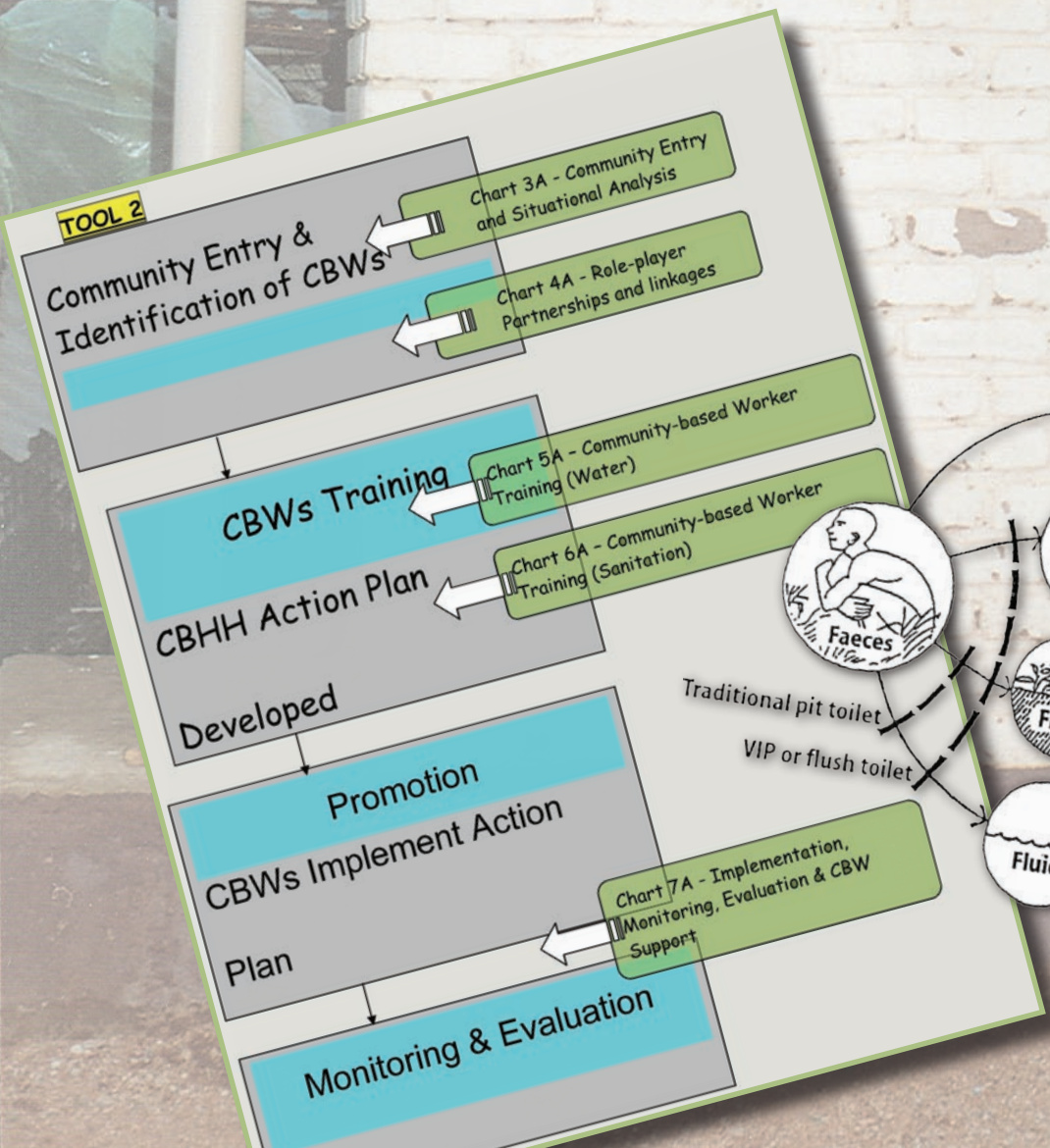
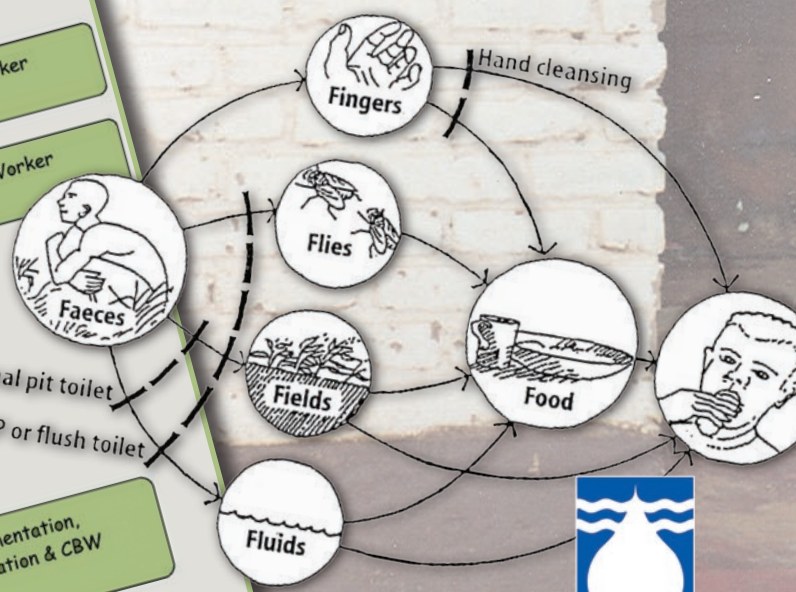
The WRC Community Based Health and Hygiene Model and Implementation Kit

Bolu Onabolu & Maliti Ndlovu





TT 264/06
Water Research Commission

The WRC Community Based Health and Hygiene Model and Implementation Kit

Report to the

Water Research Commission

by

Bolu Onabolu & Maliti Ndlovu

on behalf of

The Mvula Trust

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(WRC Project No. 1380)

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TABLE OF CONTENTS

LIST OF ABBREVIATIONS AND DEFINITIONS

CBHHM	:	Community Based Health and Hygiene Model
CBW	:	Community Based Worker (refer to guidelines for selection of community based workers who carry out health promotion)
DWAF	:	Department of Water Affairs and Forestry
EHO	:	Environmental Health Officer
HAP	:	Health Action Plan
PHAST	:	Participatory Hygiene and Sanitation Transformation

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XIII. Ms Maliti Ndlovu (Researcher)

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1. Introduction of the Community Based Health and Hygiene Model

Development is a process which aims to empower a community to provide for its own needs, beyond former levels, with dignity and justice, thus the most sustainable way to deliver services to a community would be through an approach which involves the community at all stages, hence the term community based approach (Urbana 2005). The Department of Water Affairs and Forestry concurs with this view and notes that the community based sanitation delivery approach still offers the best way to meet the objectives of the white paper DWAF (2004). In relation to the use of the community based approach in the water sector, Mvula Trust South Africa, developed a community based model for water supply which was based on an evaluation in 1996 of over 20 projects (Rall, 1998). The community based approach was also used on sanitation projects however there was no structured model for community based health and hygiene implementation leading to serious impact reducing gaps in the way crucial health and hygiene programmes are currently being implemented by service providers. In recognition of the pivotal role a well planned health and hygiene education program plays in the achievement of the targeted accelerated delivery and the challenges facing the sanitation related health sector, The Mvula Trust with funding from the Water Research Commission has developed a Community Based Health and Hygiene Model (CBHHM) which addresses these challenges.

Challenges particularly related to hygiene promotion include the absence of an effective programme in South Africa to address sanitation problems of individual households and to promote health and hygiene awareness; the futility of using educational approaches to change behaviour without the concomitant translation into understanding, conviction and practice and the lack of integration between the construction/O&M of facilities, sanitation related issues & hygiene promotion (Murkerjee, 2000; Muller, 2002 and Onabolu 2002)[1]. Research carried out in the Eastern Cape and Limpopo provinces[2] shows convincingly that a Community Based Health and Hygiene Model can address serious, impact-reducing gaps in the way crucial health and hygiene programmes are currently being implemented by service providers (See Table 1 for an overview of the gaps and the way the CBHHM addresses them).

The CBHHM consists of a summary process flow chart for community based health and hygiene programming. This summary flow chart is linked to an implementation kit which consists of flow charts for each stage of health and hygiene and tools.

The CBHHM and its attendant implementation kit provide structured guidance and tools for each stage of the health and hygiene program clarifies roles and responsibilities for optimal utilization of human and scarce financial resources and optimises socio-economic development through skills transfer and remuneration for work done.

[1] (Murkejee also notes that people who received toilets did not receive explanation about operation and maintenance and thus were not aware of the function of the water seal, thinking it was dirty water they cut off the seal, resulting in the toilets having bad odour and the owners sealing them.

[2] Water Research Funded Project K5/380 'increasing the pace of sanitation delivery using a methodical approach to health and sanitation integration'

The CBHHM and its attendant implementation kit are based on the following principles:

1. Health and hygiene programs are limited in terms of time and budget and therefore need to be maximized e.g. By providing guidance on allocation of roles in a cost and time efficient manner. CBWs carry out promotion, external agents train and mentor the CBWs, whilst EHOs and relevant government departments maintain an oversight through community based monitoring.

2. Health and hygiene programs must be demand responsive and thus Health Action Plans should be developed by the CBWs with support from the external agents, the CBHHM provides guidance on the development of demand responsive Health Action Plans and a sample is provided in the implementation kit.

3. Training should be standardized to cover the relevant aspects of water and sanitation and should only use a maximum of 3 PHAST tools; The CBHHM provides training plans with reference to the use of appropriate tools for the identification and prioritisation of appropriate solutions to community water and sanitation problems during training.

4. Water, sanitation and health and hygiene programs should lead to socioeconomic development through the transfer of skills and remuneration for work done, the CBHHM promotes the involvement of the community in every stage of health and hygiene implementation and ensures that community based workers can be mentored, their involvement monitored and thus remunerated.

5. Creation of demand for sanitation facilities is an objective of water, health and hygiene promotion on sanitation projects, therefore relevant parts of the sanitation facility messages must be inculcated into the training of CBWs, The CBHHM provides training process charts and training plans which give guidance on the integration of sanitation promotion with health and hygiene.

6. The community is a very important resource and should be involved in all aspects of health and hygiene programs i.e. training, promotion and monitoring and evaluation, the CBHHM provides structured process charts for each stage of the health and hygiene programme and gives guidance on the involvement of the community. The CBHHM also provides a simple observational checklist to facilitate community based monitoring and evaluation.

1.1 A Step by Step Guide to Using the Model and Kit

Step 1 Familiarize self with Community Based Health and Hygiene Model, principles and gaps it attempts to address. Refer to sections 1 and 2 for overview of model, principles and summary process flow chart.

Step 2 Carry out community entry and situational analysis to facilitate familiarization with community and community structures, identification of resources within the community, role player partnerships formation, presentation of implementation plan to the community and identification of Community Based Workers (CBWs). Refer to sections 3 and 4 for overview of this process, process flow chart and tools.

Step 3 Carry out water and health related training of CBWs with the objective of building capacity, empowering trainees and clarifying roles and contractual responsibilities. Other objectives of this stage include facilitating the identification and prioritization of problems and solutions and developing a demand responsive Health Action Plan (HAP). Refer to section 5 for the overview of this process, process flow chart, training plan and tools.

Step 4 Carry out sanitation related training of CBWs with the objective of building capacity, empowering trainees and clarifying roles and contractual responsibilities. Other objectives of this stage include facilitating the identification and prioritization of problems and solutions and developing a demand responsive HAP. Refer to section 6 for the overview of this process, process flow chart, training plan and tools.

