1 Workshop Goals
Handout 1.2 Workshop Schedule

Handout 1.1

Workshop Goals

The goals of the workshop are to:

- Identify the operation and maintenance tasks that must be performed to assure that rural water supply systems deliver water according to their design, in sufficient quantity and with good quality.
- Increase awareness of the important role that community participation and health education play in the operation and maintenance process.
- Clarify roles and responsibilities of water technicians, community promoters, community water committees and water system caretakers.
- Develop strategies for community financing of rural water supply systems, the recurrent costs in particular.
- Build skills in health and user education, and in training design and delivery.
- Describe the element of good monitoring and evaluation, identify what to monitor and evaluate in rural water supply systems, and develop approaches to doing it.
- Develop a back home plan to strengthen the operation and maintenance process.

WORKSHOP SCHEDULE

Handout 1.2

	MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY
WEEK 1	SESSION 1 Introduction to the Workshop SESSION 2 Selection and Operation of Rural Water Supply Systems SESSION 3 Maintenance of Rural Water Supply Systems	SESSION 3 (continued) SESSION 4 Relation of O&M to System Design	SESSION 5 Field Trip	SESSION 5 (continued) SESSION 6 Community Participation and Promotion	SESSION 7 Organizing for Operations and Maintenance
WEEK 2	SESSION 8 Financing Operations and Maintenance SESSION 9 Developing a Health and User Education Program	SESSION 10 Design and Delivery of O&M Training Sessions	SESSION 11 Monitoring Evaluation of Rural Water Supply Systems	SESSION 11 (continued)	SESSION 12 Application Planning, Evaluation and Workshop Closure

SESSION 2: SELECTION AND OPERATION OF RURAL WATER SUPPLY SYSTEMS

Total Time: 4 hours

OBJECTIVES

By the end of the session, the participants will be able to:

- Describe the selection criteria for the four predominant types of water supply systems found in rural areas, including the criteria for selecting one of the four systems over the others.
- Identify the tasks that a local operator should perform routinely for each of the four systems to assure that they operate effectively.
- Identify the characteristics of an effective operation.
- Assess the operating effectiveness of the four predominant rural water supply systems.

OVERVIEW

The purpose of this session is to make sure that the participants have a common understanding of the requirements for effective operation of rural water supply systems. The session is designed to tap the experience of the participants in identifying the predominant water supply systems in rural areas, as well as identifying the series of tasks that must be performed locally in order for rural systems to deliver water according to their design, with adequate quantity and quality.

Once the predominant water systems in rural areas are identified, a small group activity is introduced to help determine selection criteria for the four systems. This activity is followed by a lecturette on operation requirements, and another small group activity designed to identify the steps necessary in determining if a system is operating within its standard design.

PROCEDURES

1. Introduction — Time: 20 minutes

Ask participants to identify the issues one must consider in selecting a rural water supply system. Record responses on flipchart paper. Review the list when it is completed. Include the following issues, if not volunteered by the group:

- Physical Characteristics -- location of potential water sources, soil type, depth of water table, land slope, abundance or scarcity water, wind and sun.

- o Human Settlement Patterns -- land tenure
- o Traditional Water Practices and Beliefs
- o Past and Current Organizational Experience/Capacities
- o National Government Policies
- o Public Health Situation
- o Availability of and Access to Critical Technical Expertise and Project Materials
- o Current Economic Conditions

Ask the group to identify all the rural water supply systems operating in the country. Record responses on flipchart. Review the list when complete. Then ask participants which four systems on the list are most predominant. Circle these four systems on the flipchart.

Say that this session will take a closer look at these four types of systems, particularly at selection criteria for each, and at proper operation.

Trainer Note: There may be fewer than four predominant system. If there are only two predominant systems in the country, for example, circle those two systems on the flipchart.

Present the session objectives, using flipchart.

2. Selection Criteria - Small Group Task Time: 25 minutes

Divide the group into four small groups (four or five participants per group. Assign each group one of the four predominant rural water supply systems. Present the following small group task:

Small Group Task

- o For the system assigned to your group, list criteria that would lead to its selection.
- o Record factors on flipchart.
- o Select a spokesperson to report to the large group.
- o Time: 20 minutes

Trainer Note: If there are less than four predominant systems, you could assign a system(s) to more than one small group. Another option would be to assign a predominant urban water system to a group.

Trainer Note: Selection criteria for choosing one water system over another, beyond applying the general criteria already listed, might

include, for example, the following:

> Water can be obtained from surface or groundwater sources. The advantage of surface water is that it is easily accessible. The disadvantages are that it is easily contaminated, and often requires costly treatment. Access to groundwater is more difficult, and exploitation is often more costly; however, the quality of groundwater is usually better than surface water, requiring little or no treatment. (For more detailed information, see Framework and Guidelines for Care Water Supply and Sanitation Projects, WASH Document, June 1985.)

3. Small Group Reports — Time: 30 minutes

The four groups report out. After each group's report out, ask the other participants if they have any clarification questions. Ask if they agree with the criteria. Modify lists accordingly, and add criteria if there is a general consensus in the large group to do so. It is important to monitor the time carefully, so that this activity doesn't go on too long.

Compare the selection criteria developed for the four predominant systems, making sure that participants are clear why one system might be selected over the others.

Ask participants:

- o In this country, are you as technicians consulted in the selection of rural water supply systems? If not consulted, why not?
- o How often is selection made on the basis of the selection criteria just discussed?

4. Requirements in Operation - Lecturette — Time: 15 minutes

Using a flipchart, do a presentation on the general and specific requirements in the operation of rural water supply systems.

The lecturette should include these points:

Overview Of Operation and Maintenance

- o Local and national authorities, as well as donor agencies, have in the past shown little interest in improving the technical conditions of operation and maintenance once a system has been put into place.
- o Because they are responsible for the system once it is set-up, technical personnel for O&M -- those who have daily contact with all the component parts of the system -- are obliged to be familiar with its design and construction, in addition to possessing sufficient training and experience to interpret the conditions of its operation, to be able to identify deficiencies, and to be able to solve problems relative to its operation.

- o O&M should be planned and programmed so that maintenance is preventive and these actions are not relegated or postponed, since on them depends the success or failure of the service.

Importance of Appropriate Systems

An appropriate system:

- o is geared to the specific conditions in a rural community;
- o avoids solutions that are too sophisticated, or that are alien to the local environment; and
- o is an economical operation, one in which costs can be covered by the community through rates or fees that generate sufficient funds without excessively taxing the family budget.

Definition of "Operations"

- o A series of activities that the system operator(s) must perform to assure:
  - that the system functions normally; and
  - that it delivers water of good quality, in sufficient quantity, and continuously, to all the users.

Community Participation

Community participation is required to provide the elements needed at the local-level. These elements includes:

- o community involvement in all aspects of planning, implementation, and evaluation of water supply systems which will affect the target population.
- o community understanding and acceptance of the importance of having a system to supply safe water for their consumption.
- o human resources for the operation; and
- o funds to cover some or all of operating costs, e.g., parts, tools, office space.

Operating Costs

Operating costs include some or all of the following elements:

- o the caretaker's salary;
- o chemicals, fuel, lubricants, spare parts, and other materials;
- o community, town, regional, water committees;

- o other maintenance personnel (for larger schemes)
- o provision of physical facilities
- o training of personnel

Key question: Can the community afford to pay for the operation of the system?

Distribute Handout 2.1, Requirements in the Operation of Rural Water Supply Systems.

5. Operation Activities - Large Group Discussion — Time: 30 minutes

Ask the group what activities are required to operate each of the four predominant water supply systems. Develop a list (on flipchart) for each system. Review all four lists when completed. Examples might include:

a.) Borehole with hand pump

- pump functioning properly
- water quantity sufficient/continuous flow
- test water quality, and treat if necessary

b.) Gravity flow system with reservoir and distribution system

- assure sufficient water in reservoir
- are taps, standpipes, reservoir, and distribution system functioning properly, i.e., providing continuous flow, sufficient quantaties, no leaks, good pressure

6. Effective Operation - Full Group Discussion — Time: 15 minutes

Ask the group: "How do you know when a system is operating effectively?" Examples would include:

- satisfies user demand and need
- good water quality
- system functions at minimum cost

Record responses on flipchart. Review list when completed.

Distribute Handout 2.2, Characteristics of an Effective Operation.

7. Assessing Effectiveness of Water Systems - Small Group Task — Time: 30 minutes

Say that we're going to look more closely at ways to assess the effectiveness of water systems. Tell participants that we're going to work again in

four small groups, but that you want them to get into different groups from the last activity -- that this will give us a chance to mix and get to know others in the room.

Assign each group one of the four predominant water systems, and give them the following task:

Small Group Task

For the system assigned to your group:

- o Prepare a sketch of it.
- o Identify steps that the caretaker can take to determine if the system is operating effectively, particularly:
  - sufficient quantity
  - quality
  - cost
- o Record above on flipchart
- o 25 minutes

8. Small Group Reports — Time: 60 minutes

Small Groups report out. After each report out, ask the full group to comment. Compare and contrast report outs.

Refer to the "Characteristics of Effective Operation" list from activity 6 above, and to Handout 2.2. Is there anything to add or delete? Ask the group to develop a final list that is applicable to all the rural water supply systems in the country. Record responses on flipchart.

Ask the group:

- o What skills do you think the caretaker needs to operate each system?

Say that we'll talk more about these skills during the session on training.

9. Wrap-Up — Time: 15 minutes

Ask participants to reflect for a few minutes on the following question:

- o What are the most important lessons you have learned in this session about the selection and effective operations of rural water supply systems?

Record responses on flipchart. Review the list with participants when completed.

Then ask:

- o What are some things that you're going to try to do differently when you return to your work?

Tell the group that the next session will deal with the maintenance of rural water supply systems.

Refer back to the session objectives.

MATERIALS NEEDED

Handout 2.1 - Requirements in the Operations of Rural Water Supply Systems

Handout 2.2 - Characteristics of an Effective Operation

Handout 2.1

Requirements in the Operations of Rural Water Supply Systems

Introduction

The purpose of a system that supplies water for human consumption is to deliver water to the users in sufficient quantity to satisfy their domestic needs -- with continuous service, at a cost that the community can afford, and with safe quality -- throughout the life of the system.

For a system to be successful, operation and maintenance activities must be carefully programmed:

- o by clearly defining the objectives and tasks for each activity;
- o by specifying the person responsible for carrying out each activity; and
- o by establishing a schedule for each activity.

In addition, financing should be available for replacing equipment, for buying tools and materials, for providing needed physical facilities, and for training the personnel who will be in charge of operations.

Overview of Operation and Maintenance

In discussing operation and maintenance, reference is usually made to relatively small-scale mechanical jobs carried out by personnel of low technical capability. Consequently, due importance is generally not attached to nor are sufficient facilities usually provided for operation and maintenance in rural drinking water systems.

This may be borne out by the fact that not one, but several well designed and constructed systems have deteriorated in a short period of time solely because of poor operation and maintenance, deriving from the lack of trained personnel and the indispensable resources required for this task.

Not only local and national authorities, but even the financial agencies that assist in the construction of drinking water systems have usually not shown very great interest in improving the technical conditions of operation and maintenance of systems once they have begun to function. To corroborate this, it is sufficient to observe the percentage of water supply systems that are paralyzed or that are experiencing serious problems solely as a result of poor organization of operation and maintenance.

All rural drinking water systems, until they become full-fledged, pass more or less through the stages of research, justification of the need, design, construction, and start-up. From that point on they are in the hands of

those responsible for their administration, operation, and maintenance during the entire useful life of the system. Those responsible are the only ones who for all practical purposes have daily contact with all the component parts of the system.

Consequently, the technical personnel responsible for the operation and maintenance of a water system are obliged to be familiar with its DESIGN AND CONSTRUCTION, in addition to possessing sufficient training and experience to interpret the conditions of its operation, to be able to identify deficiencies, and to be able to solve problems relative to its operation. Consequently, the office responsible for this task is truly important and bears a great deal of responsibility.

Much the same as promotion, research, design and construction, operation and maintenance should be planned and programmed so that maintenance is preventive, and these actions are not relegated or postponed, since on them depends the sucess or failure of the service.

Operation Activities

In the context of water systems, "operations" is defined as the series of activities that the system operator must perform in assuring that the system functions normally and delivers water of good quality, in sufficient quantity, and continuously, to all the users.

As implied above, in rural areas the operating activities in the system are not limited to greasing pumps, repairing defective parts, and replacing broken pipes. In fact, "operations" is a process that begins when a system is designed, continues during its construction, and finally integrates the activities of operations and maintenance (O&M).

A system design that adapts to the specific conditions in a rural community -- and avoids solutions that are too sophisticated, or that are alien to the local environment -- will result in an economical operation, one in which costs can be covered by the community through rates or fees that generate sufficient funds without excessively taxing the family budget.

If a system is poorly operated, or if the operating routine is altered, serious economic loss will unfailingly result, leading to more complex and expensive maintenance. For example, studies carried out in India indicate that 85% of the existing handpumps in 1974 (65,000) were out of service due to ineffective and non-routine operation. After the implementation of a program for improved operation, followed up by effective maintenance, it was found 10 years later in 1984 that 85% of the existing pumps (850,000) were in good operating condition.

Community Participation

For successful operation of the system, community organization and participation is also required to provide the elements needed at the local-level. These elements include:

- o Community involvement in all aspects of planning, implementation, and evaluation of water supply sytems which will effect the target population.

- o Community understanding and acceptance of the importance of having a system to supply safe water for their consumption;

- o human resources for the operation; and

- o funds to cover some or all operating costs, e.g., parts, tools and office space.

The personnel selected to carry out the operation of rural water supply systems must receive theoretical and practical training to enable them to perform operation activities efficiently. The training should begin during the construction stage, so that the operator learns about the different elements of the system, their location, and their characteristics.

Operating Costs

In most rural water supply systems, operating costs are made up of some or all of the following elements:

- o the caretaker's salary;

- o chemicals, fuel, lubricants, spare parts, and other materials;

- o community, town, regional, water committees;

- o other maintenance personnel (for larger schemes);

- o provision of physical facilities; and

- o training of personnel.

The design scheme of a system should include a description of the proposed operation, and an estimate of the monthly or annual operating cost. This cost, when compared with the actual amount that the beneficiary community can afford to pay, will indicate whether or not the operation can be financed by that community.

An Effective Operation

The basis of an effective operation is:

- o precise knowledge on the part of the operator of all the elements of the system; and

- o the preparation of a guide to the operation of the system.

The guide can be prepared by making an inventory of the system, including its operating standards, and a description of step-by-step procedures for

each operating activity. Moreover, the history of the system's operation should be recorded on appropriate forms.

Handout 2.2

Characteristics of an Effective Operation

1. It satisfies the needs of the users.

   - quality
   - quantity
   - continuity
   - water pressure

2. It ensures that the water fulfills the requirements in the area of quality.

   - physical and chemical
   - bacteriological
   - disinfection

3. It ensures that the equipment and installations function in good technical condition.

   - motor pump
   - float and protection system
   - ventilation
   - structures
   - accessories

4. It allows each process to function at the minimum cost.

   - disinfection
   - pumping equipment
   - structures

In order to realize a system that functions well it is necessary to have:

- o A survey of basic information --
  - make an inventory of each and every component part of the system
  - keep the corresponding records, and update them when necessary
- o The determination of the important activities in a rural water system --
  - make an analysis of each component
  - program the activities
  - get an idea of the tasks to be carried out
  - implement and control the program
  - keep records
- o National, Regional, and Local Plans --

- program the activities
- set the tasks to be carried out
- do implementation and control
- keep records

o Summary --

- survey of basic information (inventory of the system) for the purposes of identifying the most important activities
- develop a program plan with which is obtained the optimal operation of the system

SESSION 3: MAINTENANCE OF RURAL WATER SUPPLY SYSTEMS

Total Time: 4 hours
40 minutes

OBJECTIVES

By the end of the session, the participants will be able to:

- Differentiate among preventive, corrective and emergency maintenance for the four predominant rural water supply systems in their country.
- Describe the advantages of a maintenance program that is planned and executed in a consistent manner.
- Describe the key elements of a maintenance program, and how they apply to the current country situation.
- Identify the parts of the most predominant water systems which require preventive maintenance, the preventive maintenance tasks required of each, frequency of the tasks, and the group responsible for carrying them out.
- Identify common corrective and emergency activities for the four predominant systems, and the group responsible for carrying them out.

OVERVIEW

This session is design to assist participants in defining what a well planned and executed maintenance program would look like for the four rural water supply systems that they work with most often. Three types of maintenance are covered in the session: preventive, corrective, and emergency.

The session begins with a lecturette on the general goals of a maintenance program, followed by full group and small group activities aimed at distinguishing between the three types of maintenance, and at identifying the key elements of maintenance for the predominant water systems. A lecturette on preventive maintenance is then provided, and participants -- working in small groups -- develop a list of preventive maintenance tasks for the predominant water systems, determine the frequency that they should be carried out, and by what group.

Lastly, the most common corrective and emergency maintenance activities are identified and discussed by the full group.

PROCEDURES

1. Introduction — Time: 10 minutes

Remind participants of the definition for "operation" when we talk about rural water supply systems. Ask the group how they would define maintenance. Record responses on flipchart or chalkboard. Add to the definition, as appropriate.

Say that the purpose of this session is to discuss preventive, corrective and emergency maintenance in rural water supply systems.

Present the session objectives on flipchart, and provide an brief overview of the procedure for the session.

2. Maintenance Overview - Lecturette — Time: 20 minutes

The purpose of this lecturette is to familiarize participants with general goals of a maintenance program, as well as the types of maintenance.

Use a flipchart to highlight key points from the following information.

Effective Maintenance Programs

As with effective operation of systems, an effective maintenance program must have:

- o clearly defined objectives and activities;
- o full-time trained personnel;
- o sufficient tools, materials and parts; and
- o transportation that would enable an appropriate response to corrective and emergency maintenance needs.

Types of Maintenance

Preventive Maintenance

To plan and implement maintenance tasks to avoid system damage.

Corrective Maintenance

Steps taken to repair or replace damaged components or equipment in a system.

Emergency Maintenance

Steps carried out to repair or replace components or equipment in a system that have been damaged as result of a natural disaster, such as an earthquake or flood.

Organization and Management of Preventive Maintenance

- o Determine how often maintenance tasks need to be performed, and by whom.
- o Determine the resource requirements in carrying out these tasks -- financial, human, material, transportation, and so on.

Ask participants: "What components of a community water supply system are subject to preventive maintenance?" Record on flipchart, and include the following if not already volunteered:

- o Buildings and other structures.
- o Pipes, valves and accessories, wells, handpumps, reservoirs, holding tanks, water sources.
- o Electrical equipment - motors, control panels, cables.
- o Rotary equipment - motors, pumps, windmills, solar panels.
- o Specialized equipment - manometers, chlorinators.
- o Transportation and tools.

Emphasize (if not already done so) that there are some preventive maintenance tasks which specifically relate to and can, if preformed regularly, impact on the target population's health. These could include: water treatment, protecting water sources from polution, i.e., sealing wells and capping springs. Water quality should be addressed at the same time as water quantity issues. Resolving water quality issues are often critical to meeting long-term program goals of better health.

Steps in Preventive Maintenance

In order for preventive maintenance to be organized efficiently, there are several steps to be followed to:

1. Description and classification of water supply systems and equipment
2. Inventory of machines, material, and equipment
3. Organization of technical designs, specifications, and mannuals
4. Formulation of preventive maintenance tasks and standards for each water supply system
5. Preparation of a regular schedule or program for preventive maintenance
6. Establishment of maintenance files

Monitoring of System's Performance

- Establishment of an information system: through monthly reports, technical files, maintenance logs, etc.
- Trained personnel
- Sufficient financial and logistical support for personnel

Technical Files

Ask participants what information should be included in these files. Record responses on flipchart. Add the following information if not volunteered.

- Form with identification of installations and equipment (all data).
- Manuals on operation and maintenance.
- List of replacement parts with identifying numbers
- Design plans, specifications, etc.
- Maintenance logs describing system maintained, location, problem encountered, action taken etc.

The Organization of Corrective Maintenance

In corrective maintenance, repairs are made on the elements of the system that are not functioning according to their design, such as unforeseen damage to pumps, motors, and pipes. This type of maintenance requires:

- o sufficient flexibility in the quantity and types of replacement parts, and technical capability to do the repairs in the shorest possible amount of time;
- o administrative and logistical support; and
- o the presence of a technician who is able to see the defects and the severity of the damages, and make the correct decisions in repairs or substitutions of equipment, pipes or accessories.

The Organization of Emergency Maintenance

In case of a natural disaster, all the organization for preventive maintenance must be made available to perform necessary actions under the direction and supervision of the specialized authorities handling the disaster (civil defense, for example).

Distribute Handout 3.1, Maintenance of Rural Systems.

3. Preventive, Corrective and Emergency Maintenance - Full Group Discussion — Time: 30 minutes

Ask the group to give an example of preventive maintenance that might take place with one or two of the water systems identified in the previous session. An example of corrective maintenance. An example of emergency maintenance.

Ask participants: "Why is it important to have effective maintenance programs?" List their reasons on a flipchart. Add to the list as appropriate. Review when completed.

Ask participants what they see as key elements of maintenance. Record responses on flipchart. Try to reach consensus. Add the following points if not already volunteered:

- o Institutional Arrangements (national, regional, local)
- o Funding
- o Personnel
- o Training
- o Supply of spares (tools, equipment)
- o Administration and Logistics
- o Manuals on O&M
- o Design specification
- o Inventories of equipment, machines, accessories

Trainer Note: It is important to the next activity that the group agrees on the key elements of maintenance.

Say that the next activity will help us focus on maintenance difficulties with the four systems discussed above.

4. Key Elements of Maintenance - Small Group Task — Time: 25 minutes

Say that in this activity they will analyze the degree of difficulty in successfully developing the key elements of maintenance for the four predominant water systems. Ask the group to again divide into four small groups, assign each group a water system, and introduce the following task.

Small Group Task

- o For the system assigned to your group, rate on a scale of 1 to 5

(minor problem to severe problem) the degree of difficulty in achieving success for each of the key elements of maintenance.

- o Record on flipchart, and select a spokesperson to present findings.
- o Be prepared to explain why the group came to the conclusions it did.
- o 20 minutes

5. Report Outs/Large Group Discussion — Time: 45 minutes

Small groups present their findings. Compare and contrast group findings.

Ask the group to determine the three problems that present the greatest barriers to effective water system maintenance in the country. Brainstorm a list of possible solutions to each problem. Review each list, and say that they will have a chance to consider these possible solutions a little later in the session when they develop a plan for system maintenance.

Ask participants the following questions:

- o From your experience, how often are these elements of effective maintenance taken into consideration in project design?
- o How might these elements impact on the choice of project design?

6. Preventive Maintanance Activities — Time: 45 minutes
   - Full Group Discussion/Small Group Task

Refer the group to the examples of preventive maintenance developed in Procedure 3 above, and ask:

- o What do we need to know in order to prepare a preventive maintenance schedule?

Add any of the following if not mentioned by the group.

- Determine the number of working days within that period.
- List activities during dry seasons, and activities during rainy seasons.
- Estimate the time required for preventive maintenance - equipment, structures.
- Determine the sequence of preventive maintenance services in all components of the system.

Say that we're going to look at preventive maintenance tasks in more detail, including the frequency of activities, and responsibility for carrying them out.

Divide the group into four small groups, assign each group a water system, and present the following small group task.

Small Group Task

- For the water system assigned to your group, develop a list of preventive maintenance tasks that should be performed.
- Indicate the frequency required of each task.
- Identify the group responsible for carrying out each tasks (community, government, ministry, department, other)
- Record on flipchart, and select a spokesperson(s) to report out.
- 35 minutes

7. Group Reports — Time: 45 minutes

Groups report out. Check for clarification after each report out, and ask if anyone would add to or delete from the list. Check for agreement on who is responsible for each task. Compare and contrast when all reports have been completed.

Ask the group:

- Of those tasks identified as the responsibility of the government, which could be assumed by the community, with the proper training, and access to technical assistance and "spare parts"? Why/Why not?

8. Corrective and Emergency Maintenance Activities - Full Group discussion — Time: 30 minutes

Review the differences between corrective, emergency and preventive maintenance. Ask the group to identify the most common breakdowns (emergency or otherwise) for each of the four predominant systems. Record responses on flipchart.

Review the lists when complete, and then ask participants to identify the group responsible for carrying out each activity.

Ask participants:

- Of those tasks identified as the responsibility of the government, which could be assumed by the community, with the proper training, and access to technical assistance and "spare parts"? Why/Why not?

9. Wrap-Up — Time: 30 minutes

Summarize major points from the session. Ask participants to reflect for a few minutes on the following questions:

- o From your own point of view, what were some of the most important things that you learned in this session?

- o What conclusions have you drawn about community participation?

Record responses on flipchart, and review the list when completed.

Then ask:

- o What are you going to try to do differently when you return to your jobs?

- o What skills are important to build within a community?

Say that in the next session, and as part of the field trip, they will have a chance to develop a specific maintenance program for two or three types of systems.

Refer back to the session objectives to see if they were met.

MATERIALS NEEDED

Handout 3.1 - Maintenance of Rural Water Systems

Handout 3.1

MAINTENANCE OF RURAL WATER SYSTEMS

Introduction

The word "maintenance" means to conserve something in its essence, giving it strength and permanence. In accordance with this concept, maintenance in rural water systems can be defined as the set of internal tasks carried out in the installation or equipment to prevent or repair damages.

Maintenance, by this definition, aims to:

- o ensure the effective operation of the water system, that thereby results in a continuous supply of good quality water;
- o prolong the life of the equipment installed; and
- o reduce expenditures for repairs.

Effective Operation and Maintenance Programs (O&M)

To be successful, an O&M program must have clearly defined objectives and activities, as well as full-time trained personnel, sufficient tools and parts, and transportation that allows planned O&M activities to be carried out, and enables needed corrective or emergency maintenance.

Overall Purpose of O&M

To ensure the preservation and utilization of water supply systems in rural areas -- through effective administration and operation, through the practice of preventive and corrective maintenance for structures and equipment, and through the participation of the Government and the beneficiary communities.

Specific Objectives of O&M

- o To obtain rational utilization of the water supply systems, and promote hygienic practices in the population through permanent supervision, community promotion, and community health education.
- o To finance operation and maintenance, mainly through community contributions, in the form of user fees, and with Government support.
- o To reduce the direct costs of operation and maintenance through the contracting of local labor, and by Government provision of

materials, equipment, and chemicals at low-cost.

- To reduce the costs of administering the system by establishing regionalized maintenance facilities, and by centralizing and standardizing policy and administrative procedures.
- To analyze the performance of materials and equipment in order to evaluate quality, and establish criteria for future utilization.
- To guarantee the sanitary safety of the water provided by means of disinfectants and sanitary surveillance aimed at avoiding or controlling sources of contamination.
- To guarantee service to all the users by regulating consumption.
- To administer the systems through representative entities of the communities.
- To control and evaluate O&M activities through an information system and field supervision.

Types of Maintenance Programs

Preventive Maintenance

Preventive maintenance is when maintenance tasks are planned and implemented before damages can occur; preventive maintenance is intended to avoid damages.

To be effective, preventive maintenance programs should schedule tasks to be performed at minimum over a one year period. Preventive maintenance must be done in all systems, since it is the only guarantee of effective operation. Failing to carry out an effective maintenance program will inevitably result in breakdowns and problems leading to the partial or total destruction of the system.

Corrective Maintenance

Corrective maintenance is when steps are taken to repair or replace a part or piece of equipment that has been damaged.

Emergency Maintenance

Emergency maintenance is when activities are carried out to repair systems affected by external forces, such as natural disasters (earthquakes, floods, droughts, and so on.)

Organization and Management of Preventive Maintenance

An O&M program consists of the organization and management of routine activities to be performed on the different components of a system within a defined operational area. The program consists of:

- o determining how often tasks should be performed, and by whom;
- o determining what resources are required in carrying out preventive maintenance tasks -- financial, human, tools, parts, transportation, and so on.

Initially, material and other needs can be determined based on estimates that can later be revised according to experience.

The components of a community water supply system which are subject to preventive maintenance can be classified in the following groups:

- o Buildings and other structures.
- o Pipes, valves and accessories, wells, handpumps, reservoirs, holding tanks, water sources.
- o Electrical equipment - motors, control panels, cables.
- o Rotary equipment - motors, pumps, windmills, solar panels.
- o Specialized equipment - manometers, chlorinators.
- o Transportation and tools.

There are some preventive maintenance tasks which specifically relate to and can, if preformed regularly, impact on the target population's health. These could include: water treatment, protecting water sources from polution, i.e., sealing wells and capping springs. Water quality should be addressed at the same time as water quantity issues. Resolving water quality issues are often critical to meeting long-term program goals of better health.

Steps in Preventive Maintenance

In order for preventive maintenance to be organized efficiently, there are several steps to be followed:

1. Description and classification of water supply systems and equipment
2. Inventory of machines, material, and equipment
3. Organization of technical designs, specifications, and mannuals
4. Formulation of preventive maintenance tasks and standards for each water supply system
5. Preparation of a regular schedule or program for preventive maintenance
6. Establishment of maintenance files

The Organization of Corrective Maintenance

In corrective maintenance, repairs are made on the elements of the system that are not functioning according to their design, such as unforeseen damage to pumps, motors, and pipes. This type of maintenance requires:

- o sufficient flexibility in replacement parts and technical capability to do the repairs in the shortest possible amount of time;
- o administrative and logistical support; and
- o the presence of a technician who is able to see the defects and the severity of the damages, and make the correct decisions in repairs or substitutions of equipment, pipes or accessories.

The Organization of Emergency Maintenance

In case of a natural disaster, all the organization for preventive maintenance must be made available to perform necessary actions under the direction and supervision of the specialized authorities handling the disaster (civil defense, for example).

SESSION 4: RELATION OF O&M TO SYSTEM DESIGN

Total Time: 5 hours

OBJECTIVES

By the end of the session, the participants will be able to:

- o Identify problems, causes and possible solution resulting from poor design and construction techniques that impact on O&M.
- o Describe the role of O&M personnel in the design and construction phase water supply systems.
- o Determine the steps that should occur prior to commissioning the design and construction of a water supply system.

OVERVIEW

The purpose of this session is to help participants understand the impact of poor design and construction practices on operation and maintenance, and know the steps that should be taken prior to the commissioning of a system.

Although it is necessary and important to discuss and describe the steps to be taken in the transition from construction to O&M, i.e., handing over documentation, it is critical that the design process itself be given priority attention. This discussion should go beyond whether a particular design was followed; It should analyze whether the right technical solution was chosen to resolve the problem at hand, and whether the design take into account the needs, resources, and capability of the population to be served.

Following a brief lecturette on general design and construction (D&C) issues, participants work in small groups to identify O&M problems in the predominent systems that can result from poor design and construction, and ways that these problems can be detected in the field. Participants also clarify the role of O&M personnel during the design and construction of a system.

Finally, the transition from construction to O&M is discussed in the full group; specifically, participants identify the documentation needed by O&M personnel as a particular system is completed, and the steps that personnel should take to inspect the system.

PROCEDURES

1. Introduction — Time: 10 minutes

Ask participants the following questions:

- o How much emphasis in the country is presently placed on O&M

activities? In what ways could O&M activities be strengthen?

- o How many of you have been unable in the past to carry out an operation or maintenance activity effectively for reasons of poor design or poor construction? Examples? What was the impact on O&M?

Take a few responses, and say that in this session we're going to discuss poor design and construction techniques, and how they can impact on O&M.

Present the session objectives, and briefly say a few words about session procedures.

Emphasize the point made in the overview this session will not simply look at whether the design specifications were followed, but also at whether the right technical solution was chosen to resolve the problem at hand, and whether the design take into account the needs, resources, and capability of the population to be served.

2. O&M Problems from Design and Construction - Lecturette — Time: 20 minutes

This lecturette is intended to provide participants with an overview of general design and construction issues.

Present key points (on flipchart) from the information provided below.

O&M as a Process

- o O&M is a process that begins after the system is designed, continues during the construction, and finally includes operation and maintenance activities.

Appropriate Design

- o Design decisions made during the initiation of a project often have profound impact on the long-term durability and reliability of a water system.
- o The chances of long-term use of the system will be greatly reduced -- despite all of the efforts of the local manager -- if:
  - the initial design decisions require skills in operation and maintenance which are not locally available;
  - frequent additions are required of expensive spare parts or lubricants; and
  - frequent downtime for O&M is expected.
- o Appropriate design is an attitude which places long-term durability and maintainability above the natural tendency of engineers to seek the system with the highest technical performance or more cost-effective delivery of services.

- o For each piece of equipment or technique proposed, three fundamental questions should be asked:
  - Are the skills required for the operation and maintenance of the equipment in keeping with those of the local population?
  - Is the complexity of the operation and maintenance cycle greater than the value placed on the service by the local population?
  - Are the costs for spare parts, lubricants and maintenance within the means of the local population to support?
- o An appropriate design, among other things, is a design that results in economic operation and maintenance, the cost of which can be covered by the community.

Poorly Designed Systems

Poor designs can lead to large economic losses.

Design deficiencies can be produced by:

- inadequate feasibility and technical studies
- inappropriate technical solutions and options implemented (hasn't solved the problem, too sophistocated)
- design too narrowly conceived/applied (e.g., water supply system for cattle that provides water while ignoring range management issues)

Poorly Constructed Systems

Poor construction can also lead to large economic losses.

Construction deficiencies can be produced by:

- negligence of the builder/contractor
- noncompliance with design specifications and construction standards
- lack of adequate supervision
- poor site conditions

Distribute Handouts 4.1 - 4.3.

4. O&M Problems from Design and Construction - Small Group Task — Time: 1 hour 20 minutes

Say that there are more serious O&M problems resulting from poor design and construction, as their examples during the introduction indicated. Explain

that we're going to identify specific problems for the four predominent water systems that we've been working with the past couple days, and that we're going to do so in small groups.

Ask the group to divide into four small groups, assign each group a water system, and presnt the following task:

Small Group Task

- o From your own experience with the system assigned to your group, share examples of O&M problems that resulted from poor design or poor contruction. (20 minutes)
- o For each example, determine what was the design deficiency or contruction deficiency. (20 minutes)
- o Record summary points on flipchart. (15 minutes)

Trainer Note: Suggest that they complete task 1 for the entire small group before they move on to task 2.

Trainer Note: As noted in Session 2, if there is only one predominent system in the country, assign the system to all four groups.

5. Reports — Time: 60 minutes

Small groups report out. After each report out, ask the full group to react, making appropriate additions or deletions.

Ask:

- o Given these problems, whose responsibility is it to minimize D&C deficiencies?
- o What role should O&M personnel play in project design? In project construction?

6. Role of O&M Personnel in D&C - Full Group Discussion — Time: 20 minutes

Ask participants the following question for each system:

- o What steps can O&M personnel take during design and construction to minimize O&M problems?

Record responses on flipchart, and review the list when it complete.

7. Documentation - Full Group Discussion — Time: 20 minutes

Ask participants the following question for each system:

- What information and documentation will be needed by O&M personnel as the system is completed?

Record responses on flipchart, and review the list when it is completed. If not volunteered, add the following to the list: water system plans, O&M manual, spare parts lists, numbers of spare parts included with the system, and sources for spares.

8. Inspection - Full Group Discussion — Time: 30 minutes

Ask the full group to identify the steps that O&M personnel should take to properly inspect each type of rural water system in the country. Develop a separate list for each system.

9. Wrap-Up — Time: 15 minutes

Ask the group to reflect for a few minutes on the following question:

- What conclusions have you drawn from this discussion about the relationship between D&C and O&M?

Record responses on flipchart, and go back over the list when its completed?

Ask:

- Looking ahead to when you return to your jobs, what are you going to try to do differently with respect to design? Construction? Documentation? Inspection?

Review the objectives for the session. Preview the field trip, and the purpose for doing it.

MATERIALS NEEDED

Handout 4.1 - Effects of Design and Construction on Operation and Maintenance

Handout 4.2 - Transition from Construction to Operation and Maintenance

Handout 4.3 - Problems Resulting from Design and Construction: Project Example

Handout 4.1

Effects of Design and Construction on Operation and Maintenance

Introduction

Technical personnel responsible for the operation and maintenance of a water supply system must be familiar with its design and construction, since DESIGN and CONSTRUCTION constitute the technical basis for operation and maintenance -- just as community promotion and sanitary education provides the social support for O&M, and the community financing plan provides the economic support.

Operation and maintenance is a process that begins after the system is designed, continues during the construction, and finally includes operation and maintenance activities.

Appropriate Design

Design decisions made during the initiation of a project often have profound impact on the long-term durability and reliability of a water system.

If the initial design decisions require skills in operation and maintenance which are not locally available, frequent additions of expensive spare parts or lubricants, and frequent downtime for O&M, then the chances of long-term use of the system will be greatly reduced, despite all of the efforts of the local project manager. Appropriate design is an attitude which places long-term durability and maintainability above the natural tendency of engineers to seek the system with the highest technical performance or more cost-effective delivery of services.

For each piece of equipment or technique proposed, three fundamental questions should be asked:

- Are the skills required for the operation and maintenance of the equipment in keeping with those of the local population?
- Is the complexity of the operation and maintenance cycle greater than the value placed on the service by the local population?
- Are the costs for spare parts, lubricants and maintenance within the means of the local population to support?

An appropriate design, among other things, is a design that results in economic operation and maintenance, the cost of which can be covered by the community. Project criteria is determined, the technology is defined, a feasibility study is performed using water system parameters and standards

-- all leading to a system that can be put into operation in accordance with specific rural community conditions and needs, one that excludes sophisticated solutions, or solutions alien to the environment, and uses local technology and equipment capable of being operated and maintained by local personnel with a minimum of supervision and support.

Experience shows that if a system is poorly designed or constructed serious problems of operation and maintenance will emerge that will lead to large economic losses.

Design deficiencies may be produced by:

- inadequate feasibility and technical studies
- inappropriate technical solutions and options implemented (hasn't solved the problem, too sophistocated)
- design too narrowly conceived/applied (e.g., water supply system for cattle that provides water while ignoring range management issues)

Poor construction can also lead to large economic losses. Construction deficiencies can be produced by:

- negligence of the builder/contractor
- noncompliance with design specifications and construction standards
- lack of adequate supervision
- poor site conditions

The design report of a water system should include a detailed description of the technical construction specifications, in addition to a description of its operation and maintenance with an estimate of the monthly or annual cost of operation and maintenance. This cost, compared with the real payment capacity of the beneficiary community, will indicate if the operation can be financed or not by the community.

The final goal of good design and construction of a water system should be adequate operation of its component units in providing efficient service throughout its useful life.

Handout 4.2

Transition from Construction to Operation and Maintenance

When the construction of a system has been concluded, it is necessary before proceeding with its delivery to operation and maintenance to make an inventory of all its installations, components, and elements. In addition, detailed plans of finished work should be included, indicating: the pipes and their diameter, length, and location; flow control, air, drain valves, and so on.

All other elements should be recorded, such as: location and details regarding accessories, intake, conduction works, storage, distribution, and final connections to the consumer. Complete specifications should also be included of all the equipment, in addition to manuals for its operation and maintenance, and identification of replacement parts. For all special equipment, such as motors and pumps, manufacturers' catalogues should be annexed and recommendations made for maintenance and operation.

Arrangements for the transition from construction to operation and maintenance should be made with sufficient anticipation and with the joint participation of personnel from both construction and operation and maintenance.

Among the most important documentation is that referring to hydraulic operation of a system. A copy of this should always be in the hands of the water committee.

Once the construction period has terminated, a ceremony of formal delivery to the community is held. This ceremony should include transfer of the system to the water committee, and to the caretaker of operation and maintenance.

Prior to the delivery ceremony, the system should be approved by a high-level supervisory engineer.

After the delivery ceremony, periodic inspections should be performed by the district-level water technician.

Steps in the Transition

In making the transition from construction to operation and maintenance, the following steps should be carried out.

1. Verification of the finished system.

   - Visits to the community.
   - Review of the system in accordance with plans.
   - Acquisition of basic information for operation and maintenance

(inventory).