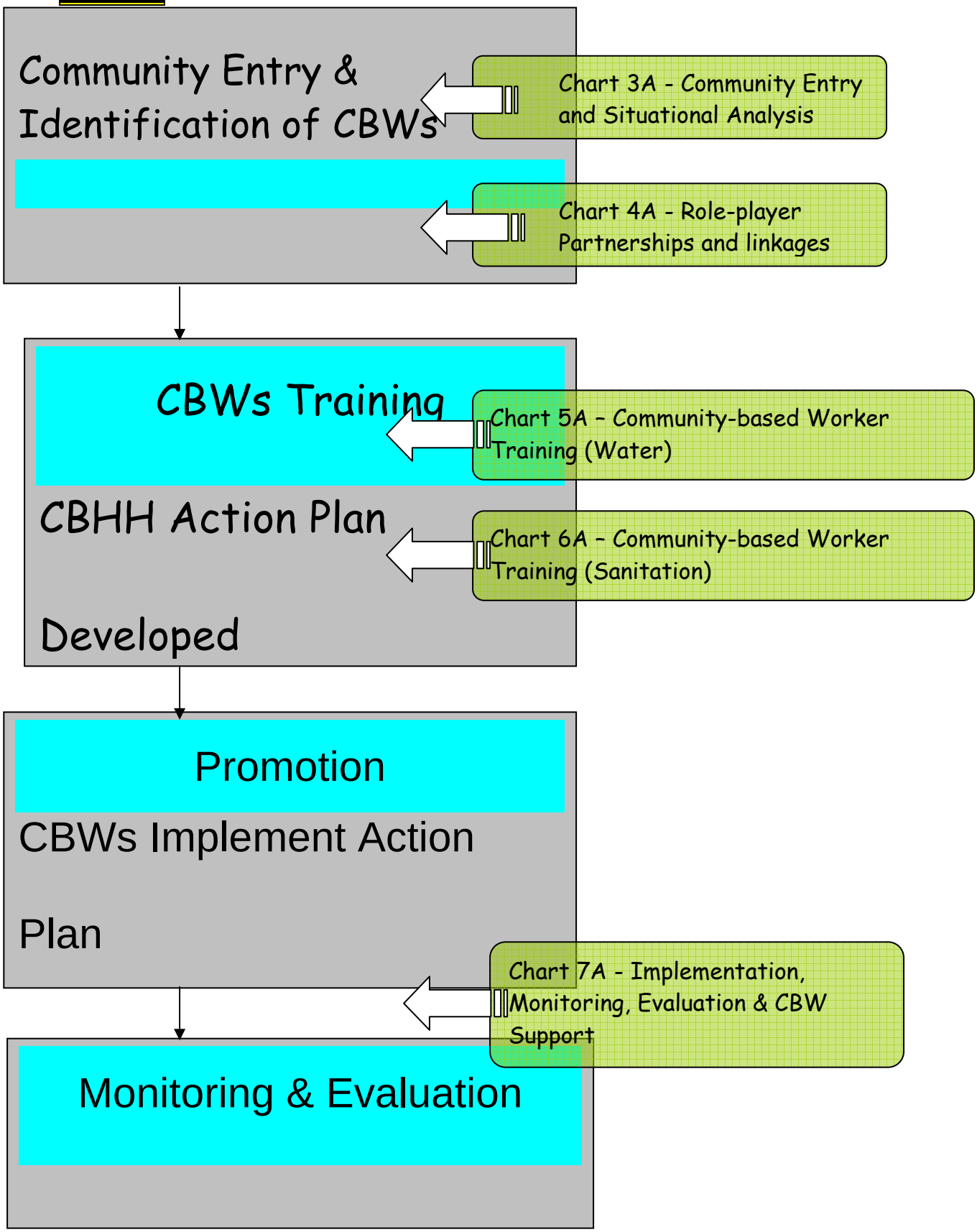
Step 5 Facilitate promotion, monitoring and evaluation. Objectives of this stage include provision of support to the CBWs as they implement the Health Action Plan of promotion. Other objectives include the development of a monitoring and evaluation framework which allows data collection and HAP amendment during promotion. Refer to section 7 for overview of this process, process flow chart, training plan and tools.

TOOL 1 Overview of Gaps in Current Methods and Ways in Which Community Based Health and Hygiene Model Addresses These Gaps

Stage in H&H programme	Gaps in Current Methods as Identified from Mvula Field Experience	Community based model
Planning	Though H&H budget is often a much smaller proportion of the construction budget, the manner of allocation between stages and possible role players is neither cost effective nor efficient.	Improved cost efficiency and improved impact on **local economic empowerment**. (H&H promotion budget utilised as CBW stipends rather than for project agents). Project agent play and are paid to train and mentor the CBWs.
Training	**Non demand responsive** as health and hygiene promotion plan developed by external parties i.e. project agents	Development of action plan by CBWs **fosters ownership and empowers** CBWs to develop linked initiatives**.** Time bound HAP also facilitates monitoring and evaluation as a few problems are chosen, solutions implemented and then reviewed periodically.
	Training by social consultants of CBWs on *many* PHAST tools rather than on water and sanitation does not foster the needed clarity to enable the community identify and prioritise their problems and solutions.	Training of village health workers on water and sanitation using minimum **PHAST** tools as relevant. This method, saves time and cost. The method also means that CBWs are capacitated and able to utilise the same tools if necessary when carrying out promotion.
Promotion	Reduced **impact** as H & H promotion carried out by PAs at community level through 1-3 workshops.	**Maximal impact** as H&H carried out by dedicated CBWs on a household level through out the period of intervention
	Government official participation difficult (coverage of large areas, no transport, under stocked clinic etc)	**Partnerships and linkages** are formed at early stage of process (Government EHOs, Clinics and CBWs etc), roles and responsibilities allocated giving each role player adequate time to perform optimally. PA train & mentor, EHOs monitor, CBW promotes.
	Inadequate **mentoring** of village health workers and skills transfer not incorporated when Project Agents carry out health and hygiene promotion.	**Skills transferred to CBW** during training & Project agents rather than carry out promotion themselves, are able to mentor CBW through the provision of tool kit and regular evaluation meetings.
	H&H a separate process from water or sanitation implementation e.g. CBWs usually said to be behaviour change agents without much involvement in sanitation training, construction etc	Health workers are water or sanitation promotion agents. Involved in sanitation training, sanitation construction e.g. communication of pit dimensions, subsidy and household commitments etc
M&E	Difficulty in measuring impact of health and hygiene interventions	Simple pre and post intervention observational checklist developed. Simple reporting sheets, disease incidence register and evaluation visits constitute a robust community based M&E system
Other	Unskilled project agents	Use of the CBHHM with its guiding framework and tools provide project agents with a form of on –the- job mentoring.

2. Summary of the Community-Based Health and Hygiene Model, with Flowchart titles

TOOL 2



2.1 List of Tools[3]

[3] Tools is used here to mean documents in this model and kit which facilitates health and sanitation integration.

3. Overview of Community Entry and Situational Analysis Processes and Flow Chart

The overview of the Community Entry and Situational Analysis process used in the CBHMM, the attendant flow chart and gaps addressed by the model is presented in this section.

3.1 Community Entry Flow Chart Overview

The community entry and situational analysis stage has the following objectives:

- ✓ The familiarisation of project agent (PA) with community and community structures
- ✓ The assessment of resources within community by PA to facilitate efficient use within budgetary and time constraints.
- ✓ The presentation of the implementation plan to community and further familiarisation with community.
- ✓ The identification of Community Based Workers.

3.1.1 Community Entry Tools Overview

Community Entry checklist

A checklist, which gives the PA an idea of the information, s/he needs to obtain at this stage of the health and hygiene program. Relevant portions of this tool should be adapted to suit the particular situation.

CBW Selection Guiding Criteria

- ✓ The guiding criteria which is given to the relevant community structure has the following objectives:
- ✓ Assist the community with the identification of resources within the community
- ✓ Facilitate ownership and buy-in from the relevant community structure.
- ✓ Reduce time and thus finances spent by project agent to select community based workers.

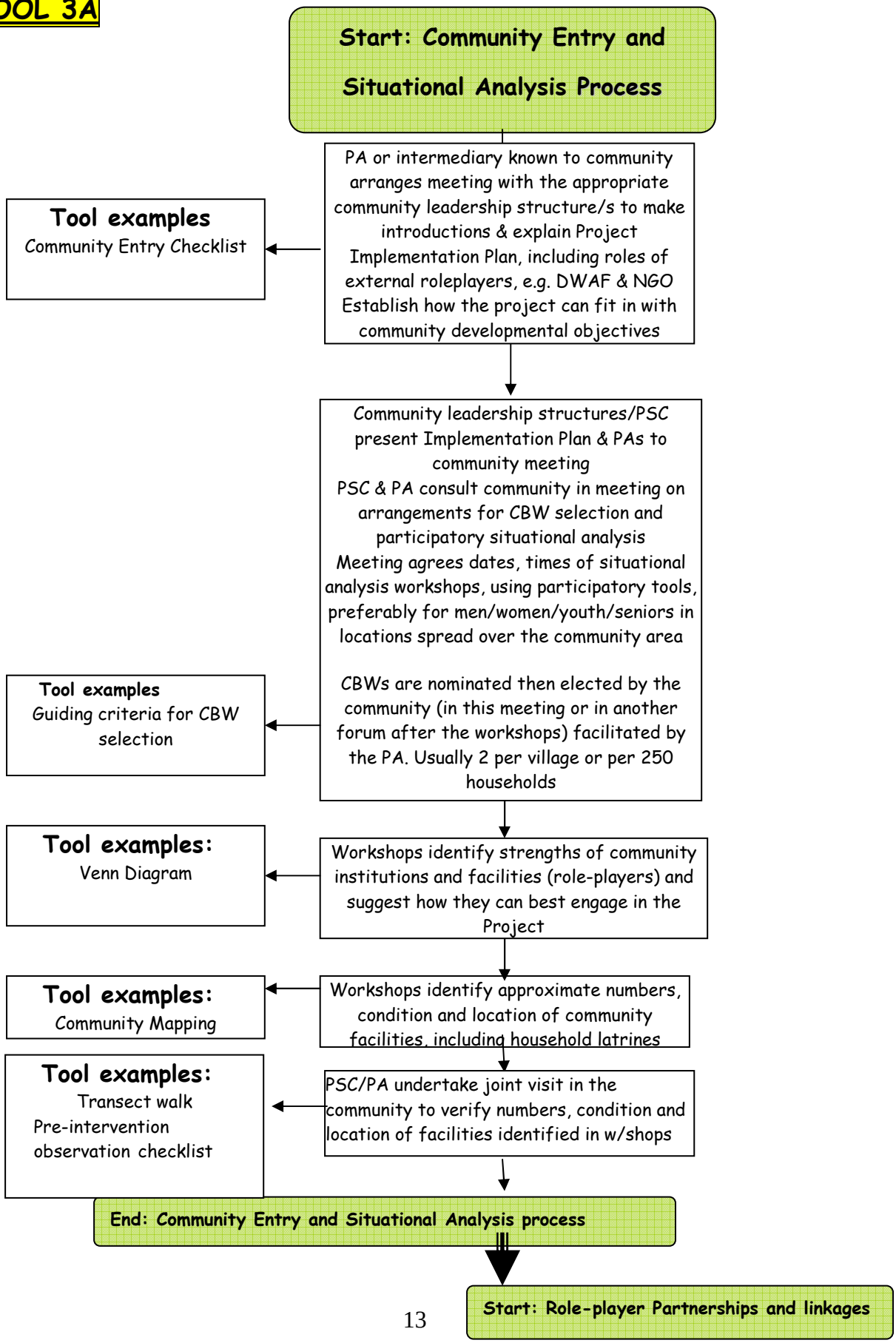
Pre- Intervention Observation Checklist

This is a simple tool for achieving the following:

- ✓ Provide baseline for future monitoring and evaluation
- ✓ Reduction of time and money spent on Knowledge, Attitude and Practices (KAP) studies.
- ✓ Simplicity so that all PA are able to monitor and evaluate their programmes.

3.1.2 Community Entry and Situational Analysis Flow Chart

TOOL 3A



3.1.3 Community Entry Checklist and Guide

TOOL 3B

Community Entry checklist (PSC)

Name of Project:
Purpose of meeting:
Date of meeting:

√ Make a decision tree of the Community structures. The relative importance of political role-players, e.g. TRC, SANCO, ANC/PAC, and traditional leadership. Is there a development forum? Where and when does it meet?