2. Verification of the hydraulic operation of the system (if appropriate).

   - Obtain information about hydraulic tests on operation of:

     a.) equipment
     b.) network and accessories
     c.) tanks
     d.) leaks

3. Receipt of system documents.

   - Project report
   - Detail of contributions
   - Agreements
   - Other Documents:

     * Concession of lands
     * Order initiation of works
     * Orders for modifications and/or expansions
     * Registers of hydraulic tests
     * Water quality tests
     * Disinfection

   - Plans of constructed work

   - Lists of:

     * Materials/accessories used
     * Equipment/catalogue
     * Users
     * Installations and connections (public pool)
     * Public works

4. Technical assistance to water committee and caretaker.

   - Before the delivery

     * Meetings
     * Organization of water committee
     * Training of the water committee members and caretaker

   - After delivery

     * Continuous administrative/technical advisory services

Handout 4.3

Problems Resulting from Design and Construction

-- Project Example --

The following example briefly describes two rural water supply projects for cattle. The first experienced certain operation and maintenance problems which can be directly related to the design and construction process. The second project was designed to overcome these constraints.

PROJECT A	PROJECT B
Standard size reservoir unrelated to carrying capacity of surrounding grazing land	Reservoir size adjusted to carrying capacity at each site
Pumps and holding tanks required, thus raising cost of construction of operation and maintenance	No pumps - thus no requirement for fuel, spare parts, and cost mechanics
Reservoir sites not necessarily where target placed where target population would find most useful	Siting to be done in consultation with target population
Construction design requires considerable ongoing maintenance with heavy machinery	Design is simple, follows natural land contours, and requires maintenance which can be done (ongoing) by local labor
Watering troughs are incorrectly sized, and organization of animal troughs lacking	Better sizing and spacing of troughs, and introduction of guide rails for cattle to drink
Destruction of sides of reservoir by cattle when entering to drink in absence of functioning pump	No pump - when reservoir is empty so will be the well from which water drawn by hand. Thornbush fencing to protect reservoir which is entirely below ground level and not above

Construction undertaken in large part by subcontracts to private sector, which failed to fulfill commitments. They were not involved in maintenance	No contractor involvement in ponds contruction - Direct execution by government and technical assistance

SESSION 5: FIELD TRIP

Total Time: 10 hours

OBJECTIVES

By the end of the session, the participants will be able to:

- o apply the technical information provided thus far in the workshop to existing water supply systems.

OVERVIEW

The purpose of the field trip is to provide participants with some first-hand experience assessing water supply systems, in particular, the current state of operation as compared to its original design, and the current steps being taken to maintain the system as compared to the preventive maintenance steps that should be taken. Participants will also have an opportunity to determine if systems were properly turned over to O&M after construction completion.

Prior to departing to the various field trip sites, participants will work in small groups to develop lists of appropriate interview questions to aid in the water system assessments. These lists will be shared in the large group just before departure.

Following the field trip, participants will present their findings.

PROCEDURES

1. Introduction — Time: 15 minutes

Say that over the last two days there's been a lot of discussion and information sharing about water system design and construction, and operations and maintenance. Say that it's one thing to talk about systems in a classroom setting, as they all know, and another thing to go out and see these systems first-hand.

Present the session objective on flipchart.

Explain how the group will be divided up, visiting different sites. Say that each subgroup will visit two or three sites.

Trainer Note: In planning for the field trip, it is best to keep each subgroup to under ten people. If sites near the workshop are limited, however, subgroups could visit the same sites at different times.

2. Field Trip Questionaires - Small Group Task — Time: 30 minutes

Say that there are six areas that they are to gather information on. Present these areas on flipchart as the following:

- o Water Supply System Selection Process
- o Operation of the System
- o Maintenance of the System
- o Relationship of O&M to Design and Construction Process
- o Transition from Construction to O&M
- o Role of Community Participation

Explain that in gathering information in these six areas, they need to do some planning about the kinds of questions to ask. Ask the group to break into six subgroups, assign each group one of the above areas, and present on flipchart the following task:

Small Group Task

- o Develop a brief questionnaire for the area assigned to your group.
- o Record on flipchart, and select a spokesperson.
- o 25 minutes

3. Report Outs — Time: 40 minutes

Each group reports out. Following each report out, ask the full group if they would add or delete any questions.

Distribute Handout 5.1, Information Gathering Questionaire, and review those questions not already volunteered by the six groups.

4. Field Trip Task and Logistics — Time: 15 minutes

Assign field trip subgroups, making sure that each subgroup includes at least one representative from each small group in the last activity. Introduce the following field trip task.

Field Trip Task

- o At each site:

  Take a few minutes to plan how your team is going to ask the questions developed.

- o Be prepared to do a flipchart presentation on your findings

Explain field trip logistic.

Trainer Note: If possible, the report-outs should be on four different systems. The small groups, however, could visit more sites than the one system they're responsible for reporting on.

5. Field Trip — Time: 6 hours

Participants visit field trip sites.

6. Field Trip Reports — Time: 2 hours

Subgroups report out their analysis and conclusions. Clarify points, and solicit reactions from the full group after each presentation. Compare and contrast findings among the various sites.

Ask:

- o What seems to be the most common issues?
- o Which of the categories on the questionnaire were being satisfactorily addressed, and which were not, and why?
- o Which systems operate most effectively, and why?
- o What kind of impact is the system having on the target community, and why?

Trainer Note: It is recommended that the field trip reports take place the next day to give subgroups time to prepare for them. If they are to take place the same day, however, it will be necessary to give groups an hour or more for this preparation.

7. Wrap-Up — Time: 20 minutes

Tell the group to step back from the field trip and their analysis, and to reflect for a few minutes on the following question:

- o What are the most important things you've learned from the field trip experience?

Record responses on flipchart, and review the list when completed.

Ask:

- o How is this experience going to change the way you do things?

Review the objectives for the session. Link to the next session by saying that the economics of O&M have been already been raised as an issue and

Handout 5.1

Information Gathering Questionnaire

Water Supply System Selection Process

- How many of the criteria outlined in Session 2 were applied?
- Who selected the type of water system?

Relationship of O&M to Design and Construction Process

- Does the design reprepresent the most appropriate technical solution?
- Who was involved in the design process?
- How has the systems design and construction impacted on O&M?

Transition from Construction to O&M

- Was the system properly turned over to O&M?
- Did the construction meet design and construction specification?

Operation of the System

- Is the system operating according to its original design?
- Is the system meeting the criteria for effective operation outlined in Session 2?
- Assess current operational problems?
- Recommend steps to restore the system to its proper operation?

Maintenance of the System

- What prevention maintenance is currently being done, by whom and how often?
- What corrective maintenance has been done in the last year, by whom, and what maintenance is outstanding?
- What is the cost of maintenance? Who pays and by what method?
- Number and quality of maintenance teams, and staff training budget.
- Infrastructure - the proposed organization and institutional arrangement for operation and maintenance of system, and staff capacity budget.

Role of Community Participation

- What was their role in the design, implementation, and evaluation phases of the water supply system?
- Beneficiaries, number of people served, involvement in selling water, and role in maintenance.
- Cost-user fees local taxes, cost of standpipes and house connections.

SESSION 6: COMMUNITY PARTICIPATION AND PROMOTION

Total Time: 5 hours
45 minutes

OBJECTIVES

By the end of the session, the participants will be able to:

- Describe the general relationship between a successful O&M program and community participation and health education.
- Describe the requirements of water supply system development, within the context of full community participation.
- Identify the specific ways that communities should be involve in the development of water supply systems, and in the O&M process.
- Describe the role of the community promoter, and the required skills.
- Develop strategies for ensuring community support for operation and maintenance.

OVERVIEW

This session presents community participation and health education as the key to successful development and long-term sustainability of rural water supply systems.

A basic premise established early in the session is that water supply systems will not work and will not last unless there is full community participation from the very beginning. This premise sets the framework not only for the session, but also for the rest of the workshop.

The session begins with a lecturette that defines full community participation, including an eight step process to help bring it about. Following the lecturette, participants have an opportunity in a case study activity to further discuss these eight steps, and to explore the role of the community promoter in helping to achieve them. Three parts of this five part case are covered in this session; the other two parts are introduced in later sessions.

PROCEDURES

1. Introduction — Time: 15 minutes

Ask the group the following questions:

- What level of community participation was observed at the system you

visited yesterday?

- o How was this participation defined by the community and by government technicians?

- o How were the benefits of water supply described by the people that you interviewed?

Take a few responses, and say that in this session we're going to take a closer look at the ways that communities should be involved in water supply system development, and at their role in the management of O&M.

Present session objectives, and overview the session procedures.

2. Water Supply Benefits, and the Impact of Community Participation - Lecturette — Time: 25 minutes

Present a lecturette using flipchart which covers the major points highlighted below.

Water Supply Benefits

Water supply impacts on many segments of the economy, but particularly on health.

Impact of Water Supply on Health

- o Studies have identified contaminated water as the main agent in the transmission of typhoid, cholera, dysentary, and parasitic diseases.

- o By providing clean water to the rural sector:

  - morbidity and mortality rates decrease,
  - the population increases its resistance to non-water related disease,
  - general health standards improve,
  - expenditures for health care decrease, releasing funds for other development activities, and
  - the local population, particularly women, free up time used for collecting water.

The Role of Health Education

- o New water sources are often misused, not properly maintained, or not used at all.

- o An education program is essential:

  - to provide information on how to use and maintain water sources and sanitation facilities; and

  - to provide training in basic health education practices to

community promoters, community water committees, and community members.

Say that a later session will focus on health education.

Why Community Participation?

Experience has shown that:

- o Projects that effect a community don't work unless local people are actively involved in their design and implementation.
- o Projects don't last unless the planned inputs, incentives, and activities are linked to resources that already exist in the community.

Say that:

- o Active participation results in better solutions to problems.
- o Active participation results in the growth of a community's capacity to continue solving problems with less assistance in the future. It leads to long-term sustainability.

Ask participants: "At what points in project development do communities need to be involved?" Take a few responses, and say that communities need to be involved in every aspect of project development. Present the following list, acknowledging those points already mentioned by the group:

- analyzing the current situation
- identifying problems
- analyzing a chosen problem
- choosing a Plan of Action to solve it
- planning how to take the action
- carrying out the action or project
- monitoring and evaluating it

Community Participation and Long-Term Sustainability

Say that historically community participation in water development projects has been given very little emphasis. Project experience with community participation has occurred at three levels:

No Community Participation

- o Early water supply projects were designed to fulfill the needs of communities as perceived by donor agencies.
- o They were designed and implemented without community input or consensus.
- o The lack of community input in these projects resulted in

numerous problems, including:

- improper siting of projects;
- use of inappropriate technologies;
- inadequate preparation of communities; and
- lack of concern for community priorities.

Partial Community Participation

- o Gradually, a greater concern for community participation was expressed by donors; communities were asked to contribute to projects in the form of labor, materials, and housing for outside technicians.

- o Target communities still had little or no input into the needs assessment process, and little or no responsibility for planned activities.

- o In many cases, low degree of sustainability resulted.

Full Community Participation

- o Now being discussed and practical by a few donor organizations and governments.

- o Emphasis is placed on community priorities, and not donor or government priorities.

- o Communities are encouraged to:

  - decide what is important;
  - play an active role in the design process; and
  - take responsibility and eventually control of the project.

Eight Step Process for Full Community Participation

Ask (rhetorically): "What does 'active participation' or 'active role' really mean? What does 'taking responsibility' mean?"

Present the Eight Step Process for full community participation in water supply system development outlined below.

Eight Step Process

The community:

1. Identifies the problem, and defines the need.

2. Establishes a water committee.

3. Understands the technical options, and selects the system.

   [Say that selection is based on recommendation of the water

technician.]

4. Agrees to perform specific construction tasks, identifies specific individuals responsible for each task, and agrees to provide specific inputs to complete each task.

   [Point out the type and number of tasks will vary according to the ability of the community.]

5. Manages the operation and maintenance process:

   - supervise the caretaker
   - make decisions on O&M tasks
   - identify needs for outside assistance

6. Finances recurrent costs (100% ideally).

7. Agrees on a monitoring process:

   - identify benchmarks, and agree on timeline and procedures
   - agree on system/personnel performance standards

8. Agrees on evaluation criteria, and an evaluation process.

Say that when we're talking about full community participation in water system development, we're talking about these eight steps. Emphasize that communities will vary in terms of how extensive they are able to carry out each step.

Distribute Handout 6.1, Rural Water Supply Systems and Long-Term Sustainability.

3. The Eight Step Process - Small Group Task — Time: 40 minutes

Divide the group into four small groups, assign two of the eight steps to each group, and introduce the following task:

Small Group Task

- o For the two steps assigned to your group, identify all the things that need to happen to achieve each step.
- o Identify the major constraints that may hinder each step.
- o Develop strategies for addressing these constraints.
- o Record your list on flipchart.
- o 40 minutes

Emphasize that the purpose in giving this task is to insure that we are all clear about the kind of things that go into making a system community

supported and managed, effective and sustainable.

4. Reports — Time: 45 minutes

Small groups report out. After all four reports have been given, ask:

- Which steps are commonly done in water projects at this time? Which steps are never done? Why?
- Which steps the most difficult to achieve? Why?
- How might these steps vary for the four predominant systems?

Summarize major points from the discussion.

5. Role of the Community Promoter - Full Group Discussion — Time: 20 minutes

Say that it's one thing to talk about the need for community involvement, and another thing to get it. Ask participants how many of them consider themselves to be "community promoters".

Ask:

- "What messages are you and others trying to communicate as promoters?" (Record responses on flipchart.)
- "What are different ways that you communicate these messages?"

Stress to participants that being able to deliver a message effectively is as important as the message itself.

Then ask: "What skills do you think a community promoter should have?"

List skills on flipchart, and say that they may also want to add to this list during the session.

6. Community Participation Case Study - Small Group Task/Full Group Discussion — Time: 3 hours

Introduce the concept of a case study -- that it is fictional, yet based on real experiences by people like themselves, and that it's designed to help them analyze situations and discuss issues similar to their own.

Explain that there are three parts to the case study, and that they will have a chance to read each part individually, analyze it in their small group, and discuss it in the full group before moving on to the next part. Distribute Part One of the case (Handout 6.2), and give participants a few minutes to read it. Clarify as needed, divide the group into four small groups, and introduce the following procedure summary on flipchart:

Case Study - Part One

- o Individual Analysis - 10 minutes
- o Small Group Analysis - 20 minutes
- o Full Group Discussion - 20 minutes

Case Study - Part Two

- o Repeat the same process.

Case Study - Part Three

- o Repeat the same process.

Point out that a set of questions is included with each part, which they can use as a discussion guide during their small group analysis.

Distribute Part 2 of the case study (Handout 6.3) following the full group discussion of Part 1. Repeat the procedure for Part 3 (Handout 6.4).

During the full group discussion periods for each part of the case, you may want to ask one or two participant who feel strongly about a particular strategy or approach to "try it out" as Adam, with other participants taking on the role of the council of elders, and so on.

Questions to ask during full group discussions could include the following:

- o What did you see as the most important aspect of Adam's role?
- o Why is the decision-making process so important in this situation?
- o What does the case suggest about local management systems?
- o Which steps in the eight step process did you see being carried out?
- o What can a community promotor do to help a community organize itself so that it can participant in solving its own problems?
- o What could happen if Adam worked only with the council of elders?
- o How should Adam approach working with the clans?
- o What other information does Adam need to gather?
- o How can a general community meeting help promote community participation?
- o How can a formal organization, such as a community water committee, help promote community participation?

Distribute Handout 6.5, Organizing a Community to Participate, and give

participants a few minutes to read through it individully. Go over it with participants, and clarify points.

Return to the flipchart headed "Skills needed by a Community Promoter", and ask if there are other skills that they've identified that we should add to the list.

Distribute Handouts 6.6 and 6.7, Job Description of a Community Promoter and Community Promoter Skills Inventory. Give participants a few minutes to read through the handouts. Ask if there are additional points or skills that we hadn't yet considered.

7. Wrap-Up Time: 20 minutes

Ask participants to reflect for a few minutes on the questions:

- o What were for you the major things that you learned in this session?

Record responses on flipchart, and review the list when completed.

Ask:

- o What are you going to try to do differently when you return to your post?
- o What skills are you going to try to improve?

Say that the next session will explore issues of organizing for water system development once community interest and participation is assured.

Review the session objectives to see if they were met.

MATERIALS NEEDED

Handout 6.1 - Rural Water Supply Systems and Long-Term Sustainability
Handout 6.2 - Case Study, Part 1
Handout 6.3 - Case Study, Part 2
Handout 6.4 - Case Study, Part 3
Handout 6.5 - Organizing Communities to Participate
Handout 6.6 - Job Description of a Community Promoter
Handout 6.7 - Community Promoter Skills Inventory

Handout 6.1

COMMUNITY PARTICIPATION AND LONG TERM SUSTAINABILITY

Introduction

The potential impact of rural water supply on health, agriculture, and other sectors of the economy seems clear. Yet, until recently, rural water supply has been approached from a purely technical perspective. Social considerations have been to a great extent overlooked and underfinanced.

Efforts in water development have concentrated on developing techniques to enable better exploration of water resources. Many water projects seem to have been designed as construction activities without regard for essential support programs.

In the rush to supply sufficient quantities of water, itself an objective of unquestionable urgency, the area of water quality has too often been neglected or forgotten. Equally lacking have been mechanisms by which the rural population themselves, who of necessity and by right, must take ultimate responsibility for water supply in the rural areas, should be brought in, made conscious, and be empowered to take on these responsibilities.

Too many water systems have been imposed on rural villages where, in the absence of community participation and responsibility, they fail due inadequate maintenance. In some cases, the new water systems are not used and the local population returns to old, often polluted sources. The result in many cases is that the potential these newly developed water sources hold for the rural sector is never fully realized.

Thus, water projects in the rural sector need to be redesigned and no longer limit themselves to construction activities. Local communities must be approached. They should be made aware of the process about to take place, its impact on the community, and their role in the proposed activity. A comprehensive package of closely related activities should be brought together, including environmental education, water quality, sanitation, and maintenance, as well as construction.

The Impact of Clean Water on Health

Studies have identified contaminated water as the main agent in the transmission of typhoid, cholera, dysentary, and parasitic diseases. It is reasonable to assume that in most developing countries, the standard of environmental sanitation in general, including the quality and quantity of water supplies, has a direct bearing on the extent of morbidity and mortality due to diarrhoeal conditions. By providing clean water to the rural sector, morbidity and mortality rates should decrease, the population should increase its resistance to non-water

related disease, and general health standards should be improved. Expenditures for health care should decrease, and these funds could be used for other activities.

Better health and savings in time spent collecting water will free the local population, particularly women, for other activities. The improvement of living conditions of this group through the provision of clean water in sufficient quantities will allow women to play a greater role in the development process.

The Role of Health Education

Very often, new water sources are either misused, not properly maintained, or not used at all. To be effective in alleviating problems, any rural water supply program for village communities must be adequately supported in making sure that the water supply units it provides are used and used properly. An evironmental education program should aim at providing such technical support, leading to the flow of information on how to use and maintain water sources and sanitation facilities, while at the same time making sure the motivation and organizational support to do so is available.

Such a component should be primarily concerned with the provision of information and training in basic health education practices to community promoters, community water communities, and members of the community. One or two day workshops could include information on how water sources are contaminated, water related diseases, personal hygiene, environmental sanitation, and how this information can be transferred to the participating communities. Also to be stressed are ways the community members can organize, support, and motivate individuals to act on the newly learned information.

After the workshops, follow-up meetings should be held by the promoters in the participating communities. The follow-up meetings can facilitate supplementary training on other health problems of the committees, as well as evaluating the workshops.

Why Community Participation?

Community participation is seen as the process by which the community targeted for development assistance becomes actively involved in all aspects of the planning, implementation, and evaluation of the actions it takes to resolve its identified problems.

Active participation results in better solutions to problems, and the growth of the community's capacity to continue solving problems with less assistance in the future.

Experience has taught us that:

- Projects don't work unless local people are actively involved in their design and implementation.

- Projects don't last unless the planned inputs, incentives, and activities are linked to resources that already exist in the community.

Communities need to be involved in every aspect of project development. These include:

- analyzing the current situation
- identifying problems
- analyzing a chosen problem
- choosing a Plan of Action to solve it
- planning how to take the action
- carrying out the action or project
- monitoring and evaluating it

No Community Participation

Historically, community participation in water development projects has been given little emphasis. Early water supply projects were designed to fulfill the needs of communities as perceived by donor agencies; they were designed and implemented without community input or concensus.

When these projects did not achieve long-term sustainability, analysis showed that the lack of community input was resulting in numerous problems, including:

- improper siting of projects;
- use of inappropriate technologies;
- inadequate preparation of communities; and
- lack of concern for community priorities.

Partial Community Participation

Gradually, a greater concern for community participation was expressed by donor agencies. Projects began to ask communities to contribute to the proposed water supply activities by donating labor, materials, and housing for outside technicians.

This definition of community participation, however, still did not give the target population the opportunity to assess their priorities, or take responsibility and control over the planned activities. In some cases new water supply systems were abandoned or not effectively used. These project still indicated a low degree of sustainability.

Full Community Participation

A new level of community participation is being discussed and practiced by a few donor organizations and governments. These groups believe that for long lasting benefits, communities must decide what is important and play an active role in designing projects which meet their needs.

Once the community has identified a need and helped design the project, they then must take responsibility and eventually control of the project. Emphasis should be put on community priorities rather than agency priorities.

Eight Steps for Full Community Participation

The following Eight Steps will help ensure full community participation in water supply system development:

1. The community identifies the problem, and defines the need.

2. The community establishes a water committee.

3. The community understands the technical options, and selects the system.

4. The community agrees to perform specific construction tasks, identifies specific individuals responsible for each task, and agrees to provide specific inputs to complete each task.

5. The community manages the operation and maintenance process:

   - supervise the caretaker
   - make decisions on O&M tasks
   - identify needs for outside assistance

6. The community finances recurrent costs (100% ideally).

7. The community agrees on a monitoring process:

   - identifies benchmarks, and agrees on timeline and procedures
   - agrees on system/personnel performance standards

8. The community agrees on evaluation criteria, and an evaluation process.

Handout 6.2

Case Study

— Part One —

The community of Sinsano was recently selected to be included in a new water supply project co-sponsored by the Ministry of Health and the Water Authority Board. Sinsano has a population of approximately 1600 people. It is situated 15 kilometers off a major road that connects two regions of the country. The community relies on hand dug wells for its water supply for most of the year, although during 3-4 months of the dry season, women must haul water from a water hole 3 kilometers away.

Adam Atu, the new water supply technician for the project, has just returned from a three day visit to Sinsano. His assignment was to organize the community for planning, construction, and maintenance of a new water supply system. Adam is an experienced field worker, and has done similar work in other regions of the country.

Adam had learned what he could about Sinsano and the surrounding area from government and non-governmental sources in the regional capital before going to Sinsano. These source confirmed that the area has the highest infant and child mortality rates in the country. The long dry season and periodic drought, as mentioned above, result in a shortage of water. Diarrhea and undernutrition are the most important causes of mortality, with measles and pneumonia taking seasonal tolls.

Adam also met with the District Administrator responsible for Sinsano. He told Adam about the people of Sinsano, and also agreed to accompany Adam to the community to introduce him to the chief and elders.

When they arrived in Sinsano, they went first to greet the chief, who then summoned the community leaders. No sooner had the District Administrator introduced Adam than several elders told them of their need for a well. The son of one of the elders was a geologist, and on a recent visit to the community, he had selected a site for the well. Several of the elders then interrupted the discussion, saying that they didn't like this site, and an argument starts. The chief tried to change the topic to enable the administrator to finish with his presentation, but he was not successful. Finally, the Administrator interrupted the argument and finished his presentation.

Adam then thanked everyone present for agreeing to meet with him, and expressed the hope that they would all be able to work together to solve their water supply problem. After the meeting, Adam talked briefly with the chief and several elders. He agreed to meet the next day with the chief and council of elders to discuss how they can all work together.

Later in the day, Adam walked around the community. He noticed that

Sinsano is divided into four, fairly distinct neighborhoods. In talking with people, he learns that these neighborhoods represent four distinct clans. He wondered to himself how they were able to complete projects like the new community primary school and the community center. From his conversations with people, he learned that the clan heads are very powerful, but that the council of elders' decisions have power only when they are unanimous.

Adam also found out that their are two other powerful groups in town: the farmers' association, ans a women's cooperative. The people most respected by the community, he learned, included the school headmaster, the local agricultural extension agent, the itinerant pharmacist and the midwife.

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1. What did Adam do that was effective?

2. What are potential problems?

3. What should Adam propose?

Handout 6.3

Case Study

-- Part Two --

The next day, Adam met with the chief and the council of elders. The council included, among others, the heads of the four clans in Sinsano. The clan heads appear to be more powerful than the chief. Adam noticed that the chief defered to them and didn't interrupt them when they talked. They were not in agreement about the well. The heads of two of the clans want the well situated in their part of the village. The heads of two other clans do not want the well to be built on the other side of the village from where they live. They were not willing to work on the project, they said, unless the site is changed.

Adam explained to the chief and the council that it was too soon to decide where a well should be placed, or even if a well is the best source of clean water for the community.

Adam then proposed that a community water supply committee be formed, so that all the community leadership (including the farmers' association, the women's cooperative, the school headmaster and so on) would get involved in the project. The clan heads, however, thought that the committee should be set up as a committee of the council of elders. The chief, and some of the others present, thought that the committee should be set up as a separate organization. Adam recommended to the council of elders that they bring up the issue at a community meeting.

It was decided that the meeting would take place the next day. The elders agreed to present their idea for the committee, but they did not want the meeting to make the decision. They were only willing to have the community meeting nominate eight members to the committee; two from each clan. Adam was disappointed. He wanted to see a separate organization which is not so tied to the clans, but he did not feel that he could tell the elders what to do.

What did Adam do that was effective?

What potential problems does he face?

What should he do next?

Handout 6.4

Case Study

— Part Three —

Adam decided to talk to the headmaster, the extension agent, and the heads of the farmers' association and the women's cooperative to see if they could influence the elders to change their minds before the meeting.

The meeting took place as planned. There was a large turnout and an active discussion. While the issue of the site for the proposed well came up and were discussed briefly, in the end the community agreed to form a water committee to work with Adam and investigate how best to provide the entire community with clean water.

The school headmaster and the others were able to make effective arguments to the council of elders to have the committee set up as an independent body. The members of the council of elders agreed, as long as the composition of the committee equally represented the four clans. After a long discussion, the decision was made to form the Sinsano Water Committee. It was to have twelve members: two from each of the four clans, the chief, the school headmaster, the midwife, and the head of the women's cooperative.

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1. What problems still remain to be resolved? How would you recommend that he solve them?

2. What information does Adam still need to gather?

Handout 6.5

Organizing Communities to Participate

Field workers responsible for promoting community participation need to know how such participation can be organized. All communities need some form of organization in order to make decisions and work together.

Types of Community Organization

There are many ways for communities to organize themselves. For example:

- o some communities make decisions when everyone is together in a general community meeting;
- o some allow traditional leaders to make decisions for them;
- o some may be organized around community committees;
- o some may be organized around units of local government, or around branches of political parties or movements; and
- o some may be organized through informal contacts made between leaders of various age groups, family groups, religious groups or occupational groups.

Community promotors have a responsibility to talk with a community's leaders and discuss with them how best the community can work together. The leaders should recommend what types of organizations will help the whole community participate: existing organizations, new formal organization, or new informal organization.

The Purpose of Community Organization

Initial organizing means more than just calling community meetings or asking community leaders to form a community water committee. Meetings and committees are ways of organizing a community so that the entire community is in a position to do something.

Making a presentation or speech at a well attended general community meeting without using that time to find out what the community really thinks about an issue, will not promote community participation, nor will working with a committee that does not have good relations with the rest of the community.

The purpose of community participation as we are talking about it in this workshop is to get all the members of a community to participate in identifying and analyzing their problems, and in planning ways to solve

these problems. To get this participation, one has to do more than present information to the community.

Mutual Respect and Trust

Field workers need to develop relationships with community members based upon respect for their ideas and wishes. This can lead to a relationship in which you trust them and they trust you. When there is trust, there will be open discussions and respect for different viewpoints.

Once trust has been established, you can discuss ways the community can organize itself to participate. Imposing your own ideas, or totally accepting community ideas with which you don't agree will not work as well.

General Community Meetings

However the community decides to organize itself for full participation, you will probably want to meet with the entire community several times. At these general community meetings:

- o decisions can be made or formally approved by community leaders;
- o the water committee can present issues for discussion;
- o the water committee can share information with the community;
- o the water committee can share some of the skills that they have developed; and
- o the field work has an opportunity to observe how much the community supports a leader, a committee or an idea.

Day-to-Day Organizing

The support of prominent people in a community is essential, particularly in organizing day-to-day tasks required to implement a project. Their opinions and suggestions are necessary in getting the widest community participation possible.

Such people may be traditional community leaders, or members of a committee or other formal community organization. Some may be people with influence in the community, such as teachers, religious leaders, traditional health practitioners, head of a women's group, cooperative members, successful farmers, and so on.

These people should be involved early on to help the field worker:

- o analyzing information he or she has collected on the way the community is organized, answers to questions such as:
  - How is the community organized right now?

- What organizations exist that work with community development projects?

- What have these organizations done for the community in the past?

- What informal networks of communication exist?

- What is the importance of these different informal networks in the community?

o estimate the influence each of the formal or informal groups has in the community, influence that could help promote community participation;

o identify those community members who could help gain the support and trust of these key formal and informal groups;

o develop a good working relationship based on respect and trust with community leaders and other people who are influential in the community;

o assist community leaders and influential people in deciding on the best way to get true community participation by asking questions, presenting ideas or information, answering questions;

o assist the community, if asked, to form a new organization, or to help improve an existing one, capable of promoting community participation;

o monitor community support;

o develop respect and trust with community members or groups that are not well represented by the existing organizations, and try to get them involved when it is appropriate to do so;

o organize general community meetings to:

- present project information and answer questions

- get people comfortable with providing feedback about the field worker's activities in the community

- judge how much support there is in the community for the project that is being planned or done

- make decisions on how the community will participate in solving its own problems

- discuss, demonstrate or train new skills

- increase the number of people who are actively participating in identifying, analyzing and planning solutions for community problems

- analyze how successfully the community is working together, to assure true community participation.

Handout 6.6

Job Description of a Community Promoter

Promoting community participation is a big job. The promoter must help community people become actively involved in all parts of planning, implementing, and evaluating the actions required to solve its problems.

The promoter:

- o helps the community to organize itself, so that as many people as possible can participate;
- o helps the community to train its members to participate; and
- o helps the community to make it easier for its members to participate.

Promoting community participation means helping the community become capable of doing for itself what the promoter could otherwise do for it. The promoter must transfer his or her skills to the community, so that the community can learn to solve its problems on its own in the future. The job description prepared for this workshop describes everything a promoter needs:

- o Part I: Describes the tasks a promoter does to help the community solve its enivronmental health problems. It is broken down into all the phases of developing solutions to health problems.
- o Part II: Describes the tasks a promoter does to help the community do the tasks in Part I. The promoter must prepare individuals in the community to do these tasks after he or she leaves, to continue promoting community participation.

Part I: The Phases of Developing Solutions to Community Problems

1. Initial Organizing

The promoter can help the community start a new organization if it wishes to do so, or he or she can help existing community organizations decide how they can become more effective at promoting community participation. If the community has not had a committee before, or if existing committees or groups feel that they need training on how to better run their organization, then the promoter helps plan training sessions for the officers and selected members of the organization.

While working with community organizations, the promoter notes their strengths and weaknesses, and judges how these might affect their ability to help the community. If a community organization is having problems,

he or she tries to help its members solve its problems themselves.

The promoter meets and gets to know informal community leaders so that she can build up a working relationship with them.

2. Gathering and Analyzing Information on Community Conditions

The promoter helps the community plan how to collect information about the health conditions in the community. He or she trains members of the community to help gather this information. The methods used might include making a map of the community, counting the number of people sick with different illnesses, asking people for information, watching what other people do, counting things that are present in the community.

After the information has been collected, the promoter helps community members analyze it, present the results to the community and promote discussion of the meaning of the results.

3. Identification of Community Problems

The promoter trains members of the community or one of its organizations to understand and identify the community's problems. They start with the information about the health situation in the community which they gathered and analyzed in the previous phase. They learn how to put the problems that have been identified into order of importance, and they select one problem to be solved first by the community.

4. Analysis of Community Problems

The promoter helps the organization learn how to analyze the problem that has been chosen for action. The community members list and discuss everything that causes or makes the problem worse, as well as everything that might make the problem go away. The community members then decide which of these things they themselves can do something about with the resources available to them. The promoter helps the community members list all the actions the community can take to do something about the problem.

5. Choosing a Plan of Action

Working from the list of actions developed in the previous phase, the promoter helps the community learn how to put together a plan of action to solve the chosen problem. Each action on the list is looked at to see whether it can be done from a technical point of view, and then whether the community could afford to do it with its existing resources. Each action is looked at to see exactly what people and materials are needed to carry it out, and how much the action is going to cost the community during construction, and in the next five years.

If necessary, the promoter can help community members get technical experts to come to community meetings, answer their questions and explain the important parts of a given "plan of action". The community members learn how to choose their "plan of action" by comparing how practicable it is to do, its effects and its cost compared to the other possible actions on their list. A final Plan of Action is then prepared.

6. Making a Contract

Generally, the promoter's agency will be responsible for providing some resources to the community, so that it can complete the Plan of Action. The community learns how to make a contract between itself and the promoter's agency, specifying what the community and agency will be responsible for doing, supplying and maintaining.

7. Developing a Work Plan

The promoter helps the community members learn how to make a detailed work plan for the chosen Plan of Action. This work plan includes a clear statement of the final goal of the project, and the objectives of each step in the work plan. The major steps in the plan are broken down into tasks. The community members discuss the people, materials and time needed to complete each task. Based on these discussions, the community members put together a work calendar which clearly describes who and what have to be where and when for how long.

If community members need to develop certain skills to be able to carry out tasks in the work plan, the promoter plans when and how such training will take place in time for the task to be completed on schedule.

8. Carrying out the Project

The promoter helps the community members organize and supervise the work for the project. She helps the community members select and train a person to supervise the project and a foreman to oversee the manual and technical work. She sees to it that any required training of community members takes place on time. She uses this opportunity to recommend people to be responsible for maintaining the finished system.

The promoter helps the community learn how to monitor the progress of the project according to the work plan. He or she helps them learn how to solve problems that arise, so that the project gets completed as planned.

9. Health and User Education

The promoter helps the community learn how to get people to change their health behaviors, and learn how to use the new system. They learn how to interview each other to discover barriers they might have to changing behavior (the barriers may be social, money-related, or due to traditional beliefs). He or she models how to respect the ideas and beliefs of others, and to work with people of the opposite sex, and with children.

He or she helps them to be imaginative in presenting information to people through talks, by asking questions, staging plays, using puppets, and so on.

10. Maintenance of the Finished System

From the very beginning of planning the solution to the problem, the promoter helps the community members consider what will be needed to

maintain the finished system. He or she helps the community members decide who is going to be responsible for doing them; where required resources for maintenance are going to come from; how they are going to be looked after; how much they will cost; and how they will be paid for.

11. Looking at the Progress of the Project

The promoter helps community members learn how to look at the progress of the project while it is being carried out, and when it is completed. The community members use "success analysis" (see Part II #7) to identify what they are doing that is successful, what problems have come up, and how they might best solve them. They also use this information to plan the next project better.

Part II: Ongoing Helping Tasks

1. Preparations for Entry into a Community (Pre-Entry Tasks)

When the promoter is assigned to a new area, he or she should look for any available information on the community. Such information will help develop a plan for entering the community. The information to look for should include:

- how the community is presently organized;
- what has happened in the community in the past in terms of development efforts, their success or failure, and why;
- who else has been working who can provide information;
- what is the ethnic, religious, tribal or clan makeup of the community; and
- is there health, sanitation, cultural or economic information available from the field worker's agency, or from another agency.

With this information, the promoter plans how he or she will approach working with the community, and prepares for the first meeting with community leaders.

2. Entry into the Community

The promoter enters the community and first organizes a meeting with the official community leaders and other people who are influential in the community. During such meetings, the promoter presents a description of the services offered by his or her agency, and the role that he or she expects to play in community development efforts. The promoter asks the leaders many questions, and gets them to ask many questions in turn. The promoter starts to check the truth of any information he or she may have gathered before entering the community.

The promoter will often want to ask the leaders to call a community meeting so that he or she can be formally introduced to the community. At the meeting, the promoter can begin to help community members look at the community situation in an organized manner.

3. Continuing to Learn about the Community

The promoter is always looking for further information about the community. He needs to know as much as possible about its history, its health, its resources, its conflicts, its leaders, its neglected groups, its customs, and so on. The longer the promoter works with the community, the more he or she should be discovering how it works, and who or what make it work. Some of the information may only be available after some time.

4. Organizing Community Groups and Committees

The promoter is always working with community groups and committees to help them improve their skills in solving community problems. These may be general health-related problems, or the problems people are having working together to solve these broader problems. If he or she is working with a formal organization (e.g., a health committee), he or she helps some committee members build organizational skills, so that they can help the committee do its job.

The promoter is always on the lookout for new leaders, and ways to help them develop their skills. He or she is always looking for ways to get the community to take on more responsibility for solving its problems.

5. Training Community Members

A primary task of the promoter is to transfer basic problem solving and project development skills to the community. This means that he or she must be a skilled trainer. He or she must identify skills community members need, and how to plan and carry out training activities to help develop these skills.

6. Facilitating or Making Tasks Easier to Do

The promoter often works behind the scenes to make tasks easier for community members to do, so they can improve their abilities to make decisions, to plan and to carry out these plans on their own. A major principle for the promoter is that he or she should not do anything for the community that it can do for itself. The goal of the promoter is to work with the community until it is capable of identifying and planning its own solutions to problems without outside help.

7. Analyzing Success

The promoter should constantly be looking at the success of activities by asking these questions:

- What have has been done that was successful? Why was it successful?
- What problems did I/the community meet? How have I/the community overcome them?
- What problems do I/the community still have? What will I/they do to overcome them?

The promoter should then be able to convince the community members of the value of asking themselves the same questions after any major

activity.

8. Solving Problems

The promoter needs to solve the problems that occur in his work, as well as help the community solve its problems. Some common problems which arise in promoting community participation are:

- o how to build other people's trust;
- o how to listen to other people;
- o how not to upset people by being judgemental;
- o how to help people make committee or public meetings work;
- o how to identify and analyze a work problem that they have; and
- o how to put together a personal work plan.

The promoter uses the same steps in solving problems that he teaches to the community.

9. Liaison Tasks

The promoter uses his or her position as the connection between the community and outside resources to help the community find information or help from other agencies. He or she can also inform other agencies of what is happening in the community, so that they can help the community develop a broad range of development activities.

10. Promoting Self-Sustaining Participation

The promoter works with the community from the very first day in such a way as to enable the community to take over when he or she leaves, and continue to solve problems on its own. He or she does this by:

- o organizing the community to participate;
- o working with the community organization to help it become strong and effective;
- o training community members to do everything he or she has been doing with them;
- o facilitating their work so that tasks are easier;
- o pointing out successes, so that the community is encouraged by its efforts; and
- o helping existing and new leaders take over his or her role as the promoter of community participation.

SUMMARY

The job description of a promoter of community participation includes the following categories of tasks which promoters both perform themselves, and train community members to perform.

The Phases of Developing Solutions to Community Problems

1. Initial Organizing
2. Gathering and Analyzing Information on Community Conditions
3. Identification of Community Problems
4. Analysis of Community Problems
5. Choosing a Plan of Action
6. Making a Contract
7. Developing a Work Plan
8. Carrying out the Project
9. Health and User Education
10. Maintenance of the Finished System
11. Looking at the Progress of the Project

Ongoing Helping Tasks

1. Preparations for Entry into a Community (Pre-Entry Tasks)
2. Entry into the Community
3. Continuing to Learn about the Community
4. Organizing Community Groups and Committees
5. Training Community Members
6. Facilitating or Making Tasks Easier to Do
7. Analyzing Success
8. Solving Problems
9. Liaison Tasks
10. Promoting Self-Sustaining Participation

Community Promoter Skills Inventory

Place a check in the appropriate column for each item.