√ **What** are the links between the PSC and the political structures? (It is important to ensure there is sufficient political support for & commitment to the Project. What evidence is there of this? How can it be encouraged if the link appears to be weak?);

√ **Is** there a regular community meeting time and place, e.g. to give Project updates to?

√ **Names** of political role-players, and any cell phone numbers & postal addresses;

√ The development history of the community. What initiatives have there been in the past, and which are ongoing? *(The more 'active' the community the greater the chance of members participating in the Project)*;

√ What do they think of the standard of services, if any, e.g. electricity, telephones, roads, schools, clinics? *The last two questions give an idea of the community's developmental priorities;*

√ If there has been a water project is the committee active and is a reasonable service being provided? What are their successes and failures? Are the same members of the water committee now in the sanitation committee? This should affect the Committee training programme;

√ Other active community developmental group/clubs, such as:
- √ Sewing or bread-making groups *(mainly women?)*;
- √ Animal keeping groups *(mainly men or women?)*;
- √ Sports clubs & youth groups *(are the youth active?)*.

√ Names of key contact persons of these groups, and any cell numbers & postal addresses;

√ Providers of a public facility/service, such as:
- √ Primary & secondary schools;
- √ Crèches;
- √ Churches;
- √ Clinics and numbers of nompilos.

√ Names of key contact persons providing these services, and any cell numbers & postal addresses;

√ The names and any cell numbers & postal addresses of PSC members (have space for these on the meeting attendance sheet) and their membership of political groups and participation in other development activities. *(It is advisable to be aware of who was instrumental in applying for the Project and consider what any political motivations may apply, in light of the above answers)*

√ Date, time and meeting point for the situational analysis in the community. Plan the route with the PSC, who can arrange to inform those you'll be visiting. Up to 3 PSC members can attend. *(Maximise PSC involvement and check their understanding by e.g. running through how they would introduce you & the Project to the key community contacts/informants)*

Note. This is a suggested checklist. Cut and paste it onto your own check sheet and modify it/ add to it to suit Project purposes. You may still need to obtain information on community demographics and which administrative district it comes under etc. Do this well in advance of the meeting to familiarise yourself with the scope of the questions. Similarly, ensure that you have prepared for the rest of the meeting, e.g. if you are introducing your organisation & the Project. Have copies of key papers available for the PSC.

Community Entry checklist

(Community developmental group/club)

Name of Project:
Name of group or club:
Attendance *(presuming a small number not requiring an attendance list)*:
Purpose of meeting:
Date of meeting:

√ Preferably have prepared for the PSC members to take notes, make the introductions, explain the Project, and the main purpose of the meeting. (There must be clarity about your organisation is and what the project purposes are, so time must be allowed for some discussion.)

Specific purposes:

1. *To find out what groups are active in the community and what are the issues they are trying to address? What sort of people in the community have they mobilised?*
2. *To tell them about the Project. Would health & hygiene issues be of interest to the groups? Would it fit into their agendas?*
3. *To see what skills they are using, e.g. drama, song, etc. and whether these could help raise awareness of health & hygiene issues.*

√ Tell me about the group/club you are involved with?

√ How many members do you have? Age range & gender balance?

√ The development history of the group/club. What initiatives have there been in the past, and which are ongoing?

√ If there is already a Project Implementation plan at this stage, discuss the content to see which aspects the group/club would like to be involved with.

√ Names of key contact persons in the group/club, and any cell numbers & postal address;

Community Entry checklist

(Providers of a public facility/service)

Name of Project:
Name of facility/service:
Attendance *(presuming a small number not requiring an attendance list)*:
Purpose of meeting:
Date of meeting:

√ Preferably, prepare for the PSC members to take notes, make the introductions, explain the Project, and the main purpose of the meeting. (There must be clarity on your organisation and what the project purposes are, so time must be allowed for some discussion.)

Specific purposes:

1. *To find out in what ways the service is active in the community and what issues they are trying to address? What sort of people in the community have they mobilised?*
2. *To tell them about the Project. How do health & hygiene issues it fit into their agendas? Do they want to be involved?*
3. *To see what skills they are using, e.g. drama, song, etc. and whether these could help raise awareness of health & hygiene issues.*

√ How many people have an involvement in promoting any sort of health awareness? (numbers of teachers, health teachers, clinic sisters, nompilos as appropriate)

√ What health & hygiene awareness initiatives have there been in the past, and which are ongoing? (e.g. in the curriculum of the school or on Health Days/special events)

√ Do you believe diarrhoea is a problem in the community?
√ What practices do you believe to be the causes of diarrhoea?
√ What treatments for the symptoms of diarrhoea would you recommend?

√ Where does health & hygiene awareness feature in the school/clinic/church priorities at present?

√ Does he/she believe that the conditions at the school/clinic/church healthy? *(There may be poor sanitation and/or water provision etc)*

√ If there is already a Project Implementation plan at this stage, discuss the content. Is there any aspect they may like to be involved with?

√ Names of key contact persons and any landline, cell numbers & postal address;

3.1.4 Guiding Criteria for CBW Selection

TOOL 3C

Guiding Criteria for Selection of CBWs

The following guiding criteria should be used by the Project Agents to facilitate the selection of Community-based Workers by the Community at the Community Entry Stage:

- Male or Female
- Above 25
- Agile
- Resident in the community represented
- Literate in English and the local language of the target area.
- Availability – for training throughout the course of the project
- Apparently healthy and neat in appearance

TOOL 3D

3.1.5 Sample Pre & Post Intervention Observation Checklist

Date:_____

Name of interviewer:_____
I am calling as a…..(state capacity, e.g. Community-based worker, PSC etc) representative of the ……. water (and sanitation if appropriate) project. I have come to gather information from a sample of community members on issues related to the program. It is part of working together with the members of this community, towards our common goal of better health for this community and all of us in South Africa.

Please bear with us, as some of the questions might be delicate but needed. All information given is confidential as your name will not be recorded. We appeal to you to provide answers to the questions we ask as accurately as possible, so that we can see again later if the project improves the water (and sanitation) facilities and practices that lead to better health. Thank you.

Notes to Interviewer: Please put 1=Yes or 2 = No in box corresponding to answer

No: _____

Community:_____

SAMPLE OBSERVATIONAL CHECKLIST

		1=Yes 2=No,
Is there a stool disposal facility in the yard?	1.	
Are the seats, walls and floor all free from faeces?	2	
Is there a hand washing facility? (e.g. a tap or bowl)	3	
Is there any evidence of the use of a hand washing facility? (e.g. water in the bowl, traces on the floor, water in tap)	4	
Is there soap near any hand washing facility?	5.	
Is the yard clean of garbage?	6.	
Is the water storage container covered?	7.	

Thank you for your time. You will be seeing us again.

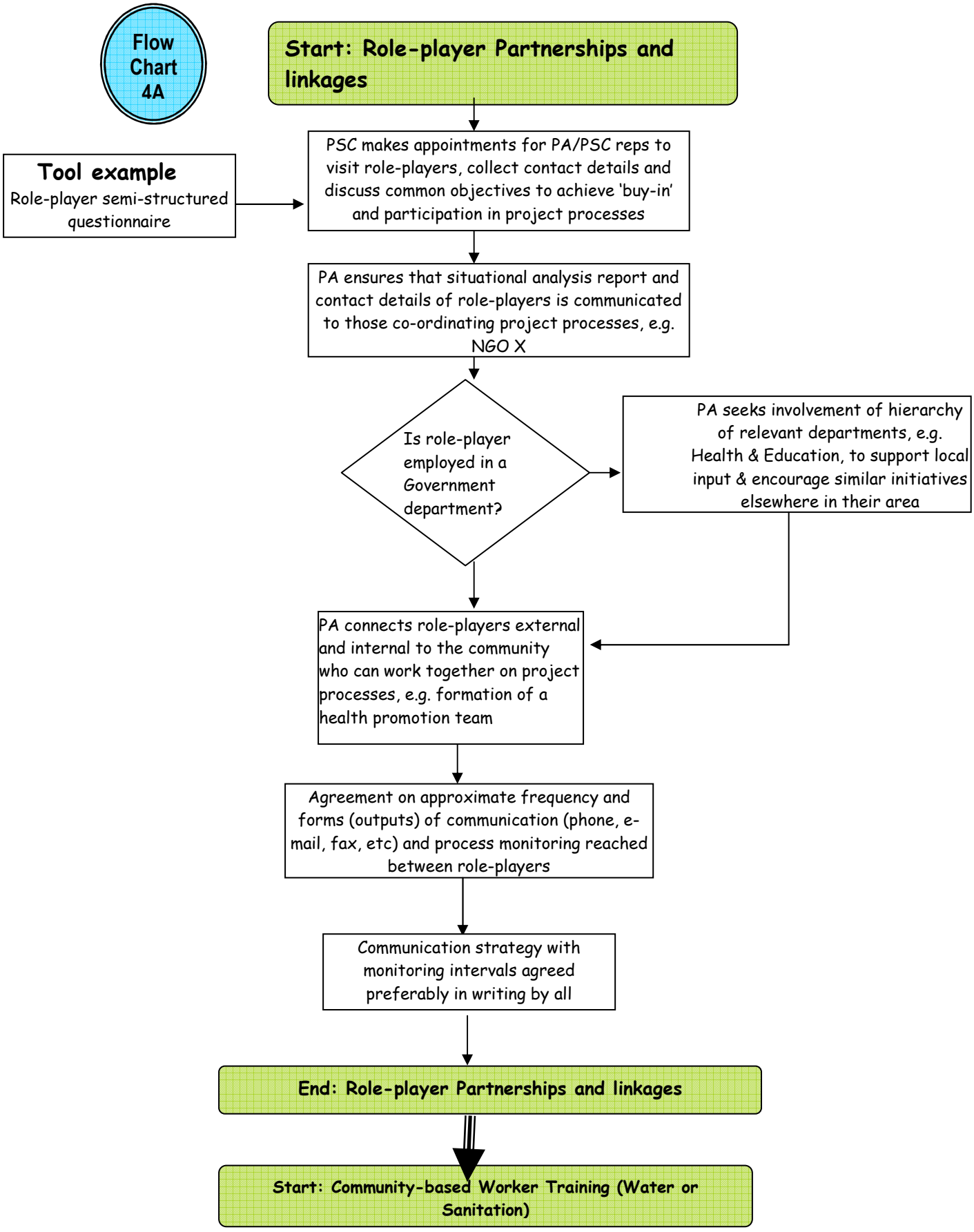
4. Overview of Role Player Partnerships and Linkages

An integral part of the CBHHM is the formation of partnerships and linkages as part of the health and hygiene process. It is essential that these linkages are formed early in the process to ensure that the available resources are maximised optimally.

A Health Promoting Team is formed with training, promotion, mentoring and monitoring roles allocated to the appropriate role-player vis a vis time availability and budget.

Note that the results of the community entry and situational analysis will be used to inform partnerships.

4.1 Role Player Partnerships and Linkages Flow Chart



5. Overview of Community Based Worker Training (Water) Processes and Tools

This section tries to provide a framework for the following:

- ✓ Build the community based workers' capacity on water and health related issues.
- ✓ Empower the community based workers to fulfil their roles as communication agents on a house to house basis to community
- ✓ Provide structure so that the training and use of participatory tools are part of problem identification and solving process.
- ✓ The development of a demand responsive time bound Health Action Plan as an output of this process.
- ✓ Clarification of expectations, responsibilities and contractual arrangements etc.

Overview of Tools

Community Based Worker Training Plan (5B)

This tool structures the training process and use of and use of PHAST tools for problem identification, prioritisation and problem solving.

Pre-training Assessment Form (5C)

Assists the project agent with the assessment of the gaps in existing knowledge of the selected CBWs before and after training.

CBW Contract (5D)

Clarifies project expectations and responsibilities to CBWs. Terms of employment, conditions, remuneration, duration of work etc are also clarified.

Post Training Evaluation Form (5E)

This form provides the project with information about the communities' perception of the training style and content etc.

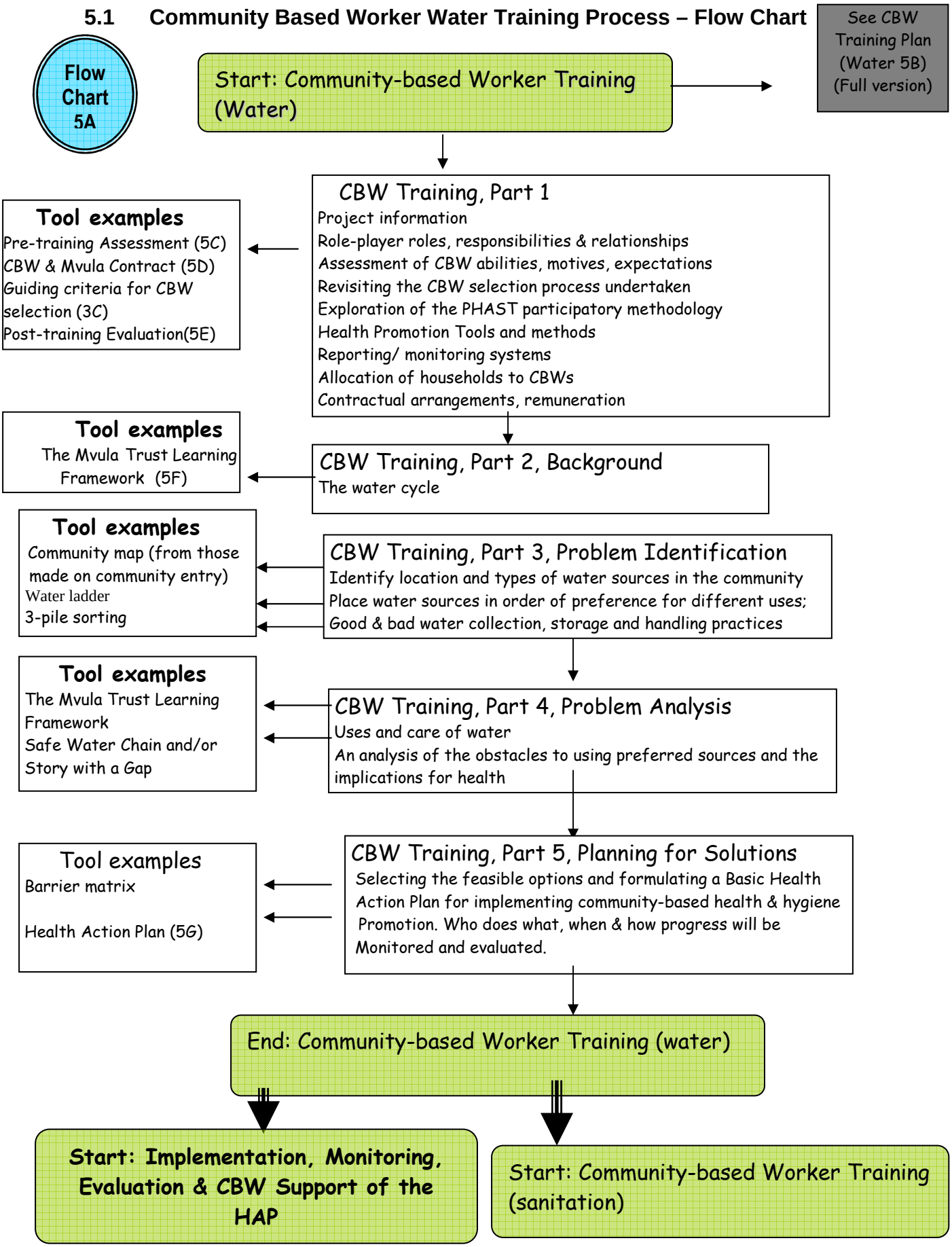
Mvula Trust Learning Framework (5F)

A simple water and sanitation training guide, which has contextualised to suit the community based workers environment and assumed level of knowledge.

Community Based Health Action Plan (5G)

- The Health Action Plan is an output of the training of the Community Based workers.
- Training is structured in a way that community based workers can use similar tools during health and hygiene/sanitation promotion.
- Training process facilitates the identification of problems, analysis and prioritisation of feasible solutions within the context of the particular project.
- It is essential that health, hygiene, water and sanitation issues, which will be addressed during promotion, are identified and scheduled in Health Action plan.
- Process and progress should be reviewed once in every six weeks or as relevant to the project time frame.

5.1 Community Based Worker Water Training Process – Flow Chart



5.1.1 Community Based Worker Training Plan (Water)

TOOL 5B

Community-based Worker Training Plan (Water)

Recap (30 minutes)

The facilitator allows the CBWs to recap on the training covering project and contractual issues, reflect on lessons learnt, seek further clarification and take forward any actions.

Broad Plan facilitator should enable the group to:

- ✓ Identify issues of importance to community
- ✓ Give opportunity to express their problems
- ✓ Analyse their problems
- ✓ Identify possible solutions
- ✓ Select appropriate options
- ✓ Develop a plan to implement agreed solutions
- ✓ Establish ways to monitor and evaluate the outcome of the plan

Background

a) Water source linkages (45 minutes)

The facilitator will enable the CBWs to explore the different domestic water sources (river and rainwater etc) within the context of the water cycle, and the potential for them to become contaminated.

Tool: The Mvula Trust Learning Framework

b) **Facilitate the establishment of links between different water sources**

Tool: Story with a gap or 3 pile sorting

Problem Identification

a) Location and types of water sources in the community (25 minutes)

Refer to the community map(s) earlier produced during community entry if available. The group should look at each map produced and identify sources used in the community and other items of interest.

Tool: Community Map(s)

b) Water sources for different uses (45 minutes)

The group will then arrange the water sources identified above in a 'ladder' in order of use and then later in order of preference. There will be differences that indicate that sources used are often not the first preference. The group should

give reasons for differences between preference and reality. They might identify problems related to water sources taste, appearance, distance etc. The facilitator should note this as part of identified problems.

Tool: Water Ladder

c) Good & bad water collection, storage and handling practices (1hr)

The group can exchange experiences of community hygiene practices, particularly those related to water collection, storage and handling.

The tool pictures allow discussion of what are considered to be 'good', 'bad' or 'in-between' practices.

Tool: Three-pile Sorting

Problem Analysis

a) Uses and care of water (20 minutes)

Information is provided about the potential risks to health posed by the practices discussed. It will start to facilitate the analysis of the reasons for the practices especially in relation to community knowledge and socio-economics. This lays the basis for 'planning for solutions' to influence the rest of the community to change behaviour.

Tool: **Learner Framework, 'Uses and Care of Water'**

b) Obstacles to using preferred sources or 'good' practices (20 mins)

These tools aim to allow a more open discussion of the obstacles to change and the implications to health of 'bad' practices.

Tool: Safe Water Chain and/or Story with a Gap

Planning for Solutions

a) Selecting barriers to disease transmission (30 minutes)

By reviewing the outcomes of the previous steps the most effective barriers that are easiest to do are identified. These will form the basis of the Action Plan.

Tool: Barrier Matrix

The Action Plan can be made for water issues, as outlined under b) & c) below, or, where sanitation promotion is included one Plan can be made after sanitation training (Flow Chart 3b).

b) Formulating a CHHAP Health Action Plan (45 minutes)

Agreement on roles, responsibilities and time-plans for implementing stages of a Community-based Health & Hygiene Action Plan, Confirming the contents of the house-to-house promotional visits, including the reporting sheets and disease incidence register for water-related issues.

Tool: Health Action Plan

c) Monitoring and evaluation (20 minutes)

The facilitator will guide the group on deciding how and when they can check the progress of the Action Plan. This can be done in the context of the M&E undertaken by other stakeholders, as explained using Flow Chart 6.

Recap and capture the session in written form (40 minutes)

Presentation of the CHH Action plan, discussion of the first day of implementation and support required by Community-based Workers.

5.1.2 Community-based Worker Pre& Post-Training Assessment

TOOL 5C

Community-based Worker Post/Pre-Training Assessment

(Covering sanitation, the concept, objective, faecal-oral contamination route and barriers, sanitation options)

Occupation.....

Age.....

Address.....

Name.....

Educational level.....

1. What is 'sanitation'?

_____

_____

2. Why do we carry out sanitation projects? Or what are the objectives of good sanitation?

_____

_____

_____

_____

3. Describe 3 types of faecal disposal facilities you know of

---

(a) _____

(b) _____

(c) _____

4. Describe 3 ways that human beings catch germs that are originally from human faeces?

(a) _____

(b) _____

(c) _____

5. For each way you mentioned above, mention a way that this can be prevented.

(a) _____

(b) _____

(c) _____

5.1.3 Community Based Worker Contract

TOOL 5D

Community- Based Worker Contract

AGREEMENT made

between: **……..**
(Project Agent)

AND

…….
(“The Community-based Worker”)

ON THE …….. PROJECT

FOR THE DURATION: (start date) ……

(end date) ……

The **social consultant** appointed for this project is

……, for which

…….. is the contact person.

The community management structure for this project is either the **Project Steering Committee** (PSC) or the **Water Service Provider** (WSP), both structures being democratically elected committees representing the community and overseeing all project activities.

GENERAL CONDITIONS OF THIS CONTRACT:

1. The Community-based Worker will perform the duties outlined in Appendix A of this contract.

2. The Community-based Worker is expected to cover ……households/day to promote the activities outlined in the Health Action Plan.

3. The Community-based Worker will provide his/her services for a period of …. months, between the dates outlined on page 1 of this contract.

4. The Community-based Worker will receive a monthly gratuity of R……. for ….. months, which will be paid on a monthly basis by the social consultant.

5. The ***X company*** will not be responsible for any claims, losses and legal actions against the Community-based Worker.

6. The Community-based Worker will report to the nominated contact person from the social consultant company, as stated above.

7. The Community-based Worker must complete the relevant reporting sheet, for household visits during the implementation of the Health Action Plan. These are to be signed by the Water Management Committee and will be paid once these have been received and approved by the social consultant.

8. The Community-based Worker must be currently unemployed. If his/her employment status changes within the duration of this contract, preventing him/her to perform the duties outlined in Appendix A, a suitable replacement is to be nominated by the relevant community structures (using the same selection criteria) and this contract terminated.

9. The ***X company*** can cancel this contract by giving the Labour Desk Officer one day's notice, on the following grounds:

10. the CBW's performance does not meet with the ***X company*** standards;

11. it is evident that the CBW is not acting in the community's best interest; or

12. the CBW finds other employment, which interferes with his/her ability to perform the activities outlined in Appendix A of this contract.

13. The Community-based Worker can give the ***X company*** one day's notice, if he/she does not want to or cannot continue working on the project.

To accept this appointment, we request that you sign this letter, initial all pages, and return an original to the ***X company*** as soon as possible. We look forward to a successful collaboration in this matter.

I understand and agree to the contents that have been stated in this Contract. I hereby undertake to provide the services listed in this Contract and understand the conditions of this Contract.

At..... for and on behalf of the …… ……..
(community based worker)

on the …….. ……Project

on this.....day of.....20.....

As Witnesses:

1. Signature ....

2. Full Name ....

At.....for and on behalf of the **……**
(Project agent)

on this.....day of.....20.....

As Witnesses:

1. Signature ....

2. Full Name ....

APPENDIX A

LIST OF ACTIVITIES

1. Training
2. Health Audit
3. Action Planning
4. Project promotion (sanitation, health, water)
5. Household Visits - PHAST Training
6. Monitoring & Evaluation
7. Interaction with Community Structures

5.1.4 Post Training Evaluation

TOOL 5E

General Evaluation of CBW Training

Name:(Optional)_____Community:_____

Date of Training: _____

1. What is your general impression of the training?

2. What do you suggest or advise us to add?

3. What section do you find most helpful?

4. Is the time scheduled for the workshop convenient and sufficient?

5. What suggestions do you have that could have made this training exercise more useful for you?

Thank you!