Skill Categories	I have never done this before	I have tried this but without much success	I do this and it works well	I have taught community people to do this well
1. Pre-Entry Skills				
o Gather and analyze information about a community to assess its "readiness" to participate in a water supply and sanitation project.				
o Develop a strategy to enter a community.				
o Meet with government and other officals to clear the way for entry.				
o Prepare materials for the initial meeting.				
2. Entry skills				
o Initiate work in a community				
o Make a presentation to community leaders.				
o Develop a dialogue with influential community members.				
o Check the truth of pre-entry information, and adapt entry strategy.				
3. Organizing Skills				
o Analyze existing community-level organizations to assess their ability to promote participation.				
o Help community leaders select an appropriate structure.				

Skill Categories	I have never done this before	I have tried this but without much success	I do this and it works well	I have taught community people to do this well

- o Help a newly formed committee get started (select members, and officers, define its mission, adopt by-laws, train officer)
- o Identify and work with informal leaders as well as formal leaders.
- o Help committee solve its problems.

4. Gathering and Analyzing Information

- o Map a community.
- o Enumerate households.
- o Take sample.
- o Conduct an interview.
- o Make observations of the environment.
- o Compile data for analysis.
- o Analyze and interpret data.
- o Prepare community to do the above.

5. Training Skills

- o Identify needed community skills.
- o Plan and prepare training activities.
- o Carry out training activities.
- o Monitor learning in progress.
- o Evaluate job performance after training.
- o Train community trainers.

6. Facilitation Skills

- o Work behind the scenes to make tasks easier.
- o Help solve problems before they become major obstacles to participation.
- o Get others to do things rather than doing them yourself.

Skill Categories	I have never done this before	I have tried this but without much success	I do this and it works well	I have taught community people to do this well
o Help others find their own answers and solutions to questions and problems rather than providing them yourself.				
o Train local facilitators to take over from you.				
7. Identifying Problems				
o Define what "a problem" is.				
o State a problem clearly.				
o Choose criteria for putting problems in order of importance.				
o Rank problems using these criteria.				
o Choose a problem to work on based on this analysis.				
o Help (train, organize, and facilitate) community members to do all of the above.				
8. Analyzing Problems				
o Describe a problem in detail.				
o List and success everything causing the problem or making it worse.				
o List and discuss everything lessening the problem.				
o List and discuss the resources of the community.				
o List all the actions which can solve or lessen the impact of a problem.				
o Help (train, organize, and facilitate) community members to do all of the above.				
9. Choosing a Plan of Action				
o Get help from technical experts if necessary.				
o Analyze whether an action can be done from a technical point of view.				

Skill Categories	I have never done this before	I have tried this but without much success	I do this and it works well	I have taught community people to do this well

- o Analyze all the costs of such an action.
- o Choose one plan of action by comparing different actions in terms of how hard they are to do, how costly they will be and their effect on the problem.
- o Help community members do all the above.

10. Developing a Work Plan

- o Define a goal for the plan of action.
- o Break the plan into its component steps.
- o Identify specific objectives for each step.
- o Identify the tasks in each way.

- o Decide on resources needed for each step or task (human, technical, material, financial).
- o Organize the above on a work calendar.
- o Plan training needed for community members (the human resources) to do their jobs.
- o Help community members to do all the above.

11. Carrying out a Project

- o Help community members organize and supervise project work.
- o Help train project supervisor, work foreman and anyone else needing training.
- o Monitor progress of the project according to the work plan.
- o Solve problems as they arise.
- o Recommend people to be responsible for maintaining the finished system.
- o Help community members to do all the above.

Skill Categories	I have never done this before	I have tried this but without much success	I do this and it works well	I have taught community people to do this well

12. Health And User Education

- o Identify behaviors which need to be changed to solve health problems.
- o Identify barriers to changing behaviors.
- o Identify practices for proper use of new systems.
- o Respect ideas and beliefs of others.
- o Work well with people of the opposite sex and children.
- o Present information imaginatively.
- o Generate and lead discussions through questions, and imaginative presentations.

13. Maintaing the Finished System

- o Identify maintenance tasks.
- o Establish a maintenance schedule.
- o Help community members organize a revolving fund.
- o Select persons to perform maintenance tasks.
- o Set up an inventory of spare parts.
- o Set up and implement a monitoring system.
- o Help community members to do all of the above.

14. Analyzing Project Progress and Success

- o Analyze work success, as well as problems.
- o Establish a system based on "success analysis" to analyze the progress of a project.
- o Analyze your own work success and problems.
- o Identify unresolved problems to solve.
- o Help community members do all of the above.

Skill Categories	I have never done this before	I have tried this but without much success	I do this and it works well	I have taught community people to do this well
15. Promoting Self-Sustaining Participation				
o Help form and strengthen community organizations.				
o Transfer all skills to community members.				
o Help the community successfully solve problems by facilitating its work and encouraging it to solve other problems on its own.				
o Help leaders develop in the community to take over promotion.				

SESSION 7: ORGANIZING FOR OPERATIONS AND MAINTENANCE

Total Time: 7 hours
30 minutes

OBJECTIVES

By the end of the session, participants will be able to:

- o Define the roles and responsibilities which contribute to the O&M process, and describe how they interact.
- o Describe selection criteria of O&M personnel, including government technicians, community promoters, community water committee members, and water system caretakers.
- o Describe current logistical issues, and strategies that maximize existing resources for operation and maintenance.

OVERVIEW

The major purpose of this session is to provide participants with a shared understanding of the roles and responsibilities for the key groups and individuals who collectively contribute to the operation and maintenance process.

Once these roles and responsibilities are clarified and agreed to, the types of characteristics and skills needed by each of these groups and individuals can also be identified. In so doing, participants not only establish norms for how they should work with community groups, and identify skill improvement needs that would enable them to be more effective, but they also reach a common understanding of the types of people they should be promoting as water committee members, and as caretakers. Two small group activities facilitate the clarification of responsibilities, and the determination of selection criteria.

The session also addresses issues of transportation, equipment and facilities. The primary emphasis is on ways to improve the effectiveness of O&M by being more efficient with existing resources, and not by developing an unrealistic wish list.

PROCEDURES

1. Introduction — Time: 10 minutes

Briefly remind participants of the key conclusions drawn from the last session about the level of involvement that should be expected from communities in the development and management of water systems. Ask: "What about government? What should government be expected to do?"

Take a few responses. Acknowledge that we've already discussed the role

and skill requirements of the community promoter, but what about other individuals and groups who help establish and support water systems. Say that this session will try to clarify the roles and responsibilities of the various levels that interact in the O&M process.

Present the session objectives, and provide an overview of session procedures.

2. Roles in the O&M Process - Lecturette — Time: 25 minutes

Present a lecturette using flipchart of the roles of the various levels that interact in the O&M process. Roles described should reflect the official role descriptions.

Trainer Note: This lecturette will need to be based on interview data gathered prior to the workshop. It may also be appropriate to bring in a senior official from the sponsering government agency to deliver this presentation.

Trainer Note: If roles at one or more level are unclear, suggest to the group that this session might help clarify these roles, or, at the very least, provide a basis for recommendations to the sponsering agency.

Role of Government

- o National Level
  - policy making/coordination bodies
- o Regional Level
  - regional offices and workshops
- o Local Level
  - O&M technicians/community promoters

Role of the Community

- o Water Committee
- o Caretaker

3. Responsibilities of Various Levels of O&M - Small Group Task — Time: 45 minutes

Say that now that we've talked about roles of these various levels of organization, and the groups that represent them, let's take a more specific look at the responsibilities of key groups in carrying out their O&M roles. The key groups that we're going to focus on are:

- o regional engineer
- o O&M technicians/community promoters
- o community water committee
- o caretaker

Trainer Note: The first category, regional engineer, may not be the appropriate designation or group in the host country. The intention here is that this category represent the "supervisor" of the O&M technicians.

Divide the group into four small groups, assign each group one of the above categories, and introduce the following task:

Small Group Task

- o Identify the major O&M responsibilities for your assigned group.
- o Record on flipchart.
- o 40 minutes

Trainer Note: If O&M technicians and community promoters are two different groups, divide the full group into five small groups to handle the five categories.

Trainer Note: This exercise aims at clarifying major responsibilities of the various groups. The lists are not intended to be exhaustive.

4. Reports Time: 1 hour

Groups report out. Challenge the group when overlapping responsibilities appear by asking: "Who's responsibility should it be?" Identify areas where further clarification is needed.

Ask:

- o What kind of support should technicians expect from the regional engineer? In general, are you getting this support?
- o What kind support should the technician expect from the community? Are you getting this support?
- o What kind of support should water committees be getting from technicians? Are they getting this support?
- o How long should the community expect support from the technician?

Refer to earlier discussions of the dependency issue between the community and outside technicians, and emphasize that developing and maintaining water supply systems involves a learning process on the part of the

community that occurs over time. Stress that to avoid dependency the community must build the skills required for sustainability. The promoter must help facilitate this learning process.

5. Personnel Selection Criteria - Small Group Task — Time: 35 minutes

Ask participants the following questions:

- Why is it important to select appropriate personnel at the community level to carry out these responsibilities? At the government level?

Take a few responses, and emphasize (if not already done so) that "appropriate personnel" means type of personnel, characteristics, skills and motivation.

Say that in this activity we're going to develop selection criteria for the personnel discussed in the above activity.

Divide the group into four small groups, assign each group one of the four personnel categories, and introduce the following task:

Small Group Task

- For the personnel category assigned to your group, identify the characteristic and skills needed to carry out the above responsibilities.
- Record on flipchart.
- 25 minutes

6. Reports — Time: 30 minutes

Each group presents its list. Seek group consensus on personnel characteristics and skills.

7. Caretaker Selection Criteria - Individual Task/Simulation — Time: 1 1/2 hours

Ask:

- To what extent would the caretaker selection criteria vary with the water system developed? What are some of these differences?

Record responses on flipchart.

Ask participants to reflect for a few minutes on the following questions (on flipchart): "How might Adam communicate this criteria to the Water Committee in the case? What would be your strategy?"

Present the following individual task on flipchart:

- Prepare a strategy for how Adam should communicate this selection criteria to the Water Committee of Sinsano.
- 20 minutes

Ask for volunteers willing to share their strategy. Ask a participant who feels strongly about his or her strategy to "try it out". Give the participant a couple minutes to prepare, ask the rest of the group to represent the water committee (select specific participants to represent the four clan heads, the chief, the school headmaster, and so on), and run a short simulation (10-15 minutes). Discuss the simulation on the basis of the following questions:

- What was the strategy chosen by "Adam"?
- How effective was it?
- How did the committee react?
- What would you do differently?

If time permits, run a brief second simulation based on the last question.

8. Logistics - Lecturette Time: 20 minutes

Present a lecturette on the principal components of logistical support to O&M programs. Highlight the key points included below.

Basic Logistical Requirements of O&M

Transportation

- Trucks, pick-up trucks, motorcycles, bicycles, public transportation

Equipment

- spare parts, tools, fuel

Facilities

- Offices, workshops, garages, housing

Ask the group what the current situation is with respect to the above logistical requirements.

Trainer Note: This question will provide participants with an opportunity to vent any frustration they might, such as insufficient vehicles, spare parts and so on. Once heard, however, the next question is "how do we make better use of the resources that we do have".

Common Logistical Issues

Transportation

- o Who needs what type of transportation for effective O&M? Why?
- o How can vehicle requirements be reduced, while maintaining effective O&M?
- o How can other modes of transportation be utilized?

Emphasize that the objective should be to minimize and simplify the requirements through an effective program designed to have vehicles moving the least amount of time.

Equipment

- o Where should equipment and materials be stockpiled?
- o Quantity of each item
- o Who purchases equipment and materials? Availability?
- o Location of storage, and inventory system
- o Who transports parts?

Emphasize that O&M programs are doomed to failure if materials and parts are not available when they are needed. Materials and parts required most frequently should be acquired by the community periodically so as to have them on hand at all times.

Facilities

- o What types of facilities are needed? National? Regional? Local?
- o Where should these facilities be located for effective O&M? Why?
- o Which facilities could be provided by the private sector? By communities? What needs to happen for this to occur?

Point out that the objective is to provide effective maintenance at minimum cost:

- Facilities should not be duplicated.
- Sophisticated equipment should be avoided.
- Workshops and equipment should be made full use of by means of sound O&M planning.

9. Logistics - Small Group Task Time: 65 minutes

Ask the group to return to their same small group that they worked with in activity 5, assign each group a logistics category, and introduce the following task (assign "transportation" to two groups):

Small Group Task

- o With the current situation in mind, respond to the questions raised in the lecturette for the category assigned to your group.
- o Develop a plan for improvement with existing resources.
- o Prepare for a flipchart presentation of your responses and plan.
- o 60 minutes

Ask the two groups with the "transportation" category to consider the different transport needs for each of the four levels of personnel discussed in activity 5.

11. Reports — Time: 50 minutes

Each group presents the results of its work.

Ask:

- o Based on outcomes of reports, can O&M be effectively handled given the current situation?
- o What conclusions might one draw in terms of system selection criteria?
- o What needs to happen to better facilitate vehicle coordination?

12. Wrap-Up — Time: 20 minutes

Ask participants to reflect for a few minutes on the following question:

- o What are the most important lessons you have learned in this session?

Record responses on flipchart. Review the list with participants when completed.

Then ask:

- o What are some things that you're going to try to do differently when you return to your post?

Explain that the next session will deal with approaches to financing operation and maintenance, as well as issues that may need to be addressed in the process.

Read over session objectives, and ask the group if they were met.

SESSION 8: FINANCING OPERATIONS AND MAINTENANCE

Total Time: 4 1/2 hours

OBJECTIVES

At the end of the session, participants will be able to:

- Identify the cost elements relating to the operation and maintenance of rural water supply systems in the country.
- Describe what goes into a realistic budget for O&M.
- Describe the concepts of "ability" and "willingness" of the community to pay for O&M.
- Define the capital and recurrent cost factors for the four predominant water systems, and assess differences in impact among them on recurrent costs.
- Describe different strategies and methods that can be used to promote cost recovery at the community level.

OVERVIEW

This session builds on the community participation goals of the two previous sessions, focusing specifically on the community's role in financing a system's operation and maintenance. The session also emphasizes the promoter's role in helping communities to see and accept their financial responsibility for O&M before a system is selected and constructed.

Following a lecturette on capital and recurrent costs, strategies are developed in the full group for recovering recurrent costs, and then participants in small groups estimate capital and recurrent costs for one of the four predominent systems, and develop a community financing plan for O&M using one of the strategies developed in the full group.

Lastly, participants are given an opportunity to "try out" their plans in a simulation of a meeting between a water technician (or community promoter) and the community water committee.

PROCEDURES

1. Introduction — Time: 10 minutes

Ask the group the following questions:

- What do we mean when we say "recurrent cost"?
- What are some examples of O&M recurrent costs from the last session

and our discussion about logistics?

- o Who usually pays for these recurrent costs?

Take a few responses, and acknowledge that there are different approaches to financing O&M recurrent costs. Say that this session will focus on the issues of financing recurrent costs.

Present the session objectives.

2. Financing O&M Recurrent Costs - Lecturette — Time: 25 minutes

Ask the group: What can happen to a system if the financing of O&M has not been assured before its construction?

Present a lecturette that covers the points included below.

Capital and Recurrent Costs

Recurrent Costs

- fuel, lubricant, spare parts, chemicals
- routine maintenance of installations
- replacement of lost, damaged, or stolen parts
- salary for local caretakers
- transport of parts and supplies to the community
- input into a revolving fund
- training

Capital Costs

- machines, equipment, and materials for the actual construction of the system

Who Should Pay What?

Community: At a minimum, the community should cover all or most recurrent costs. Depending on ability, the community should also cover some of the capital costs.

Government: The government may need to cover all capital costs. They may also need to cover some recurrent costs, such as chemicals and spare parts, particularly for the larger systems.

Meeting Community Costs

Beneficiary Fee -- direct payment by individual using the system (or a per bucket charge at a standpipe, for example)

Establishing Rates -- installing meters to measure water usage

Local Taxes -- a general tax which includes a portion for handling water system recurrent costs.

Community's Ability and Willingness to Pay for O&M

- o Communities need to understand the importance of O&M in the sustainability of a system.
- o O&M requirements should be linked to resources that are available in the community.

Emphasize that these two steps are vital, and in many ways are more than the development of a cost recovery strategy.

3. Cost Recovery Strategies - Full Group Discussion — Time: 30 minutes

Ask participants: "What steps should the designer of an O&M activity include to assure that money can be raised and used effectively?" Include the following if not volunteered by the group:

- Introduction of responsibility for recurrent costs early in the project.
- Inclusion of ways for raising money in the decisions by communities on solutions to address problems.
- Training the treasurer of the local water committee in accounting and financial management.
- Provision for starting a revolving fund, e.g., a line item in the project budget.

Ask the group to brainstorm a list of cost recovery strategies that have worked or would work in their region of the country. Record on flipchart, and review the list when completed.

Include the following "strategies to consider" if not already mentioned by the group:

- o cost sharing (government may subsidize)
- o revolving fund
- o local taxes
- o special financing by community, i.e., gardening projects, growing bananas around the well to sell for spare parts.

Ask the group which two strategies they would consider to be the most feasible. Circle these two. Then ask the group to list the advantages and disadvantages of each strategy. Record responses for each strategy on separate flipchart.

Ask:

- o Which of these strategies would be best for a community that has demonstrated ability, but not much willingness in paying for O&M?
- o Which strategy would be best for a community that has demonstrated willingness to pay, but lacks the capability to do so?
- o Which strategy would you pursue for a community that has demonstrated low ability and low willingness to pay?

4. Financing O&M Recurrent Costs - Small Group Task — Time: 1 hour 20 minutes

Divide the group into four small groups, assign each group a water system, and introduce the following task:

Small Group Task

- o Estimate capital and recurrent costs
- o Develop a Community Financing Plan for O&M using one of the stategies just discussed.
- o Record estimated costs and key points of your plan on flipchart.
- o 1 hour 15 minutes

5. Reports — Time: 50 minutes

Groups report out. After each report out, ask participants to check lists for omissions in costs. After all report outs are completed, compare and contrast estimated development and recurrent costs.

Then ask:

- o What was similar about the Community Financing Plans? Different?
- o Which plan will involve the most organization on the part of the community? The least?
- o Which plan will have the greatest chance of long-term cost-recovery? Why?

6. Community Financing Plan - Simulation — Time: 55 minutes

Ask participants to individually prepare for a meeting with the Sinsano Water Committee as if it were going to happen in 15 minutes.

Individual Task

- o Prepare to explain your group's collection strategy to the Sinsano Water Committee -- how are you going to sell the plan?
- o 15 minutes

Explain that they're going to have an opportunity to try out their strategies. Ask two small groups to go with one trainer to another room.

In separate rooms, each trainer facilitates the simulation. Participants individually "try out" their approaches as the technician, with the others in the sub-group being the water committee. Run each round for 8-10 minutes. After each round, ask the following questions:

- o What was the strategy chosen by the technician?
- o How effective was it?
- o How did the Committee react?
- o What role was played by the women's group and farmer's association?
- o What would you do differently?

Run two or three additional rounds.

7. Wrap-Up Time: 20 minutes

Bring the two groups back together. Ask:

- o What have been the major lessons for you in this session?

Record responses on flipchart, and review the list when it is complete.

- o What do you intend to do differently back on your job?

Review the session goals and ask if they were met.

Link to the next two sessions, Developing a Health and User Education Program and Design and Delivery of O&M Training Sessions, by saying that we have already discussed to some extent the need for community health education and the need for community training in the successful implementation of O&M programs. The next two sessions will provide skill-building in these areas aimed at helping them work more effectively with communities.

SESSION 9: DEVELOPING A HEALTH AND USER EDUCATION PROGRAM

Total Time: 3 1/2 hours

OBJECTIVES

By the end of the session, the participants will be able to:

- Describe how health education impacts on both health benefits and the sustainability of water supply.
- Identify the individual behavior which can be the subject of a health and user education program.
- Describe a variety of health and user education activities.
- Develop health and user education approaches.

OVERVIEW

Session 6, Community Participation and Promotion, identified health and user education as paramount to gaining full community participation in the O&M process. This session provides participants with information and skill-building aimed at helping them initiate health and user education activities.