5.1.5 Community Based Health Action Plan

TOOL 5G

Sample of Village Health Worker Action Plan
An
Output of Village Health Worker Training

i Identified Problems:

1. Topic: Water Availability
Some of the water sources cause disease (diarrhoea, skin rash)

2. Household storage containers
a) Water is of poorer quality than water from the taps or rainwater tanks

3. Streams
a) Water is of poorer quality than water from the taps or rainwater tanks

4. Rainwater tanks
a) The water from some tanks is of poor quality

5. Taps
a) Breakdown. Then as some households do not have rainwater tanks it means that the people then have to resort to using streams and other polluted sources even though their first preference is rainwater and then tap water.
b) The community does not like the taste.
c) It leaves white deposits on the skin
d) There are economic consequences as it is makes one use more soap.

ii Implementation of Solutions:
Topic: Water Uses and Care
CBW guides the community:

a) How to care for their water from collection to consumption
b) That local people will be empowered to reduce breakdown & trained on simple maintenance or notification of the right person at the District Council.
c) Give all relevant information on rainwater tanks: i.e. framework, cost of tank, material and size of tank, size of roof. (This will be relevant in a rainwater harvesting project)

Tools:
5F - Learner framework (Sections 1.2.1 - 1.2.2)
Mention the results of any water quality tests to the community (if carried out during baseline survey)
Same PHAST tools as used during training
Contamination routes of water

Time frame – 4 weeks (to be decided in relation to the total time allocation for health and hygiene promotion).

iii Implementation of Solutions:

Topic: Water Treatment Methods
CBWs guide the community:

a) Some feasible water treatment methods, making a differentiation between those that affect taste and the bacteriological quality (disease)
Discuss the pros and cons of each method. Efficacy, cost, convenience of 2 pot storage, solar disinfection, boiling, sand filtration.

Tools:

- Use learner framework (Sections 1.2.3, 1.2.3.1, 1.2.4, 1.2.4.1)
- Sections of framework on tanks, role-play and demos
- Give relevant information on the stage of the process of empowering the community
- Demonstrations showing: types of buckets for storage, solar disinfection, types of chlorine, how to prepare 1% chlorine solution containers, understandable containers

Time frame – 4 weeks – to be decided in relation to the total time allocation for health and hygiene promotion

i) Identification of Problems

Topic: Sanitation

1. The use of the veld
Indiscriminate defecation (e.g. at night) is deemed unsatisfactory by the community members because:

a) It causes diseases Tapeworm, Hookworm, Gastroenteritis;
b) Odour (especially to those living near the veld)
c) Inconvenience as the veld does not give privacy or dignity to the women defecation (e.g. at night)
d) When guests come it is considered a shame to point them to the veld.

2. Existing toilets

a) Where toilets exist they are poorly maintained
b) They are a source of mosquitoes and other unpleasant insects
c) Children cannot use the toilets for fear that they will fall in
d) Either people do not practice hand washing at all or when they do so do not practice it correctly.

ii) Implementation of Solutions

Topic: Sanitation

a) Show through routes of contamination that disease related to sanitation occurs when we eat our shit.

b) Show community pictures and let them form contamination routes from pictures
c) Use the opportunity to ask the community if they have some of these diseases
d) Treat simple ones like a skin rash or refer them to the clinic
e) Use role- play to depict the situation and tell the community to make use of the opportunity provided by the project to subsidise community's efforts to build toilets such as types of toilet, cost etc
f) Show the community how to maintain toilets so that faecal contamination does not continue and mosquitoes and other non-desirable insects do not breed.
g) Teach the community the proper way to wash hands
h) Encourage hand-washing facilities in toilet or outside for households where the veldt is used.

Tools:

- Learner framework and
- PHAST tools –see training plan
- Contamination routes
- First aid toolbox
- Role-plays,
- Demonstration pictures of hand-washing facilities
- The white powder, fruit, knife and shaking hands role-play[4]
- Finger culture results [5]

Time frame – 4 weeks (decided in relation to the total time allocation for health and hygiene promotion).

<u>iii) Evaluation of behaviour change:</u>

1. Meeting with small manageable groups of households according to divisions or house-to-house visits
2. Comparison of water quality tests pre and post intervention
3. Village Health Worker Reports
4. Disease incidence register
5. Toilet subsidy take-up
6. Pre and post intervention observational checklist e.g. comparison of number of toilets and hand washing facilities pre and post KAP.

It is suggested that the Health Action Plan is devised during the training process using the table below:

[4] Simple visualisation tool of how faeces depicted as white powder can be transferred from person to person through contamination routes such as food preparation.
[5] This refers to taking cultures of reportedly washed hands of community and sending to the laboratory. Show the resulting slide with the offensive odour as a means of demonstrating that hands that appear clean to the naked eyes still need to be washed thoroughly with soap.

Topic	Prioritised Solutions	Method	Tools	Time Frame
Water Uses and Care				
Water Treatment				
Sanitation				

Time frame will indicate the promotion period of each topic by health workers.

Tools - refer to the particular participatory tool or section of learning framework which Community based workers will use as support material during promotion

Method refers to house-to-house or other method of promotion

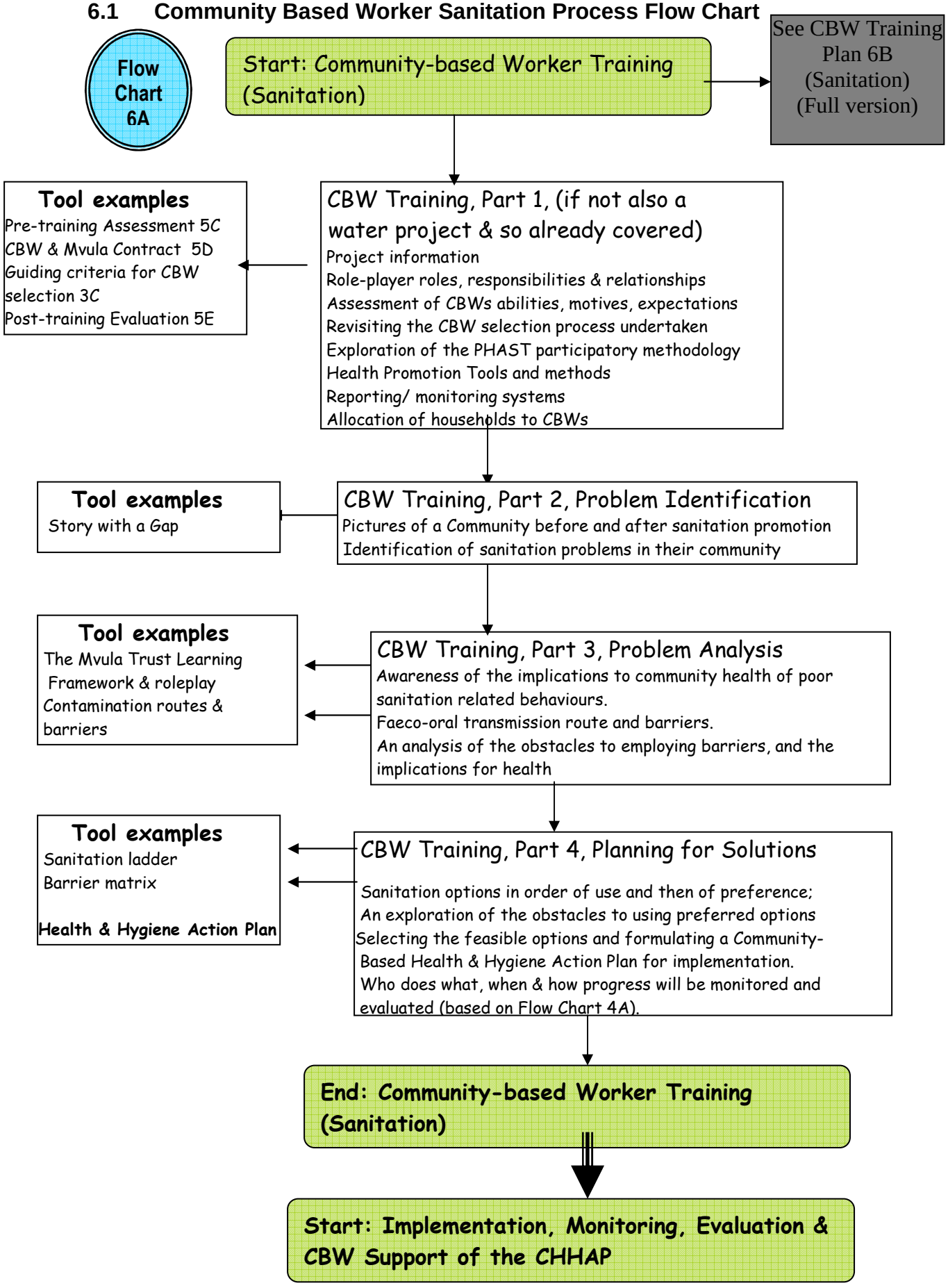
6. Overview of Community Based Worker Sanitation Training and Tools

The objectives of this section are essentially the same as those of the training on water and health. The tools are also similar to those used for training in water, though PHAST tools differ (refer to Tool 6B -Training Plan for Sanitation).

This section tries to provide a framework to achieve the following:

- Build the capacity of the CBWs on sanitation, health & hygiene issues
- Empower CBWS to fulfil their roles as sanitation and health promotion agents on a house to house basis.
- Integrate hygiene promotion with sanitation promotion.
- Support the participants in problem identification and prioritisation of solutions by providing a structured training plan and guidance on the appropriate use of participatory tools.
- Facilitate the development of a Health Action Plan as an output of the training.
- Facilitate the clarification of expectations, responsibilities and contractual arrangements etc.

6.1 Community Based Worker Sanitation Process Flow Chart



6.1.1 Community Based Worker Sanitation Training Plan

TOOL 6B

i. Recap (30 minutes)

Trainer and CBWs recap on any training, covering the water-related health risks, reflect on lessons learnt, seek further clarification and take forward any actions.

ii. Problem Identification

Definition/ Concept of Sanitation (25 minutes)

Use the 'story with a gap' pictures of before and after sanitation.

Ask group to look at the two pictures (paste them where visible to all in the group), and to describe which activities or aspect of the pictures, in their opinion is related to sanitation? Each participant takes it in turn to make a comment. Each different or new view is noted down on the board.

Still using the story with a gap tool, ask the group to identify sanitation related problems in the before picture e.g. defecation in open spaces etc and note this down.

Tool: Story with a gap

iii. Problem Analysis

This aspect aims to lay the foundation for the group desiring to change from the before picture to the after picture. The facilitator does this by guiding them to an awareness of the implications to community health of poor hygiene and sanitation related behaviour. It is useful during this session to stress that sanitation is a communal responsibility as poor sanitary behaviour by an individual can affect neighbours or the whole community.

a) Sanitation and disease (40 minutes)

Using the Learner Framework, provide an introduction to the relationship between sanitation and diseases. Ask the group how sanitation is related to health.

Tool: Learner Framework

Then use role-play to liven group discussion and to:

- Identify what sanitation-related diseases are present in their community;
- Explore how health practitioners in the community treat these identified diseases.

One person is a nurse or doctor, another an inyanga (traditional healer) and the remainder of the group take it in turns being a patient. Each person thinks of a disease symptom present in the community that they think is related to sanitation. They then choose to visit the doctor or nurse or inyanga practitioner to describe their symptoms.

The practitioner would explain:

I. how the patient became sick,
II. how he/she would treat the symptom, and;
III. if they would attribute it to a particular disease.

The facilitator ensures that the symptom, practitioner and responses are noted down, but not corrected. They can then be revisited after routes of transmission have been explored.

Tool: Role-play

b) Faecal-oral route of transmission (40min)

Introduce the concept of the faecal-oral route of transmission (literally shit ending up in our mouths) using the contamination routes and barriers tool. Then revisit the role-play responses.

Tools: Contamination route overview pictures (from child defecating, goat stepping on it to family members having diarrhoea)
Contamination routes and barriers.

iv. Planning for Solutions

a) Sanitation options (40 minutes)

Sanitation technical options are considered in order of use and then of preference. An exploration of the obstacles to using preferred options.

b) Selecting barriers to disease transmission (30 minutes)

By reviewing the outcomes of the previous steps the most effective barriers that are easiest to do are identified. These will form the basis of the Action Plan.

Tool: Barrier Matrix

The Action Plan can be made for sanitation issues, as outlined under b) & c) below, or, where water promotion is included one Plan can be made after that training is complete (Flow Chart 3a).

c) Formulating a CHHAP Health Action Plan (45 minutes)

Agreement on roles, responsibilities and time-plans for implementing stages of a Community-based Health & Hygiene Action Plan.

Confirming the contents of the house-to-house promotional visits, including the reporting sheets with disease incidence register, and modification of the implementation Toolkit to focus on these barriers and behaviours.

Tool: Health Action Plan

d) Monitoring and evaluation (20 minutes)

The facilitator will guide the group on deciding how and when they can check the progress of the Action Plan. This can be done in the context of the M&E undertaken by other stakeholders, as explained using Flow Chart 4.

Recap and capture the session in written form (40 minutes)

Presentation of the CHH Action plan, discussion of the first day of implementation and support required by Community-based Workers.

v. Post-training Evaluation (30 minutes)

7. Overview of Implementation, Monitoring and Evaluation of the Community Based Health &Hygiene Action Plan its Related Tools and Support to CBW

During this stage, the use of the model facilitates the implementation of the Health Action plan by ensuring that:

- Role players have clarity about reporting structures, logistic arrangements, time frames of evaluations etc.
- Provision is made for tool kit for the community based workers which includes:
  - A first aid box (training must be given by qualified medical doctor)
  - Reporting sheets and relevant PHAST tools
  - How - to - apply for toilets leaflet

- Mentoring support for the Community Based Workers
- Communication between the different role players
- Progress is monitored and Action plan is periodically reviewed based on information received during monitoring.

Logistics Plan (Tool 7B)

This is a checklist to ensure that the reporting structures and roles are clear (e.g. mentoring and monitoring roles) and that tool kits have been provided at the beginning of promotion.

How to Apply Leaflet (Tool 7C)

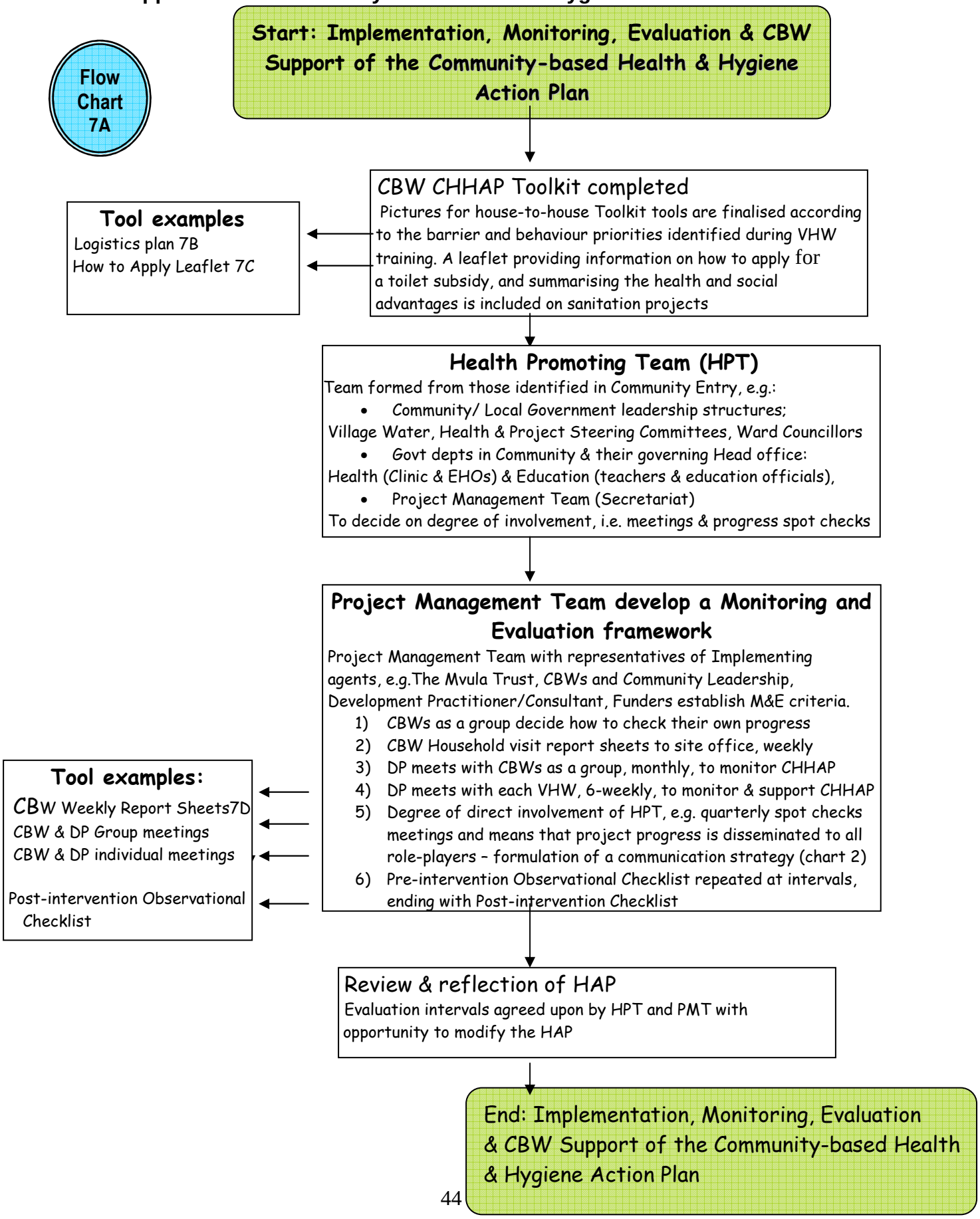
The CBHHM integrates sanitation with hygiene promotion by maximising the benefits of the house to house visits by the community based workers.
This leaflet is a guide, which the CBW uses to explain the procedure for applying for a toilet, household contributions etc. this leaflet should be amended by the project agent to fit the particular project.

Weekly Reporting Sheet (Tool 7D)

The CBHHM attempts to facilitate and ensure that the health promotion team received the necessary information about CBWs household visits.

The sheet also serves as a disease incidence register to enable the project agent note increases in incidence of water borne diseases and pass on information to appropriate stakeholder. Thus CBWs serve as first level of disease surveillance in the community.

7.1 Flow Chart of Implementation, Monitoring and Evaluation and CBW Support of the Community Based Health & Hygiene Action Plan



7.1.1 Logistics Plan

TOOL 7B

Logistics Planning for Start of Promotion

1. Summary of lessons learnt to date by (by Community-based Workers)
2. Evaluation of Training (can be done at the end of the day)
3. Logistics Planning Refresher
    i. Household divisions
    ii. Introduction of Committees and members
    iii. Health Action Plan (Refresher)
    iv. Mvula Learner Framework (Refresher)
    v. Reporting format (chain of reporting and verification of forms)
    vi. Payment issues (no of households per week etc)

7.1.2 Weekly Reporting Sheet/Disease Incidence Register

TOOL 7D **Week starting: _____** **Name of CBW: _____**

Community Represented: _____

	Household visited (no.)	Household visited (no.)	Household visited (no.)	Household visited (no.)
Date:				
Topics covered				
Summary of visit				
Matters arising				

Disease Incidence Register

	Notifications:	**Referrals:**	**Treatments:**
Disease name			
Number of people			
Disease name			
Number of people			
Disease name			
Number of people			
Disease name			
Number of people			
Disease name			
Number of people			
Disease name			
Number of people			
Disease name			
Number of people			

Checked by: _____ Date:_____
Comments:_____

References - Tools

Community Mapping, 3-Pile Sorting, Story with a Gap (Planning Posters), Barrier, Problem Box, Contamination routes & barriers and Sanitation Ladder:
These tools were used or adapted from the PHAST Participatory Hygiene and Transformation series and can be found in:

Wood S, Sawyer R, Simpson- Hébert M. *PHAST Step-by-Step Guide: A Participatory approach for the control of diarrhoeal disease*. Geneva, World Health Organisation (unpublished document WHO/EOS/98.3).

Some of the background provided for the tools was based on earlier work by Lyra Srinivasan and Deepa Narayan:

Srinivasan L. *Tools for Community Participation: a manual for training trainers in participatory techniques*. New York, UNDP, 1990 (PROWESS/UNDP Technical Series involving Women in Water and Sanitation).

Narayan D, & Srinivasan L. *Participatory development tool kit, training materials for agencies and communities*. Washington, World Bank, 1994.

Transect walk, Venn Diagram:
Venn Diagram is also known as 'Information about Village Institutions'.
There are several variations of 'Transect', in which participants walk across the community area in a structured (with a checklist) or more often an unstructured way.

Participatory Rural Appraisal Handbook: Conducting PRA's in Kenya. Natural Resources Management Support Series, No. 1, National Environment Secretariat, Nairobi

An adaptation of 'Transect' (a method within Participatory Rural Appraisal, PRA), is called Health walk, used in:

Almedon A M, Blumenthal U & Manderson L. *Hygiene Evaluation Procedures: approaches and methods for assessing water- and sanitation-related hygiene practices*. International Nutrition Foundation for Developing Countries (INFDC), 1997

Water ladder:
An adaptation of the PHAST 'Sanitation Ladder' tool.
The Mvula Trust (1998) PHAST South Africa National Training Workshop Report and Reference Guide, Johannesburg.

CBW Selection Guiding Criteria, CBW Weekly Report Sheets Pre-intervention Observational Checklist, CBW & Mvula Contract, Pre & Post-training Assessments, Pre & Post-training Evaluation questionnaires, were designed by Bolu Onabolu as part of an Ausaid/World Vision funded project at Pambili, Mooiplaas, implemented by The Mvula Trust East London and managed by Bolu Onabolu:

The Mvula Trust Learning Framework, was compiled by Bolu Onabolu and edited by Claire Boffin using both their specialist knowledge and material from the local and international water and sanitation sector.

The Community-based Health & Hygiene Model was developed primarily as part of an Ausaid/World Vision funded project at Pambili, Mooiplaas, implemented by The Mvula Trust East London and managed by Bolu Onabolu: The Mvula Trust (2000) Pambili Water and Sanitation Project, East London (unpublished)

A version of the 'How to apply' Leaflet was first developed by Rural Support Services at Kleinbullock, Queenstown, in 1998 and adapted by the Mvula Trust East London for The Pambili Project.

Community Entry Checklists & Guide and Role-player Semi-structured Questionnaire:

Rural Support Services (2000) *The Design of Health Awareness Programmes for the Control of Diarrhoeal Diseases*, East London (An RSS guide, by Claire Boffin, unpublished).

It is acknowledged that the most effective tools are developed and refined over a period of time. This has involved the working collaboration of many facilitators and communities whose names have not been recorded.

Appendix – 1 Tool 5F Mvula Trust Pambili Water and Sanitation Project Learning Framework

Pambili Water & Sanitation Project

Community Learning Framework

Source: Mvula Trust East London, 2000

Pambili Water & Sanitation Project

Community Learning Framework

FRAMEWORK CONTENTS SUMMARY

Compiled by Bolu Onabolu, Mvula Trust

Edited by Claire Boffin, Rural Support Services

LIST OF FIGURES & TABLES

Community Learning Framework

Introduction and Purpose

The Community Learning Framework was written for the people of Mooiplaas, a community of 15 villages situated approximately 48 km north of the city of East London, in the Eastern Cape Province of South Africa. It is here that a project to help improve the health of the people through water and sanitation initiatives was launched in 1999. The name of this project is Pambili Water and Sanitation Project. Pambili is a Xhosa word for 'forward'.