Through a lecturette and case study/small group activity, participants identify negative and positive behaviors that can affect health conditions in a community. Once these behaviors are identified, participants in full group discussion develop approaches to raising these health issues to a water committee. The range of potential activities that can be used for health and user education are explored and discussed, as are possible training approaches. The full group discussion of training approaches and activities lays the ground work for the next session, Design and Delivery of O&M Training Sessions.

PROCEDURES

1. Introduction — Time: 10 minutes

Introduce the session by asking participants to define what is meant by health education and user education. Clarify the distinctions between the two. Ask participants why they are important aspects of an O&M program.

Present the overview of the session in your own words, and the session objectives on flipchart.

2. Looking at Behavior — Time: 40 minutes
- Lecturette/Full Group Discussion

Ask for a show of hands of how many of the participants have observed or been part of a health or user education program. Ask some of them to briefly describe these programs. After a few descriptions, ask them to identify the goals of these programs. List their responses on a flipchart. Review the list when completed.

Add the following additional goal areas for health and user education programs, if they have not already been discussed, and emphasize that they are key goal areas for water supply system development.

Integration of Interrelated Health Activities

- Water supply system development must be carried out as a comprehensive package of interrelated activities:
  - health
  - sanitation
  - water quality
  - system construction
  - maintenance
- If system development goals include long-term sustainability of the system, and improved community health, there must be an education process from the beginning that includes health and sanitation.

Better Use of Water Supply Systems

- Key Question: How is the water supply system being used to improve the health situation of the community?
- Key Question: What's being done to protect sanitation around the water supply system?

Increase Access to Water Supply and Latrines

- All potential beneficiaries must be involved in the system development process.
- Water systems and latrines must be designed in ways that are affordable to the local population.

Better Personal Hygiene

- Avoiding the contamination of water in taking it from the system to the home to consumption is as important to health improvement as avoiding contamination within the system itself.
- Washing hands is the one behavior that will do the most to lessen water contamination prior to consumption.

Say that these lists of goals are the content of health and user education; now let's look at the process. Present and discuss the following points on flipchart:

Health and User Education helps to change or reinforce people's

o attitudes

  - how they feel about something (e.g., superstitions, water use patterns)

o knowledge

  - what they know about something (e.g., understanding the relationship of water supply, sanitation and health)

o behavior

  - what they do (e.g., where people get water -- protected source or contaminated source, what they do to protect their water, where people deficate)

in order to improve or protect the health of the community.

Ask participants to match some of the goals of their own programs (those listed on flipchart) with the above three categories. If necessary, give some additional examples from your own experience.

Emphasize the need to make sure that people are actually doing things (behavior), and are not just aware of the need to do these things (knowledge), or willing to do these things (attitude).

Next, put one of the predominant water systems as a heading on a flipchart. Ask the participants to identify the variety of behaviors related to its use. For example, with a covered, wide diameter well, behaviors would include:

Good Sanitation Behaviors

- keeping animals and debris away from the well
- washing clothes away from the well
- keeping water drainage in good maintenance
- constructing a large apron around the well at ground-level

Protection of Water

- using a pump or one bucket to draw water (one bucket kept off the ground to minimize contamination)
- use clean containers in transporting water
- keep water containers in the home covered
- use one dipping cup (kept off the ground to avoid contamination)

Personal Hygiene

- washing hands to protect water
- washing hands for food preparation

Point out distinctions between health and user education behavior, and where they overlap, such as the need to keep the drawing bucket off the ground.

Distribute Handout 9.1, Water's Impact on Health, and Handout 9.2, Quality of Water.

Trainer Note: Arrangements could also be made for an outside speaker to deliver a complementary presentation on the topic of community health education. It would be important to meet with the speaker in advance of the session to assure that his or her presentation meets the needs of the participants.

A suggested format for this activity is as follows:

a. Introduce Speaker

Introduce the speaker, and explain why this particular person was invited to speak.

b. Obstacles to Effective Health Education

Before turning the session over to the speaker, solicit from the group "obstacles to effective health education" that they have encountered first-hand. Record responses on flipchart. Explain that the speaker will try to direct his or her presentation and examples to respond to these obstacles.

c. Presentation

Speaker delivers presentation, responding appropriately to list of obstacles developed by participants.

Presentation should include the following:

- What are the existing health and user education programs in the country?
- Which government ministries are involved? What other organizations are involved?
- What is the level of coordination among these groups?
- What are the program limitations?
- What do they require to become more effective?
- What are the steps in setting up effective health and user education programs?
- What's the best approach to assure project sustainability and replicability?

d. Question and Answer

Assist the speaker in fielding questions from the group, if needed.

e. Wrap-Up

Ask the group to think for a minute or two on the question: What are your most important conclusions from this discussion? Record responses on flipchart, and review the list when complete.

3. Identifying Behavior/Approaches to Health Education - Case Study/Small Group Task — Time: 45 minutes

Tell participants that we're going to identify behavior that could form the basis of a health and user education program, and that to do so we're going to return to Sinsano and the case study. Divide the group into four small groups, distribute Handout 9.3, Case Study Part Four, and introduce the following task:

Small Group Task

- Read the case individually. (5 minutes)
- In your group, identify behavior that has a negative effect on health conditions in Sinsano. (10 minutes)
- Determine what the behavior should be to have a positive effect on health conditions. (10 minutes)
- Agree on an approach Adam should take with the committee in discussing health education. (15 minutes)
- 40 minutes

4. Identifying Behavior/Approaches to Health Education - Full Group Discussion — Time: 30 minutes

Ask each group in turn to identify one negative behavior and its corresponding positive behavior. Repeat the process.

Ask:

- What did you see as the most critical health issues in the case?
- In what ways are these health issues interrelated?

Then ask each small group what approach they think Adam should take in raising the issue of health education at the water committee meeting. If a group feels strongly about their particular approach, let one participant from that group "try it out" by doing a spontaneous role play, with particpants from other groups playing the water committee.

5. Developing Health and User Education Programs - Full Group Discussion — Time: 40 minutes

Distribute Handout 9.4, Designing Educational Efforts in Support of Community Participation in Water supply and Sanitation Projects, and read it with the particpants. Stop after each section or long paragraph to see if everyone understands the handout. Provide examples and clarification wherever needed.

When you are finished reading and discussing the handout, lead a discussion of the kinds of activities that make up health and user education programs with the following questions:

- o Describe the range of activities that can be used in health and user education programs. Record responses on flipchart.
- o Why are group work and community organizations seen as a part of these education programs? Ask for examples from their own experience.
- o How do these activities work together to change peoples' behavior?
- o Which activities ought Adam propose to the people of Sinsano?

6. Developing a Training Approach - Lecturette/Full Group Discussion — Time: 25 minutes

Say that all the ways of promoting health and user education just discussed are important. In this activity, we will concentrate on one of them -- developing training approaches. Then, in the next session, Design and Delivery of O&M Training Sessions, we'll focus on how to design and deliver individual training sessions.

Say that there are many ways to provide training, ranging from one or two day workshops for a group to one-on-one training for a caretaker. There are also many subject areas to provide training in, including:

- information on how water sources are contaminated,
- water related diseases,
- personal hygiene,
- environmental sanitation, and
- ways the community members can organize, support, and motivate individuals to act on the newly learned information.

Follow-up meetings can also be held to provide supplementary training on other health problems of the committees, as well as evaluating the specific training events.

There are also different ways to carry out training. One must pick the best way or variety of ways based on:

- o the overall goals for the training;
- o the learning style of the person receiving the training; and
- o the resources available to the trainer --

- time,
- materials,
- number,
- skills of trainers,
- space.

The ways you choose is called a training approach.

Distribute Handout 9.5, Developing Your Training Approaches, and read it with the participants. Go over each of the 14 steps, providing examples from your planning for the workshop.

Ask the group to brainstorm a list of training activities that are being used in this workshop. Record the list on flipchart, and add to it if necessary.

Trainer Note: Save this list for the next session, Design and Delivery of O&M Training Sessions.

Ask the participants what the trainers did to carry out these activities (Step 11 of the handout).

7. Wrap-Up Time: 20 minutes

Ask the group the following question:

- o What is the most important thing that you have learned in this session?

Record responses on flipchart, and review the list when completed.

Then ask:

- o Given what you have learned in this session, what are you going to do differently when you return to your post?

Say that in this session we had a chance to begin talking about training approaches in health education, and in the next session, we'll focus on how to design and deliver training session.

MATERIALS NEEDED

Handout 9.1 - Water's Impact on Health
Handout 9.2 - Quality of Water
Handout 9.3 - Case Part Four
Handout 9.4 - Designing Educational Efforts in Support of Community Participation in Water Supply and Sanitation Projects
Handout 9.5 - Developing Your Training Approaches

Handout 9.1

Water's Impact on Health

Summary Notes

- Water, sanitation, and health epidemiology is a relatively new and developing science.
- Early assumptions on the relationship between water and health has been simplistic.
- It is now commonly acknowledged that clean water is a necessary but not sufficient condition for health.
- Achievement of health objectives requires:

  1. Reduced pathogen density in the environment.
  2. Reduced transmission of pathogens.

  For this, we must achieve:

  1. Almost universal sanitary excreta disposal.
  2. Exclusive use of water from appropriate rural water supply system.
  3. Personal and home hygiene.

  To do so, we must:

  1. Develop and promote cheaper sanitation alternatives.
  2. Further improve coverage and access to rural water supply systems providing potable water.
  3. Develop major health education component.
  4. Improve hygiene around wells, boreholes, springs, etc....

OBJECTIVE: TO REDUCE INCIDENCE OF DIARRHOEAL AND PARASITIC DISEASES

REQUIREMENT	INTERVENTION	CRITICAL FACTORS
Reduce Pathogen Transmission	Exclusive use of water provided by rural water supply system	Population served by rural water supply system
		Access by all potential users
		Distance
		Performance of system and operational status
		Facilities at water supply system
		Convenience relative to ponds and other water sources
		Health education on dangers of pond water and unprotected sources, especially for children
Reduced Pathogen Density	Sanitary excreta disposal	Appropriate and cheap disposal system
		Health education on dangers of excreta, especially for children
		Promotion of disposal system & use, especially by children
	Prevention of Pollution of water at home	Hygiene Education
	Improve Personal Hygiene	Hygiene education, especially handwashing after defecation and before food preparation

Handout 9.2

Quality of Water

The quality of water consumed is the next most important characteristic of water supply. Project planners should assure the maximum protection possible: a closed-in spring, the source of a gravity system protected from encroachment by humans or domestic animals, or a well that is sealed (or at least covered) as the most desirable options.

Recognizing the desirability of sealing the cover on a well by means of a handpump, and yet the difficulty of keeping a handpump maintained, one must frequently compromise the quality of water produced by leaving the well open. Covers, if they are too heavy, will be removed by the population to permit greater access to the well. Those that are too light will be found more on the ground than over the well.

Much of the difficulty surrounding the sealing of a well stems from the fact that both the issue of well protection and that of well access must be addressed. If a well is sealed with a pump, only one woman at a time has access to the water and others are forced to stand in line, frequently for a long time in the hot sun. Two pumps on a single well offer a limited solution to the problem. If it is open, the danger of contamination increases as buckets and ropes are left on the ground and then plunged into the water. If a single bucket and pulley system are used, greater protection is assured, but access is reduced. Thus, the final decision of sealing the well is indeed not an easy one.

Minimizing Secondary Water Related Diseases

If it is not possible to have a source of water satisfactory in all respects at the beginning, one should plan the water supply development of a community in a step-wise or incremental manner. At first, one should be sure that enough water (20-30 liters per person per day as a minimum) is available at the source, then in a subsequent phase that there are enough sources to minimize walking and waiting in line, and finally that any qualitative deficiency in the water is corrected as much as poosible.

Secondary complications of water supplies are those brought about by water left standing as a result of spillage or leaking. Such water is a frequent site for larval breeding of mosquitoes, both the variety that transmit malaria and that for Bancroftian filariasis (elephantiasis). Project designers can avoid this problem by providing for the construction of an apron around the well, inclined so that water runs into a drainage canal and then to a soakaway, a garden or an animal watering trough. Water should likewise be drained around and away from a spring.

In areas of the world where livestock are raised, project designers also must make efforts to avoid encroachment of animals on the site. Such encroachment, combined with poor drainage, leads to the formation of a

muddy slough in which women and children must pass among animals to the well. A carefully built fence around the well site can effectively prevent the entry of cattle, and an animal watering trough at a safe distance from the well can provide animals with an alternate source of water.

Complementary Activities

Complementary project inputs in sanitation and health education are probably necessary if health benefits are to be achieved. Although these program elements will be discussed in more detail later in this document, they should be mentioned here as a part of what is essential in a project to maximize health benefits.

Sanitation refers not only to excreta disposal, as important a matter as that is, but also to aspects of personal and domestic hygiene, food hygiene, housing, and control of intermediate hosts of diseases. The point to make is that many of these measures are not viewed by populations as important as a convenient reliable water supply, and may in fact be dependent on an adequate supply of water. Project planners should be aware of these relationships and should plan sanitation components in a progressive incremental fashion, perhaps leading from an adequate water supply to handwashing and bathing to food hygiene to excreta disposal. The promotion of hygienic excreta disposal in a water-short population is at best ludicrous.

An educational program to accompany the above inputs is essential. The first objective of the program is the active participation of the population in the water supply improvements. As this participation is realized, the structure of participation, a community health committee for example, can begin to take on tasks related to hygiene and sanitation.

The advantages offered by a participatory structure, such as a committee, over the traditional style of educational programs result from the ability of the committee to filter the message into local terms and to plan appropriate actions for guiding and pressuring the population to conform with certain norms of behavior set by the committee itself. Fashioned in such a manner, the educational program helps to round out the essential elements of a project seeking to maximize health benefits.

Handout 9.3

Case Study

— Part Four —

The Sinsano Water Committee decided to proceed with Adam Atu's recommendation that two wells be drilled at opposite ends of the community, and that handpumps be purchased and installed. Adam had conducted an extensive study to help determine the most appropriate system for the community, and the most appropriate sites.

As part of his study of the community, Adam had also assessed the health conditions in Sinsano, and interviewed people -- elders, in particular -- to better understand the history of the community, and the health related habits of its people. He learned and observed the following:

- Up until a few years ago, when Sinsano's population was about half its present 1600 inhabitants, the river was used for all their water needs -- drinking, bathing, washing clothes -- as well as for the water needs of their livestock.

- As the community grew, the water from the river wasn't enough, especially during the dry season when it gets low. The community dug two open wells where women can get water during the rainy season. The wells have no covers so that the rain can fill them up. Sometimes, however, the sides collapse after heavy rains, and ground runoff fills them up.

- When the wells go dry, the women must walk several kilometers to a water hole, which is also shared by livestock. This is the season, people say, where the children have itchy skin and patches on their heads where hair won't grow. Their mothers feel too tired to clean and feed the children, and do other household chores as well. Water is so scarce, even adults don't bathe very often. Still, they are grateful, they say, for even the muddy water they keep in open jars by the doorway.

- During the wet season, everyone bathes in the river and drinks the water from the open wells. Sometimes the boys who play in the river have blood in their urine. With the exception government workers, Sinsano has no latrines. People deficate in the bushes near the river, and children use the garbage dump nearby. The children have diarrhea frequently during the rainy season. Many of them die following bouts of diarrhea. Their bellies are round, and often full of worms. Bellyaches are a problem for adults, too, and everyone seems to come down with fever.

Adam plans to discuss the need for health education in Sinsano at the next water committee meeting, but he's not sure how to proceed.

Handout 9.4

DESIGNING EDUCATIONAL EFFORTS IN SUPPORT OF COMMUNITY PARTICIPATION IN WATER SUPPLY AND SANITATION PROJECTS

Health education is considered an important aspect of rural water supply and sanitation projects. In the minds of many, however, health education is perceived as the mere transmission of educational messages rather than the more complicated and time-consuming effort of modifying human behavior. It is for this reason that many are calling for a change in the name of these activities from "health education" to "program communication." Notwithstanding the difficulty of interpreting just what health education is, calling the set of activities program communication leaves one with the distinct impression that transmission of messages is still the central focus.

In still another vein, health education has been equated with "social marketing." The latter, now in vogue amongst development agencies, borrows techniques from commerical marketing, but lays heavy emphasis on two way communication at the outset of a program to determine the content of messages and the format of message presentation. Although marketing principles are useful when a purchasable item is being promoted (oral rehydration packets, condoms and pour-flush latrine slabs), one still has the impression of an effort centered in selling products rather than fostering development.

For the purpose of water supply and sanitation projects health education may be considered as a combination of activities undertaken to acheive voluntary behavioral change with respect to the use and benefits of facilities. As for water supply, activities are focused on:

- o Use and abuse of the water supply
- o Maintenance of the improvement
- o Transport of water
- o Storage of water
- o Benefits of water supply
- o Links between water supply and health
- o Drainage: sometimes, in crowded areas, a total village problem.

With respect to sanitation, the list of behavioral factors is long:

- o Use of a latrine for excreta disposal
- o Handwashing after defecation and before food preparation
- o Frequent bathing, especially of children
- o Improved food handling and storage
- o Handling children's fecal matter
- o Frequent clothes washing
- o Cleaning dishes and kitchen utensils
- o Protection against insect vectors
- o Keeping the house clean and in good repair

Health education in a water supply and sanitation project has as its responsibility then to plan and implement sets of activities aimed at modifying behavior related to all of the above. In most instances these activities will be composed of group work, community organization,

training, and the use of mass media.

In actual practice, given the important role of community participation, one should try to funnel most activities through the local committee. In fact, nothing should really be planned outside the committee. The committee then, after an assessment of the behavior of community members, would plan, with assistance from the field worker, a series of meetings of small groups and of the entire community. In these meetings certain visual aids could be used to stimulate discussion, but the objective would be to decide on a concrete plan of action, not merely to transmit information. Certain community members could be trained as village-level health educators for the purposes of applying peer pressure on those for whom the group and community meetings are not effective. Other training would be technical, involving child size latrines, soap making, making mosquito nets, etc..

The mass media could be used to reinforce these local actions. Radio emission, poster campaigns, and other mass media techniques can be employed, but should be designed on the basis of local program needs.

Such a health education program closely tied to the community participation process is neither rapid nor easy, but neither is behavior change. There is no "magic bullet" for achieving desired changes in behavior.

Handout 9.5

Developing Your Training Approaches

Improving the health of a community requires a great deal of new learning. Field workers spend much of their time training community members to try new ways of doing things, whether they are improved health behavior or problem-solving or project planning. Community members need to learn, practice, and adopt new behavior that improves and protects their health. Field workers need to find a variety of ways of helping as many community members as possible to learn and practice such behavior. These ways are called a training approach.

There are a number of approaches that can be taken for any training program. You need to have experience to feel comfortable using different approaches, and in selecting approaches that you think are going to work best in a given situation. Whichever approach you choose, the steps you must take to develop a training approach remain the same. They are:

1. Identify the overall goal that you want the community to accomplish.

2. Analyze the goal, and decide what skills or behavior a person needs to accomplish it.

3. Check what the people to be trained are doing or are able to do.

4. Identify what you think they can be trained to do by the end of the program.

5. Develop a list of training needs as a result of doing steps 1-4.

6. Break these needs down into steps that have clear learning objectives.

7. Look at what resources you have available to do the training.

8. Develop a training plan that uses different approaches to meet learning objectives.

9. Decide what each training activity will be.

10. Prepare training materials you will need.

11. Carry out the training activities.

12. Discuss how successful the training was in helping participants reach their learning objectives.

13. Evaluate how well participants can do the tasks they were trained for by observing them apply the skills in their job setting.

14. If you see that some changes need to be made in the way the training was carried out, revise your plan for the next training session.

To enable community members to train others in the same skills or behavior, it is important that they learn how to set up a basic training program. You should do the above steps with them so that they will learn how to do them. They should also be trained as co-trainers, and learn how to prepare materials, plan, carry out and evaluate community training activities.

Writing Helpful Learning Objectives

Learning objectives tell the person receiving the training what he or she will know or be able to do at the end of the training. It allows the trainer and the person being trained to judge whether the training has met its aim or not.

Learning objectives should start with the words:

"By the end of this training session, the participants (or community members) will be able to....."

Learning objectives should be:

CLEAR -- They must be understood by the participants and by the trainer.

SPECIFIC -- Each one should describe one target of the training, and not a group of targets.

ABLE TO BE MEASURED -- One should be able to see that the objective has been achieved.

ABLE TO BE REACHED -- Each objective should be able to be reached by the participants. An objective that is beyond the abilities of a participant, or beyond the capabilities of the trainer, will cause problems and discontent.

ALL THERE -- Learning a new skill or how to change behaviors will usually require breaking the activity down into steps. The trainer should have a learning objective for each step. When each step and learning objective has been successfully reached, the participant will have mastered the entire skill or behavior.

SESSION 10: DESIGN AND DELIVERY OF O&M TRAINING SESSIONS

Total Time: 7 1/2 hours

OBJECTIVES

By the end of the session, particpants will be able to:

- o Identify common O&M training needs at the community level.
- o Describe the experiential learning model.
- o Select the most appropriate training techniques applicable to community-level O&M.
- o Design a training session utilizing goals, objectives, and activities in appropriate sequence.
- o Write learning objectives to influence individual behavior.
- o Practice delivering a training session.

OVERVIEW

The purpose of this session is to provide participants with basic training skills that will enable them to develop and deliver O&M training sessions.

Following a lecturette and group discussion on the Experiential Learning Model, participants (working in small groups) design a one-hour training session for caretakers or water committee members, and then are given an opportunity to deliver the session in a practice training simulation.

PROCEDURES

1. Introduction — Time: 20 minutes

Ask the group to brainstorm a list of typical O&M training needs in the community. Examples might include training operators pump repair, or training water committee members bookkeeping. Record responses on flipchart.

Then, a) categorize the different groups of people that need training, and b) categorize the different learning areas that they need training in.

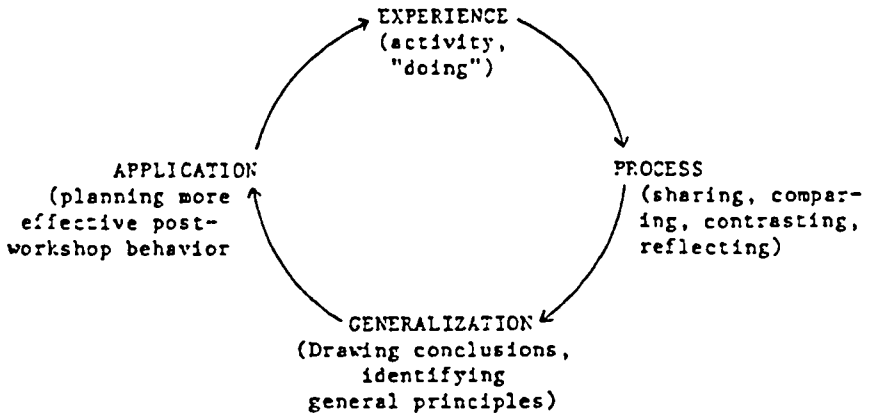
Say that given these O&M training needs, and the health and user education needs that we talked about in the last session, we want to provide you with some basic skills to carry out training.

Present objectives for the session, and overview session procedures.

2. Basic Training Concepts — Time: 45 minutes
- Lecturette/Full Group Discussion

Ask participants to give an example from their past where they remember learning something very important. Ask what the conditions and characteristics were surrounding that particular learning event.

Present the following model on the Experiential Learning Cycle on flipchart, and explain each step according to the explanations below.



Experience

Purpose: To provide a basic learning experience, information or skill.

Activities: Demonstration, guided work, lecturette with drawings or flipchart, group work, practical field experience (or a combination of these).

Processing

Purpose: To examine the experience and analyze what has happened; and to refine the learning.

Activities: Questions, group presentation.

Generalization

Purpose: To select the most important part of the material presented and solidify the learning.

Activities: Questions and answers, notes on flipchart.

Application

Purpose: To consider or attempt the future application of what has been learned.

Activities: Planning the application, posing questions, providing another activity for practice.

Distribute Handout 10.1, The Experiential Learning Cycle.

Ask the group what kinds of training methods are most frequently used with operators and water committees. Record responses on flipchart. Select a few methods (demonstrations, hands-on exercises), and discuss them in more detail. Explain how these would be used, and what tips you have for using them.

3. Design of Training Session - Full Group Discussion — Time: 35 minutes

Pass out Handout 10.2, How to do a Method Demonstration. Explain that it was developed to train field workers in how to use method demonstrations as a training tool, and that it is being provided to them as an example of a session outline which uses the Experiential Learning Cycle. Say that they might also find it helpful in training others how to give effective method demonstrations.

Go over the basic session outline with the group:

- Title
- Objectives
- Activities with time and instructions
- Trainer Notes
- Handouts

Tell them to take a few minutes to read through it. Ask the following questions:

- What are example of the "experience" step in the cycle?
- What are examples of processing questions? Generalizing questions? Application questions?

4. Preparation of a Session Design - Small Group Task — Time: 1 1/2 hours

Divide participants into four groups, remind them of the flipchart of training needs that they developed in the introduction, and present the following task (on flipchart):

Small Group Task

- Design a one hour session that uses the training design format

discussed.

- o Direct the session towards system operators or a water committee.

Say that they're going to have the opportunity to delivery their training session.

Trainer Note: Circulate and provide assistance and feedback to groups on their designs. Ask groups to revise designs as appropriate.

5. Practice Training — Time: 3 1/2 hours

Give the groups 30 minutes to prepare for delivering their training sessions. Say that they should prepare the necessary flipcharts and training aids, and decide who's going to do what in delivering the session.

When groups have prepared, explain that two groups will go with one trainer, and that two groups will go with the other trainer. Each group will present its session to the group with which it is paired. The group not presenting will act as participants.

When the first group has completed its session, the trainer leads a feedback discussion. Then the process is repreated with the other group. The following guidelines are suggested for the feedback discussions:

First — The group delivering the training are asked for self-criticism:

- o How did you do (with respect to the criteria we've been discussing)?
- o What would you do differently the next time?

Second — Ask the group receiving the training:

- o What were the strongest points or actions of the session? Weakest?
- o How were the normal steps of the cycle of learning followed?
- o Other observations on the presentation and design of the session?

Third — Observations of the Instructor (last)

Trainer Note: The following timing is suggested for the practice training:

Preparation	30 minutes
Practice Training	
Group 1	
Session Delivery	60 minutes

Feedback Discussion	30 minutes
Group 2	
Session Delivery	60 minutes
Feedback Discussion	30 minutes

[Groups 3 and 4 are doing practice training simultaniously with the other trainer.]

6. Wrap-Up — Time: 50 minutes

Reconvene the full group to discuss the following questions:

- What was the most difficult aspect of the training session?
- What is the most important thing you have learned? (Record responses on flipchart.)
- What are the most important skills the trainer should have?

Ask the group to write answers to the following questions:

- What are the most important training needs in your communities?
- What do you have to do to meet those training needs?
- What is the first training session you will conduct to practice your training skills?

Share responses.

Review the session objectives, and ask if they were met. Make a transition to the next session.

MATERIALS NEEDED

Handout 10.1 - The Experiential Learning Cycle
Handout 10.2 - How to do a Method Demonstration

Handout 10.1

The Experiential Learning Cycle

Steps in a Training Session

The Entry

PURPOSE	ACTIVITIES
o To establish the environment for learning	Story Joke Question Linking Rationalization
o To acquaint the participants with the purpose and direction of the session	Goals Objectives Schedule
o To awaken interest	Questions

The Experience

PURPOSE	ACTIVITIES
o To have the participant experience/ feel an act of learning in order to establish a skill or information base	Case study Interactive talk Exposition of a theme Dramatization Group task Demonstration or task Exercise Film Slides Field work

Processing/Reflection

PURPOSE	ACTIVITIES
o To examine the experience and analyze what was done; refine/ correct the experience; deepen the learning	Questions and answers Group presentation with criticism Tasks Discussions

Generalization

PURPOSE	ACTIVITIES
o To extract the most important parts of what was learned, and to solidify the learning	Questions and Reflection and response Making agreements Relating what was learned to other cases

Application

PURPOSE	ACTIVITIES
o To think or try a future application and use of what was learned, to strengthen the learning	Planning Reflection Trying Practicing

The Exit

PURPOSE	ACTIVITIES
o To close the session and ensure that the commitment made (what was promised) was fulfilled	Linkage with the next session Summarizing Referring to the goals Evaluation

Appropriate Methods

PURPOSE:	ACTIVITIES
o What would be the most appropriate methods of teaching and those used frequently with operators ...with water committees?	Demonstration Interactive Discussion Practice Questions (two-way communication) Concept/Agreements Talks Flipcharts

Handout 10.3

HOW TO DO A METHOD DEMONSTRATION

SESSION RATIONALE AND KEY POINTS

Method Demonstrations are an important training tool for field workers in agriculture, health, and water programs. Training managers and other training personnel who work with government agencies must be able to instruct field workers on ways to carry out effective method demonstrations.

This session is designed primarily to provide training personnel with method demonstration skills; but it also affords them the opportunity to share past experiences with method demonstrations as an training technique, and explore appropriate ways to improve the method demonstration skills of field staff in their own countries.

Session: HOW TO DO A METHOD DEMONSTRATION

7 Hours Total Time

PURPOSE

- To present step-by-step guidelines for how to plan for and deliver method demonstrations as a training technique.
- To provide an opportunity for participants to practice the design and delivery of a method demonstration.
- To explore ways to teach the techniques of method demonstrations to field personnel.

PROCEDURE

1. Climate Setting/Session Goals — Time: 10 minutes

Ask the group if anyone has used the method demonstration as a training technique? If yes, ask how they have used it.

Next ask how many people supervise and/or train personnel who do use (or should be using) method demonstrations in their work with community groups.

Link to the session purpose by saying to participants that in this session we will be looking at ways to effectively plan and deliver method demostrations -- so that they will be better able to train their own personnel on how to use method demonstrations as a teaching technique.

Present the goals of the session.

2. Lecturette: Preparing a Method Demonstration — Time: 20 minutes

Explain that a method demonstration -- demonstrating how to do something -- is an effective training technique, because it involves the learners' senses. People learn best when all their senses are used -- seeing, hearing, touching, and even smelling and tasting.

Present on flipchart the following 5 steps in preparing an effective demonstration (note to participants that this information will be provided to them in a handout):

Preparing a Demonstration

1. Decide what it is that you want your audience to understand -- to learn how to do. (Your goals!)
2. Gather and study information about the practice you want to demonstrate.

3. Write out step-by-step notes on how you will deliver the demonstration, and important points you will make with each step.

4. Prepare in advance all required materials, and test all tools and equipment to be sure that everything works properly.

5. Practice the demonstration until it is easy for you.

With Step 3 above, refer participants back to the earlier course discussion on session design, and emphasize that organizing their step-by-step notes and talking points for a method demonstration is no different than organizing their procedures for a training session.

Pass out Handout #1, Preparing a Demonstration.

Summarize the three basic parts of a method demonstration as follows (present on flipchart and note that there is a handout with this information):

Organizing Your Method Demonstration

- o Climate Setting/Introduction -- Why you believe this skill or topic is important, and what you hope to accomplish in this demonstration.
- o The Body -- What steps or skills need to be demonstrated and practiced. What are the important points to make with each step.
- o The Closure -- What key steps and points need to be summarized. Generalize what has been learned, and ask your audience how they will use what they have learned.

Pass out Handout #2, Organizing Your Method Demonstration.

Say to participants that before we discuss the delivery of method demonstrations you would like them to plan a demonstration that they or a subordinant would likely have the opportunity to present in their work situation.

Stress that the topic selected for a method demonstration should not be broad, but rather limited to a single theme or idea.

Explain that they will work in small groups, and that each small group will have a chance to deliver their demonstration.

Trainer Note: The session could be stopped here, and reconvened the next day, which would provide participants with more preparation time for their demonstrations. This option would be particularly appropriate if some participants needed special equipment or materials.

3. Group Task: Planning a Method Demonstration — Time: 1 1/2 hour

Ask participants to get into groups of four and complete the following small group task (present on flipchart):

Small Group Task

- o Select a method demonstration topic/skill area appropriate to your job situation or that of your subordinates.
- o Plan a 30 minute method demonstration following the five step guidelines.
- o Write out on flipchart the steps you will take in delivering the method demonstration.
- o You have 1 hour 25 minutes to complete this task.

Emphasize to the group that we'll all need to use our imaginations in planning and delivering the demonstrations, since they won't have access to the right materials and environment, e.g. cement or pumps.

Trainer Note: The groups should not be larger than 4 people. It may be necessary to provide examples for method demonstration topics, such as:

- How to make a rehydration solution
- How to apply fertilizer to field crops.
- How to plant a tree seedling.
- How to replace valves in a pump.
- How to make visual aids.

4. Group Task: Sharing Method Demonstration Plans — Time: 40 minutes

When small groups have completed their individual task, ask each group to pair up with another group to share their method demonstration plans, and discuss ways to improve them.

Say that they should allow 20 minutes to discuss each group's plan.

5. Large Group Discussion: Delivering a Method Demonstration — Time: 30 minutes

Ask for one or two groups to share their method demonstration topic, and who their intended audience is. Ask them why they think a method demonstration is an appropriate technique for their particular topic.

Ask participants:

- o When is it a good time to use a method demonstation?

As the group discusses this question, list on flipchart important ideas that are generated.

Next, say to the group: "Now that you have planned your demonstration, we should talk about what a good demonstrator can do to help his or her audience learn the most they can from the demonstration."

Present brief talking points on flipchart to make the following key points about conducting a demonstration (Note to participants that there is a handout with this information):

Points For Giving Demonstrations

1. Introduce yourself, and ask the audience what they already know about the topic.

2. Ask if they've ever seen a demonstration on this same topic.... where, and under what circumstances.

3. Use their comments to lead into what you are going to do, and why this topic is of interest to you.

4. Explain and show, slowly and carefully, each new practice step-by-step.

5. Stop to answer questions and ask the group questions.

6. Repeat difficult steps.

7. Ask people in the group to help you with the demonstration.

8. When you finish, ask members of the group to do one or more of the steps to check how well the audience understood the demonstration, and to give individuals a chance to practice.

9. End the demonstration by asking the audience to tell you what they learned from the demonstration, and how they plan to use what they learned in the demonstration.

10. Summarize important points.

Pass out Handout #3, Points For Giving Demonstrations.

Ask the group what else from the course would help make the method demonstration more interactive.

Link to the next activity by saying to participants that they will now have a chance to prepare to deliver a method demonstration based on the guidelines that we have just discussed.

6. Group Task: Preparation to Deliver Method Demonstration — Time: 45 minutes

Ask each small group to spend the next 45 minutes preparing to deliver their demonstration. Remind them that they will have only 30 minutes to deliver the demonstration.

Explain that once they've had the chance to prepare, half the small groups will go with one trainer, and half will go with the other trainer. Each small group will then deliver its demonstration to the other small group(s), whose members will play the role of the intended audience, i.e. subordinates, community leaders or farmers.

Present the following task instructions on flipchart:

- o Prepare materials required for the demonstration.
- o Practice the demonstration. Each group member should participate in some way.
- o You have 45 minutes to complete this task.

Acknowledge that they may not have access to all the resource they might normally use for their demonstration, but to make due as best they can.

7. Small Group Method Demonstrations: Delivery and Processing — Time: 2 hours

Call participants back together and assign two (or three) groups to each trainer. (One trainer moves his/her assigned groups to another room.)

Each trainer sets the stage for the first demonstration, reminding participants that they are now "the audience".

First group conducts its demonstration.

After 20 minutes have passed, stop the demonstration. Ask the demonstrators:

- o How do you think the demonstration went?
- o How well do you think your audience learned?
- o What improvements would you make?

Ask the audience:

- o How well do you think the demonstration went?
- o Which of the eight points in conducting a demonstration did the demonstrators follow?
- o What things did the demonstrator do well?
- o What areas for improvement do you suggest?

Repeat the procedures above for the second group's demonstration. Repeat for the third small group (if applicable).

8. Generalizing/Application Time: 30 minutes

Bring the groups back together again. Ask how the demonstrations went.

Ask participants what they learned about planning and delivering demonstrations. Record responses on flipchart.

Ask participants how they plan to use method demonstrations when they return to their jobs.

9. Closure Time: 5 minutes

Thank the group for their active involvement.

SESSION HANDOUTS

Handout #1: Preparing A Demonstration
Handout #2: Organizing Your Method Demonstration
Handout #3: Points For Giving A Method Demonstration
Handout #4: Method Demonstrations

Handout #1

PREPARING A DEMONSTRATION

1. Decide what it is that you want your audience to understand -- to learn how to do. (Your goals!)

2. Gather and study information about the practice you want to demonstrate.

3. Write out step-by-step notes on how you will deliver the demonstration, and important points you will make with each step.

4. Prepare in advance all required materials, and test all tools and equipment to be sure that everything works properly.

5. Practice the demonstration until it is easy for you.

Handout #2

ORGANIZING YOUR METHOD DEMONSTRATION

Climate Setting/Introduction

- Why you believe this skill or topic is important, and what you hope to accomplish in this demonstration.

The Body

- What steps or skills need to be demonstrated and practiced. What are the important points to make with each step.

The Closure

- What key steps and points need to be summarized.
- What have people learned from the demonstration.
- How can they apply what they learned.

Handout #3

POINTS FOR GIVING DEMONSTRATIONS

1. Introduce yourself, and ask the audience what they already know about the topic.

2. Ask if they've ever seen a demonstration on this same topic....where, and under what circumstances.

3. Use their comments to lead into what you are going to do, and why this topic is of interest to you.

4. Explain and show, slowly and carefully, each new practice step-by-step.

5. Stop to answer questions and ask the group questions.

6. Repeat difficult steps.

7. Ask people in the group to help you with the demonstration.

8. When you finish, ask members of the group to do one or more of the steps to check how well the audience understood the demonstration, and to give individuals a chance to practice.

9. End the demonstration by asking the audience to tell you what they learned from the demonstration, and how they plan to use what they've learned.

10. Summarize important points.

SESSION 11: MONITORING AND EVALUATION OF RURAL WATER SUPPLY SYSTEMS

Total Time: 16 hours

OBJECTIVES

By the end of the session, the participants will be able to:

- Describe a set of indicators for monitoring the O&M process.
- Develop and carry out a monitoring plan.
- Describe the supervision role of water committees in overseeing caretakers.
- Develop an evaluation plan for measuring the impact of a system.
- Describe the elements of a information management system, and key issues in setting one up.
- Develop community guidelines for planning and implementing the O&M process.

OVERVIEW

The major focus of this session is on monitoring and evaluation of rural water supply systems, and on the information requirements of both.

Two roles involved in the monitoring process are considered: the liaison role of the government technicians, and the supervisory role of the water committee. Participants have an opportunity to develop and carry out a monitoring plan in a field trip to community sites. Following the field trip, elements of good supervision are introduced and discussed, and supervision issues are analyzed in Part Five of the case study.

How to determine the affects of the water supply system, and how to measure impact are the primary evaluation questions address in the session. The evaluation process is introduced in a lecturette, and participants develop an evaluation plan for the community system visited as part of the field trip.

PROCEDURES

1. Introduction — Time: 20 minutes

Ask participants: "What is the purpose of monitoring?" Record responses on flipchart. Add the following points, if not already volunteered:

- o to measure whether an activity is "on track";
- o to help make timely decisions to ensure that progress is maintained according to schedule;
- o to assess whether project inputs are being delivered, are being used as intended, and are having initial effects as planned;
- o to make needed mid-course corrections;
- o to gather information that helps evaluate impact;
- o to know a water committee and caretaker, and individual capabilities; and
- o to provide an opportunity to reinforce good performance of caretakers and others involved in the activity.

Emphasize the importance of monitoring -- the importance of supervising a system to ensure its effective operation, as well as doing valuable follow-up and performing the necessary corrective tasks.

Say that in this session we're going to take a closer look at the monitoring process, at evaluation of systems, and at the kind of information flow required for effective monitoring and effective evaluation.

Present the session objectives, and briefly overview the procedures, including the field trip.

2. Monitoring - Lecturette Time: 30 minutes

Refer to the flipchart just developed on the purpose of monitoring, and ask: "How should we monitor?" Present the following key points on how to monitor (flipchart):

Good monitoring is:

- o general or specific in accordance to what is needed in each case;
- o well planned;
- o objective and timely, and gives priority to weak areas that require more attention;
- o focused on more that timelines, but also on quality of work performed; and
- o corrective.