The training of Village Health Workers in the Mooiplaas villages formed part of this Project. They are employed by the Project to raise awareness of health issues relating to water and sanitation at the household level. The Framework is a resource to support their training programme. The framework relies on material from many organizations whose main objective is to support the socio-economically disadvantaged. The Mvula Trust wishes to acknowledge their contributions.

The contents of the Framework have a much wider application than the context of rural communities in the Eastern Cape. It is hoped that the Framework can be used a s a resource for anyone who wishes to improve their knowledge of water and sanitation. It can serve as a companion to the participatory methods, now used effectively to help people to question and examine attitudes and practices relating to household water and sanitation.

The Pambili Water and Sanitation Project is made possible with funding from Australia Aid Agency. It has been implemented by The Mvula Trust, East London, for World Vision South Africa.

Fig 1. The roadside sign
to the Project Site Office

PART 1 - Sources of Household Water

Learning Objectives

At the end of PART I of the training Participants should have achieved the following Learning Objectives:

1 Understand the linkages within components of the water cycle, and how the impact of Man's activities can positively and negatively affect the Cycle;

2 Be able to investigate the:
- 2.1 Levels of health knowledge, beliefs, and practices;
- 2.2 Preferred water sources and their uses;
- 2.3 Water & sanitation skill capacity.

3 Have gained analysis and problem solving skills that can be applied to water and sanitation issues appropriate in the Project and target community context.

PART 1 - Sources of Household Water

CONTENTS

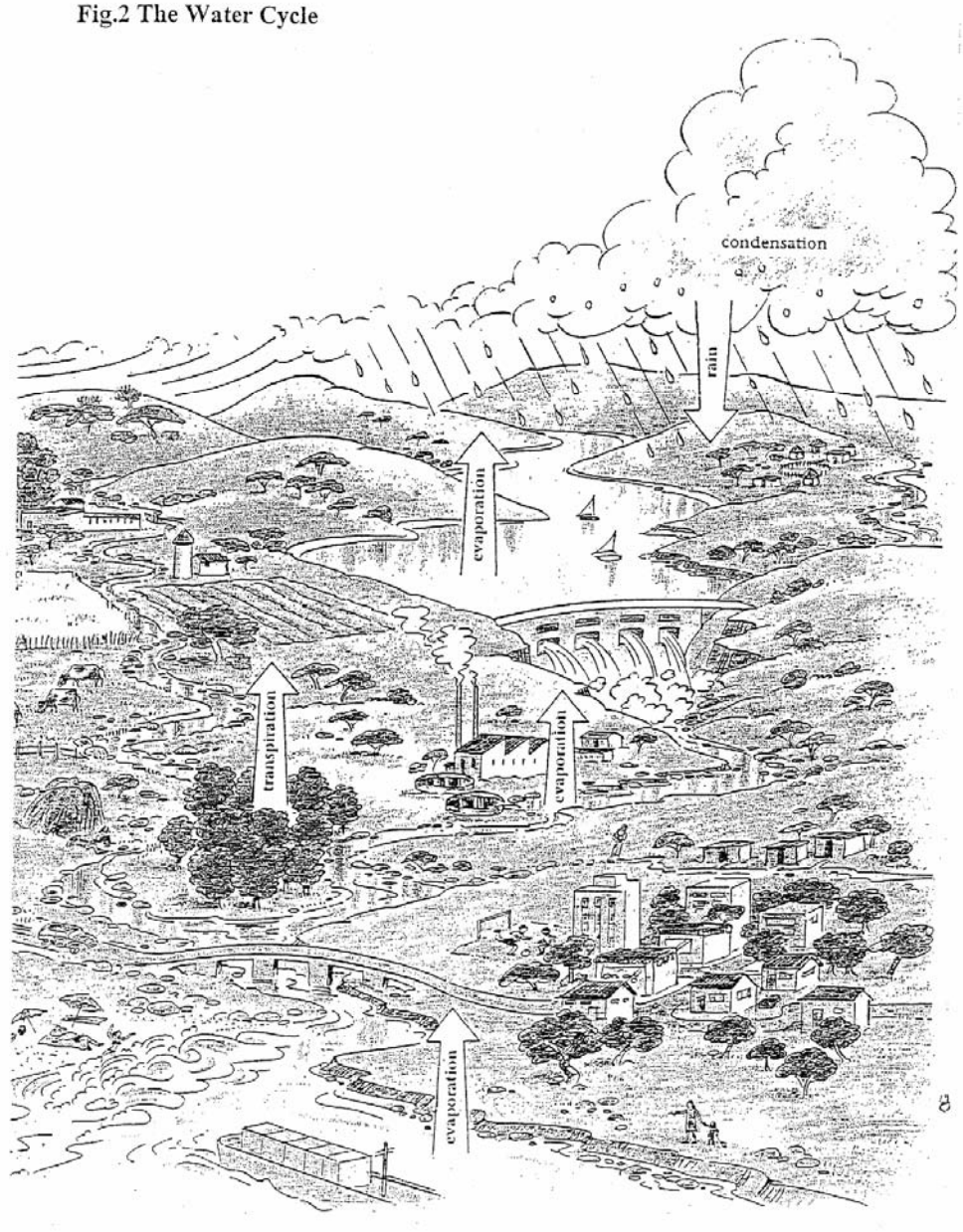
PART 1 - Sources of Household Water

1. The Water Cycle and it's components

When rain falls, some of it sinks to the ground to form **groundwater**. Some flows to the rivers and streams to form **surface water**, and some is taken up by plants and trees. And some goes back to the sky to fall later as **rain**. It continues like that in a cycle or circle, as illustrated below.

Fig.2 The Water Cycle

Fig.2 The Water Cycle



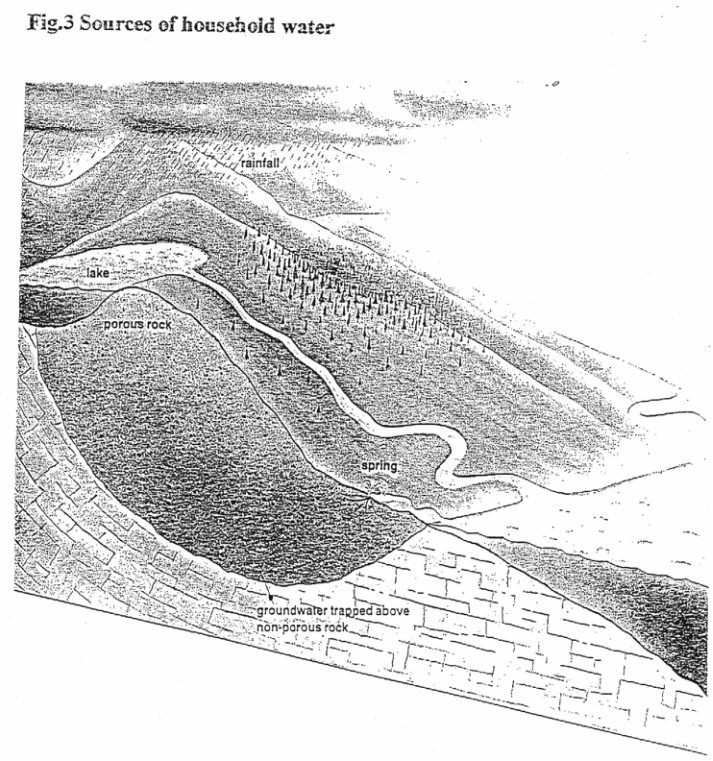
2. Water Sources for household use

There are various sources of household water, as shown in figure 3. The source we choose to use depends on many factors, such as:

- Availability;
- Convenience
  (That is **distance** of the source and **effort** to obtain the water);
- Acceptability for use (In relation to taste, colour etc);
- Cost;
- Purpose.

Water sources may be:
- Rainwater,
- Surface water or
- Groundwater.

Fig.3 Sources of household water



2.1. Rain

This is the purest form of water if collected and stored properly.

2.1.1 The collection and storage of rainwater:

Rainwater can be collected in two main ways:

- Simply putting buckets outside in the rain;
- By means of a simple piping system directing the rainwater on the roof into a storage container.

The second system is more efficient as more water can be collected within a similar period of time. Figure 4, below, is a picture of a ferro-cement rainwater tank built by Mooiplaas community builders trained under the Pambili Project.

Fig.4 A Ferro-cement Tank in Dipini Village

Fig.4 A Ferro-cement Tank in Dipini Village

2.1.2. Precautions to enable hygienic collection and storage of rainwater:

- Allow first rains to wash rooftop properly;
- Fit wire mesh over the top of the downpipe to prevent leaves getting in;
- Wash collection and storage containers regularly and keep clean;
- Keep the collection container covered to discourage insect breeding;
- Don't use the bottom part of the water settled in your storage bucket from rooftop collection containers for drinking. Heavy metal levels could be high!

Remember! Thatching material of roofs can cause the discoloration of the water

2.2 Surface Water

This includes streams, rivers and ponds. Surface water can be useful and often Governments use it as a source of water for bulk water schemes. It should be noted however that considerable time and effort is put in to make these water sources of good enough quality for human consumption otherwise, the water could become a source of disease.

2.2.1 Ways in which surface water becomes polluted

Man engages in many activities that pollute types of surface water:

- We defecate in them;
- We bathe in them;
- We wash clothes in them;
- Our animals drink from them;
- Faeces and solid wastes on the ground are washed into them by rain.

This is shown in Figure 5 on the next page.

2.3 Groundwater

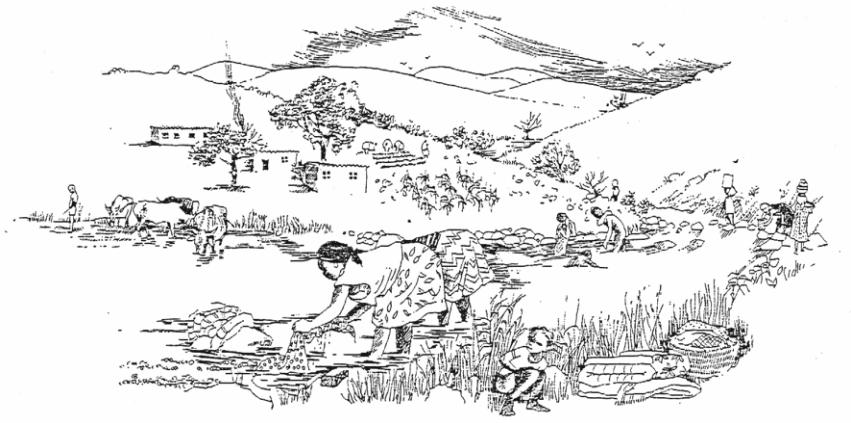
Ground water refers to all the water located beneath the surface in the cracks and holes within the rocks that can be extracted for use.

2.3.1 Advantages of Groundwater

It is a popular source of water for rural, peri-urban and urban communities because:

- It is cleaner than most surface water sources, contrary to what we said earlier about surface water, which needs extensive treatment and often a means of transportation, such as piping, over long distances before it can be used;
- It is often located close to the intended users;
- If developed properly, it is a source of water that should be available all year round.

Fig.5 How Man's activities pollute surface water source



2.3.2 Disadvantages of Groundwater

- It usually needs a pump or an arrangement to lift the water to the surface (which adds to the cost of development);
- It is often high in mineral content (e.g. Magnesium and Calcium salts, or Iron and Manganese). Although this depends on the type of rock through which the water flows. High levels of magnesium and Calcium salts make it difficult for soap to lather. Iron can cause staining and an oily film on water and clothes. Manganese also stains clothes. These disadvantages have and economic implications for users;
- Although as said earlier, groundwater is cleaner than most surface water sources and so it can often be used without treatment. However, if it is polluted this can be difficult and expensive to remedy, or will take many years to do so naturally.