Point out that monitoring should yield data and insight which can form the basis for feedback on two levels:

The Regional Level

- o for use in the planning of O&M in the community; and

The Community Level

- o to inform the water committee or caretaker what actions to take in correcting deficiencies, and to provide an on-going assessment of community training needs.

Say that there are some easily tested indicators to know if a system is working satisfactory. Distribute Handout 11.1, Monitoring Indicators/Data Requirements, allow participants a few minutes to read through it, and then go over the three sets of indicators: technical, financial and administrative, and social. Provide examples and clarify as needed. Say that they have a chance to apply these indicators on the field trip.

3. Planning for Monitoring - Small Group Task — Time: 50 minutes

Explain that the purpose for the field trip is to give them an opportunity to "monitor" a water system, and assess the need for corrective action that may be required. Provide some information on the sites that they will be visiting, and briefly describe field trip procedures.

Trainer Note: It would be best if the participants were divided into four small groups for the field trip, with each group visiting a different site.

Present on flipchart the following key issues in planning for monitoring:

Key Issues in Planning for Monitoring

1. What do you want/need to know?
   - what data will indicate that the system is working satisfactory
   - what information do you need
   - what information do others need (i.e., sponsors/donors)
2. How will you find out?
3. When will you find out, and how often?
4. How and when will you discuss your approach to monitoring with the water committee?

Say to participants that they are to rely on the indicators just discuss for gathering information.

Divide the group into four small groups, indicate which community each will visit (and the water system in that community), and introduce the following small group task:

Small Group Task

- o Plan for a "routine" monitoring visit to assess current status,

taking into consideration the key issues for monitoring, the monitoring indicators, and the data requirements just discussed.

- o Flipchart major points of your plan.
- o 40 minutes

Trainer Note: Circulate, and provide assistance and feedback as needed.

4. Reports — Time: 50 minutes

Two groups go with one trainer, and two groups go with the other trainer. Each presents their plans to the group they are paired with.

Say that each group will be expected to provide a flipchart presentation of their site visit findings.

5. The Field Trip — Time: 6 hours

The groups carry out their assigned field work in the selected communities.

Reconvene the session the next day.

Trainer Note: Ideally, each field trip site should have the following:

- existing water committee
- government technician, promoter, or community caretaker

If none of the above exist, suggest to the groups that they interview as much of a cross-section of the community as possible.

6. Field Trip Reports — Time: 60 minutes

Groups present their results. Compare and contrast findings. Ask questions pertaining to the monitoring indicators not reponded to by participants.

Ask the group what conclusions they might draw. Record these on flipchart.

7. Basic Concepts of Supervision - Lecturette/Full Group Discussion — Time: 30 minutes

Refer to the monitoring conclusions just reached in the last activity, and say that in the O&M process, "monitoring" operates at two levels:

- o between the government technician/promoter and the water committee; and
- o between the water committee and the caretaker.

Ask: "How is the monitoring role of the government techician over the water committee different from the monitoring role of the water committee over the caretaker?"

Explain that the government technician's monitoring role is more of a liaison role, whereas the water committe's role is a supervisory one.

Define supervision as the interactive process between a group or individual that oversees the outputs of another group or individual. In the case of the water committee, they define the tasks to be carried out, monitor the progress of implementation, and take corrective action when necessary.

Ask participants: "What does it mean to be an 'effective supervisor'?" Tie participant responses into the following definition (on flipchart):

Effective Supervisor

One who obtains greater effort from persons in such a way that they carry out their responsibilities with dedication, and achieve good results.

Ask participants for examples of bad supervision. Record responses on flipchart. Include the following if not volunteered:

- o Not communicating clearly what is expected of people (poor instructions)
- o Giving too many instructions at the same time.
- o Not providing follow-up.
- o Overestimating or underestimating the capabilities of persons.
- o Not meeting periodically with the employee to help resolve problems.
- o Not taking a personal interest in the well-being of the employee.
- o Not providing sufficient support to the employee.
- o Doing things for the employee, or not giving him or her enough free reign to perform the work.

Then ask: "What effect does bad supervision have on the work of the caretaker?"

Take a few responses. Present the following "principles of good supervision" on flipchart:

Principles of Good Supervision

- o Communication
  - Frequent; clarity in the assignment of tasks.

- Honest feedback on positive and corrective tasks.

o Follow-Up

- Frequent and directed toward the assigned task.

o Knowledge of Persons

- Their abilities.

- Their limitations.

- Their personal particulars.

o Recognition

- Treating persons with respect.

o Training

- To provide guidance with patience and support.

- To teach, to help and to demonstrate what should be done.

- To give more and more responsibility in accordance with capability and the situation.

- To correct constructively.

8. Supervision Case Study - Small Group Task — Time: 45 minutes

Divide the group into four small groups, distribute Part Five of the case, and introduce the following task:

Small Group Task

o Read the case individually.

o Discuss the questions written at the case's conclusion.

o Agree on ways to resolve the problem of lack of supervision that was presented in the case study.

o Be prepared to discuss your strategy in the full group.

o 25 minutes

Ask each group their response to question #1. Repeat the process for question #2. Repeat the process for question #3.

9. Supervision Simulation — Time: 1 hour 10 minutes

Introduce the following individual task:

Individual Task

- o As Adam, prepare a strategy for communicating with the Sinsano water committee on ways to resolve the problem of lack of supervision.
- o 15 minutes

Say that we're going to try out a couple of their strategies. Ask for a volunteer to play Adam, and for four volunteers to play the water committee. Run the simulation for about 10 minutes.

When you have stopped the simulation, ask the following questions:

- o What was Adam's strategy?
- o How successful was it?
- o What would you do differently?

Ask the same questions of "Adam".

Run the simulation a second time, choosing a participant who felt strongly about his or her particular strategy.

Repeat the questions that followed the first round.

Ask the group:

- o What conclusions have you drawn about the appropriate way to take corrective actions with the water committee?
- o What conclusions have you drawn about supervision in general?

Record responses on flipchart. Ask the group if they would add anything to the flipchart "Principles of Good Supervision". Record additional points.

Ask:

- o The next time you are in a supervision situation, what would be the most important thing necessary to do with the people you supervise?

10. Evaluation — Time: 20 minutes
- Lecturette

Say that we've talked a good deal about monitoring. Ask: "If monitoring is a way to assess progress of implementation, what's the purpose of evaluation?"

Make the point, if not made by the group, that the purpose of evaluation is to assess overall affects of the system, both intentional and unintentional, and their impact. Say that evaluation:

- o involves comparisons, requiring information from outside the activity, either in time, area or population; and

- o draws on the data generated by the monitoring system to help explain the trends in effects, and impact of the project.

Say (rhetorically): "What should we be evaluating in a rural water supply system?" Review the flipchart of responses from the introduction. Present the following points on flipchart:

Evaluation should focus on:

Impact

- o measure of current situation against the pre-system situation

Sustainability

- o appropriateness of the system
- o degree of community awareness and involvement
- o effectiveness of O&M
- o organizational strength of the water committee
- o caretaker skill-level

Replicability

- o lessons learned affecting future design and development

Complementary to Other Related Community Activities

- o degree of integration with
  - other water supply activities
  - sanitation activities
  - operation and maintenance
  - the overall community structure

11. Planning for Evaluation - Small Group Task — Time: 40 minutes

Present on flipchart the following key issues in planning for evaluation:

Key Issues in Planning for Evaluation

1. What information do you need?
   - what data will help determine affects of the system
   - what data will help measure impact
   - how much qualitative vs. quantitative data is needed

2. How will you find out?

3. When will you find out, and how often will you evaluate?

4. How and when will you discuss your approach to evaluation with the water committee?

Ask participants to return to the same small groups they were in for the field trip, and introduce the following small group task:

Small Group Task

- For the system that you "monitored" on the field trip, develop a plan to evaluate the affects of the system, and its overall impact.
- Flipchart major points of your plan.
- 30 minutes

Trainer Note: Circulate, and provide assistance and feedback as needed.

12. Reports — Time: 50 minutes

Groups report out. Ask:

- In what ways are the plans similar for the four systems? Different?
- How often should systems be evaluated?
- What are the benefits of periodic evaluation?

13. Information Systems - Lecturette — Time: 20 minutes

Emphasize that good evaluation is based on good monitoring, and that both are based on appropriate data and information.

Ask: "What types of information are required on an on-going basis for effective O&M, and to support effective monitoring and evaluation?"

Record responses on flipchart. Add the following, if not volunteered by the group:

Information Needed by the Community

- technical
  - design of the system
  - manuals (operation, equipment, and parts)
- administrative/finance

- work logs
- equipment inventory
- spare parts
- budgets
- personnel documents

o social

- baseline surveys
- site selection criteria
- water committee selection criteria
- caretaker selection criteria

Information Needed by Government/Donor

o all of the above

o regular status reports

Emphasize that the information systems begins where the system is -- in the community.

12. Information Needs - Small Group Task — Time: 35 minutes

Ask participants to return to their same small groups, and present the following small group task:

Small Group Task

o For the community and water system assigned to your group on the field trip, determine:

a.) the issues for setting up an information system; and

b.) how the information should be used.

o 30 minutes

13. Reports — Time: 50 minutes

Groups report out. Compare and contrast information needs. Add any of the following information, if not mentioned by any of the four groups.

Issues in Setting up Information Systems

o The need for monthly progress reports during construction.

- cost
- time delays

o The need for a completion report.

- o O&M needs.

- o Record of preventive maintenance.

  - Who keeps records
  - Where are they kept
  - How often are they updated
  - What will the information be used for

- o Understanding by all parties as to why the information system is needed

How should the Data be Used

- o Agreement by all parties on how the information will be used

- o Agreement on feedback

  - collection
  - analysis
  - conclusions drawn and shared
  - feedback to the system

14. Developing O&M Community Guidelines - Full Group Discussion — Time: 50 minutes

Say that one way to help a community fulfill its informational and other duties in an O&M program is to develop a set written and illustrated guidelines for carrying out O&M responsibilities. Such a set of guidelines can not only serve as a "how to" manual for community water committees, but also as a basis for implementation and monitoring agreements.

Ask the group what they think the "chapters" ought to be in a set of basic guidelines. Record chapters on flipchart. Tell them not to think about proper sequence of chapters at this point. Once the list is completed, sequence the chapters in way that gains agreement from most of the group. Try to eliminate "non-essential" chapters.

Under each chapter heading, ask the group to identify key sub-headings (or key content points). If there's disagreement about a point, put a question mark beside it, and move on. This exercise should move at a good pace.

Then ask how this set of community guidelines could be completed. Try to get some ownership established, and some agreements on responsibility for completing the product, and a timeline for completion.

17. Wrap-Up — Time: 20 minutes

Summarize major key points from the session. Ask the following questions:

- o What are the most important things that you've learned in this session?

Record responses on flipchart. Review the lists when completed.

Then ask:

- What are you going to do differently to be more effective in your work?

MATERIALS NEEDED

Handout 11.1 - Monitoring Indicators
Handout 11.2 - Case Study, Part Five

Handout 11.1

Monitoring Indicators/Data Requirements

Monitoring is the collection, interpretation, and utilization of information from within an activity to provide implementation guidance while the activity is underway. It is a process which yields data to provide feedback at the district-level for use in the planning of O and M in the community. Some easily tested indicators can be considered for this purpose.

Technical Indicators

Confirmation and investigation of:

- o water pressure
- o apparent quality (color, turbidity, odor, flavor, foreign matter)
- o whether the service is continuous or intermittent
- o water use
- o existence of leaks, ruptures, dripping
- o state of tapping, conducting, or producing
- o status and operation of the pumping station
- o operation of valves
- o status and cleaning of the storage tank
- o status of work in antipollution control
- o disinfection
- o status of the distribution network

Financial and Administrative Indicators

Review the following areas:

- o composition of the water committee
- o frequency of revisions and existence of records
- o salaried personnel; number and total monthly payment

- o materials and equipment; inventory and physical plant
- o census of users and status of user accounts
- o detail of payments and monthly delay (user fees, local taxes)

Social Indicators

- o functioning local water committee
- o coverage of agreed upon recurrent costs for O&M
- o functioning health user education program
- o level of community involvement

Case Study

-- Part Five --

Adam Atu has already been working with the community of Sinsano for almost a year. Adam has not been able to visit Sinsano as frequently as he would have liked. Another community in the project had difficulty agreeing on a system, and required a great deal of his time; moreover, his project vehicle had not been working for a while, and public transportation to Sinsano is not regular. On one occasion, he walked the 15 kilometers from the main road.

Ben Obutu had been selected by the water committee to be caretaker for Sinsano's two new wells. Ben does not read or write, and Adam suspects that he was chosen partly on the basis of being the chief's nephew. Adam attempted on several occasions to explain to Ben what should be done to maintain the pumps and the distribution line. Each time Ben said: "Yes, yes, I understand well." On the two occasions in the first year that Adam visited the community, Ben was away.

One day, the project division chief responsible for operation and maintenance made a surprise visit to Sinsano without the presence of Adam in order to determine how the O&M program was working. He found the following conditions:

- The water in both wells had tested positive for bacteria, but remained untreated for lack of chlorine.
- The pump leather of one well was partially worn, drawing some water, but very slowly.
- A bolt holding the pump handle of the other well was missing, making pumping difficult. All that was needed was to replace the bolt.
- Ben said to the chief that no one had told him that he needed to grease the pumps each month.
- Ben was not collecting fees from the community, and the chairperson of the water committee had decided not to collect until all the funds that had been collected before the beginning of the project had been spent (sufficient for six months of operation of the two pumps).

Upon his return from the surprise visit, the chief called Adam into his office and criticized him for not supervising the work of the water committee and the caretaker.

If you were Adam:

1. How would you solve the situation?

2. What strategy would you choose to improve the water committee?

3. What corrective measures would you take to correct Ben?

SESSION 12: APPLICATION PLANNING, EVALUATION AND WORKSHOP CLOSURE

Total Time: 5 hours

OBJECTIVES

By the end of the session, participants will:

- Review workshop learnings.
- Develop an individual action plan.
- Identify common needs that could form the basis of a district or regional plan.
- Evaluate the workshop's effectiveness.

OVERVIEW

This session is intended to help the participants plan how they will apply what they have learned during the workshop.

Throughout the workshop, at the conclusion of each session, participants have been given an opportunity to reflect on what they have learned. They have developed approaches and skills for communicating O&M requirements to communities, for providing health and user education, for designing and delivering training events, and for monitoring and evaluating systems. In this final session of the workshop, participants will have an opportunity to develop detailed plans of what they intend to do to improve O&M in their communities. They will also develop district or regional plans to improve O&M.

Lastly, this session is designed to evaluate the workshop and do whatever closing seremony is locally appropriate.

PROCEDURES

1. Introduction — Time: 10 minutes

Introduce the topic of backhome planning. Share how difficult and frustrating it can be after a workshop to want to start a project without a clear plan of what needs to be changed, and how to go about doing it.

Introduce the idea of using a personal work plan as the mechanism to organize, schedule and coordinate resources and activities necessary for the develop of a water system.

Present the session objectives on a flipchart.

2. Review of Major Workshop Themes Time: 20 minutes

Review major themes of the workshop, beginning from Session 2, Operation of Rural Water Supply Systems, through Session 11, Monitoring and Evaluation of Rural Water Supply Systems. In touching on key learning areas, note specific experiences from the field trips and other activities which helped to reinforce these learning areas.

Trainer Note: It is suggested that key flipcharts from the workshop be placed at the front of the room as memory joggers for participants.

3. Individual Planning Time: 50 minutes

Say to participants that in this next activity they'll be developing a detailed plan of what they intend to do to improve O&M in the communities in which they work. Explain that in order to do a back home plan, a planning format is useful. Suggest the following format:

Task	When	Resources Needed	Who Needs to be Involved

Since some participants may not have developed a plan time frame before, put an exampple on a flipchart. Use the list of tasks for preparing for this workshop found on page 4 in the introduction to this guide, and show particpants your own time frame for action leading up to actual implementaion of the workshop.

Present the following task on flipchart:

- Use the suggested planning format to develop a six month back home plan.
- 45 minutes

Move among the group to provide assistance and feedback to ensure that the planning exercise is well understood.

4. Sharing of Plans Time: 35 minutes

When the individual planning time is over, ask each participant to pick a partner and discuss each other's plan. Urge them to offer comments and suggestions to make the plans as realistic as possible. Each participant has 15 minutes to discuss his or her plan with another person. Trainers should move among the groups to facilitate discussion and ask questions.

Put on flipchart the following questions as a guide for the paired discussion:

- Are the tasks clear?

- Does the plan allow for the community to be involved?
- Are the resources adequate?
- Is the sequence of tasks appropriate?
- Is the timing of tasks realistic?
- Are the appropriate people involved?

When the 15 minutes are up, ask participants to take the next 15 minutes to modify their plans, based on the paired discussions.

5. District Action Plans - Small Group Activity — Time: 45 minutes

Explain that in this next activity they're going to work in small groups to develop a district plan that will cover those items that can only be dealt with at the district level. Say that examples include vehicle support, provision of tools and equipment, and monitoring and follow-up.

Ask the group to divide into four small groups, and introduce the following task:

Small Group Task

- Drawing on everything you have learned in the course, develop a district plan to improve O&M.
- 40 minutes

6. Presentation of District Plans - Large Group Discussion — Time: 1 hour 20 minutes

Each group presents its plans. Compare and contrast the plans. Work with the full group to develop a synthesis plan based on the four group plans.

Trainer Note: The group could adopt one of the small group plans, and modify it, or they could develop a new one.

When the synthesis plan has been completed, and there has been general consensus reach that the plan is appropriate and feasible, ask:

- What did you find difficult in developing this plan and the small group plan?
- Who do you need to share the plan with?
- How will your superiors react to the plan? How will you present it to them?
- What can you do to help your plan be accepted by the community and

by your immediate boss?

Tell participants that they should not consider the plan to be in final form. They should modify them as needed to gain the acceptance of their supervisors and the community.

Trainer Note: You may want to have some or all of their immediate superiors present for part of this session. Divide them among the presenting pairs and have them participant in group discussions. The superiors could play a direct role in reacting to plans after they have been developed. By involving the superiors early in the process of developing the plans, they are more likely to be committed and supportive.

7. Workshop Evaluation — Time: 35 minutes

Introduce the written evaluation, Handout 12.1, by explaining that the evaluation is important to the trainers as a way of learning how the training has been received, and for future planning purposes.

Hand out the written evaluation form, and ask participants to complete it.

8. Closure — Time: 25 minutes

Thank the participants for their participation and hard work during the workshop. Make any concluding remarks that you feel are appropriate.

If there is a local official present for the closing, introduce the person and ask him or her to make any closing remarks. Ask the local official to distribute the certificates (Handout 12.2).

MATERIALS NEEDED

Handout 12.1 - Workshop Evaluation
Handout 12.2 - Certificate

Handout 12.1

Workshop Evaluation

I. Goal Attainment

Please circle the appropriate number to indicate the degree to which the workshop goals have been achieved.

I can now:	Not at all	Somewhat	Moderately Well	Well	Extremely Well
A. Identify the operation and maintenance tasks for the predominant systems.	1	2	3	4	5
B. Describe the role that community participation and health education play in the operation and maintenance process.	1	2	3	4	5
C. Describe roles and responsibilities of water technicians, community promoters, community water committees and water system caretakers.	1	2	3	4	5
D. Develop strategies for community financing of rural water supply systems.	1	2	3	4	5
E. Implement health and user education, and in training design and delivery.	1	2	3	4	5
F. Describe the element of good monitoring and evaluation, identify what to monitor and evaluate in rural water supply systems, and develop	1	2	3	4	5

approaches to doing it.

G. Develop a back home plan to strengthen the operation and maintenance process. 1 2 3 4 5

II. Workshop Feedback

A. What have been the most positive things about the workshop?

B. What have been the most negative things about the workshop?

C. Please make specific suggestions for improving the design and implementation of this workshop?

1. Workshop length

2. Workshop site

3. Quality of trainers

4. Handouts

5. Workshop content

6. Workshop methodology

E. Do you have any other comments about the workshop?

CERTIFICATE OF APPRECIATION

_____

Participant

WORKSHOP ON OPERATION AND MAINTENANCE

OF

RURAL WATER SUPPLY SYSTEMS

_____	_____
Dates	Venue
_____	_____
Trainer	Sponsoring Agency
_____	
Trainer	