2.3.3 Ways in which groundwater becomes polluted

- Badly designed pit latrines and other onsite sanitation methods may cause pollution especially where the water table is high;
- Badly maintained pit latrines and other onsite sanitation methods
- Large concentrations of faeces on the ground (e.g. from animal feed lots or the intensive use of veldt as a defecation site);
- Where concentrations of solid waste is dumped on the ground and rain falls on it, the water formed from this (leachate) sinks into the ground;
- Irrigation return flow contaminates by increasing groundwater salinity.

2.3.4 Sources of groundwater:

2.3.4.1 Springs

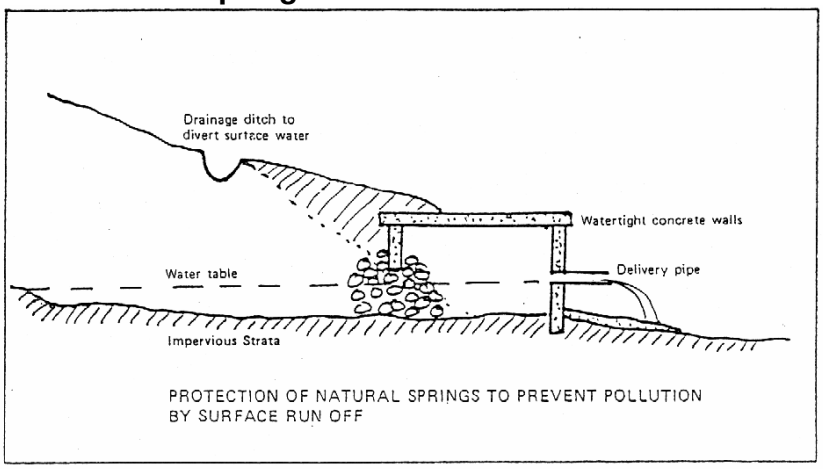
We are all familiar with springs. Springs are underground water that comes to the surface, through cracks or weaknesses in the ground as a current of flowing water.

Springs can be used without treatment especially if measures are taken to protect the source from pollution.

We can protect springs from pollution by:

- ✓ Using a brick or concrete lining so that the water flows directly into a pipe without ever being open to pollution from outside, see Figure 6;
- ✓ Drums can be used instead of bricks to protect the spring. The springs become drum lined wells.

Fig. 6 A 'Protected' Spring



2.3.4.2 Wells

Wells are holes in the ground that intersect the water table in water bearing rocks. There are many types of wells ranging from Waterholes (dug with sticks till water gathers in the hole) to Boreholes (dug with sophisticated equipment and may be several hundred of meters deep).

2.3.4.2.1 Hand dug wells:

These are a common source of water in many developing countries, though they are not common in the Eastern Cape, perhaps due to the possibility of saltwater intruding into the usually shallow wells. Hand dug wells are prone to pollution from airborne materials, and runoff from the surface.

To protect hand dug wells from pollution, some features can be added:

- A cover, which should slope so that water does not remain on it, but washes down its sides;
- Concrete Apron - this is a concrete slab/pavement around the well. It should slope such that water is carried away from the well and does not stagnate around it;

- Parapet - a raised parapet should be constructed around the wells outer rim to protect the well from the inflow of outside dirty water. The wall should be high enough to prevent children and animals from falling into the well;
- Lining - when a well is built, the owners must ensure that it is lined. Wells can be lined with brick, stone, and masonry. A lining is necessary because it:
    I. Protects during construction against collapse and caving in;
    II. After construction it prolongs the life of the well;
    III. It prevents polluted surface water from entering well;
    IV. It acts as a foundation and support for the well top and any pump that is fitted on the well after completion.

2.3.4.2.2 Tube wells

Tube wells consist of a series of pipes usually made up of galvanized iron, sunk or driven into the ground by repeated impact on the water-bearing layer. It is fitted with a strainer at the bottom and a handpump at the top. They are suitable for small capacity water supplies, due to their small yields. They however have the disadvantage of only being useful in unconsolidated ground because the drive point might be damaged in gravel or rocky terrain.

2.3.4.2.3 Boreholes

Boreholes are drilled wells with depths of over 300m and small diameters of 15-20cm or a maximum of 60 cm. They serve small communities due to their very high yield and they are the types of wells the government in South Africa and other countries use for bulk water supply (when groundwater is the source) e.g. in the Mooiplaas area. Their limitation is that they are expensive to drill for the less economically advantaged.

2.3.4.3 Dams/Watering Ponds

Watering ponds or dams in the Eastern Cape rural context mean natural collections of water (rainwater) in shallow depressions. They are usually of poor quality as they are not protected in any way and will need to be treated extensively if their intended use is drinking or cooking.

PART 2 - Water Use and Treatment

Learning Objectives

At the end of PART 2 of the training participants should have achieved the following Learning Objectives, and be able to:

1 Impart learning on uses and re-uses of water sources as a means of reducing the burden of procurement;

2 Obtain information on uses of different water sources in the target community;

3 Impart learning on the importance of caring for water from collection through to consumption;

4 Impart learning about the meaning of poor water quality and simple ways of identifying poor water;

5 Obtain information from community on problems experienced within target community from use of poor quality water;

6 Impart learning on the role of man in reducing the quality of water;

7 Obtain information on the quality of water used in the communities;

8 Obtain information on practices in the community that reduce the water quality;

9 Impart learning on ways to improve water quality at household and community level;

10 Work with target group to identify, design practicable and affordable ways to improve water quality at household and community levels;

11 Impart learning on preparation of 1% chlorine solution, and how to vary the dose according to the quantity of water to be treated.

PART 2 - Water Use and Treatment

CONTENTS

PART 2 - Water Use and Treatment

1. Domestic Use and Care of Water

1.1 Uses of different Sources of Water

Different water sources can be used or consumed in different ways to reduce the cost and burden of procuring water. Water of poorer drinking quality, for example stream/river and water from dams can be used for gardens, farming and washing of clothes whilst rainwater, which is of better quality, is best used for drinking and cooking. In the Mooiplaas area, where rainwater is the most preferred source for reasons related to unpopular, salty, tap water taste in the community. Rainwater is reserved for drinking and for making tea, whilst tap water is used for cooking. According to the results of the Project household survey, the unpopular taste of the tap water is not noticeable when used for food.

1.2 Care of water from collection to consumption

Water used in a home is handled at various stages namely:

1.2.1 Collection
1.2.2 Transportation
1.2.3 Domestic storage and use

It is important that care is taken though all these stages not to contaminate the water with germs, otherwise the water that is finally consumed is of poorer quality than the source it was collected from. It has been observed from water quality tests that in rural and urban poor communities the water in the storage containers is frequently of poorer quality, in other words has more germs, than water from the source, e.g. the tap or protected spring.

Problems associated with water are related to:

I. Health - health related problems occur when one contracts diseases from drinking poor quality water;

II. Economic – economic related problems occur from loss of income due to ill health and the cost of buying drugs. Even where the government provides drugs free, transportation to and from the hospital is done at a cost to the family.

1.2.1 Collection

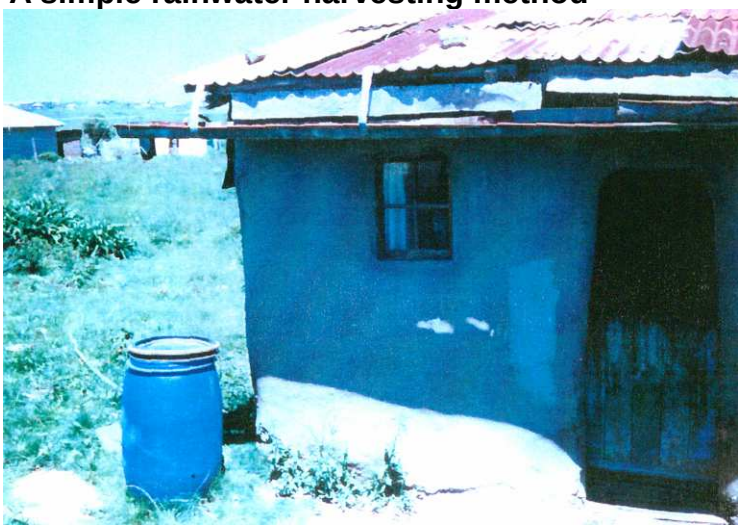
- Well washed collection containers should be used. **Figure 7** shows this happening in Mooiplaas. Though note the contamination hazards posed by poor drainage and litter around the tap;

- If rainwater is collected, it can be contaminated from the roof. If possible, allow the first rains to wash accumulations off the roof before collecting it.

The owner of the house in f**igure 8** said that he waits for the first rains before he takes the cover off his rainwater collector;

Fig. 7 A lady by a standpipe cleaning her water collection containers

Fig. 8 A simple rainwater harvesting method



Precautions:

- Keep a cover over the well to protect the water before and after collection;
- If the source is a river, try to make sure that you fetch water from the area set aside for the purpose you want to use it for. Many communities that have rivers flowing through them designate some stretched for bathing, washing, drinking, and defecating. This is a good idea, though the only problem is that the same river often flows through more than one community, so that one community's washing water becomes the drinking water of another community downstream;
- Dam water is used for cattle and so is likely to be contaminated. Faecal matter is clearly visible by the collection bucket in **figure 9** at Ncalukeni.

Fig.9 Lady scooping the cleaner dam water off for clothes washing

1.2.2 Transportation

Even when water is transported through pipes, care must be taken of the pipes to ensure that they are not damaged and allow inflow of dirty water from the outside. Illegal connections to the pipes could introduce contamination to the whole supply and should be sanctioned against by the whole community.

1.2.3 Domestic storage and use

- Always make sure your hands are clean when handling water especially water meant for drinking and cooking;
- Store water in a clean container;
- Keep water in a container with a cover;
- Teach family members not to make hand contact with the stored water;

Care of water at this stage is important because water can be clean at the source but if not stored properly, it results in reduction of water quality. As has been said earlier poor water quality has negative health and economic implications. For example if water is not covered properly, flies that have earlier come in contact with faeces may land on the uncovered water, thus putting faecal germs in our water which could cause diarrhoeal or other diseases.

It is better to store water in a container with a spout or a tap, so that we do not need to dip our hands into the containers. Where this is not possible, use clean hands and only one cup or vessel to take water from the storage container.

Tanks are a common way of storing water. Materials and sizes of tanks vary depending on factors such as income level and population of household. Tanks can be made of plastic, metal, cement and ferro-cement. Different materials have different advantages when cost and life span is considered. Whatever the size or material used all tanks should be washed regularly. The surroundings should be kept clean and if possible plastered with concrete to prevent pools of water forming, which create insect breeding sites, and to make cleaning easier.

The preferable colour of the tanks is black as this reduces the light entering and therefore reduces algal growth. Where the tank cannot be black outside then the inside can be painted.

Remember, improper care of water at any stage can cause poor water quality

2. Water Quality Treatment

2.1 Defining 'water quality', & The aim of water treatment

Good water which is safe, i.e. not harmful to human beings, is an essential basic need. The human being can survive for longer without food than without water. We need water to perform various functions. However water of unacceptable quality or polluted can kill or otherwise adversely affect health.

Water is poor in quality if it is not acceptable for its intended use. That is, if it:

- stains clothes
- has a taste
- has colour
- has a smell, or
- has a high amount of visible impurities

2.2 Ways in which we reduce water quality

(See back to **figure 5**)

2.2.1 The improper disposal of household wastes

If we do not dispose of the wastes from our households properly, but leave it in open dumps or left outside our houses, they become a potential source of pollution to our surroundings, including our water sources. This is because the waste:

- is an attraction to flies, rats and other germ breeders, and;
- rain can wash the harmful substances produced from the unkempt waste into our rivers or into the groundwater resulting in us drinking our wastes!!

2.2.2 Improper disposal of human and animal faeces

When we defecate on open ground and leave faeces uncovered, or when we use toilets but do not care for the toilets properly, then faeces can come into contact with our water sources in the following ways:

- Rain can wash the exposed faeces into river and ground water;
- Flies and other insects can land on the exposed faeces on the ground or in poorly maintained toilets. These flies may land on uncovered drinking water, thus contaminating it with faecal germs that could cause diarrhoeal or other diseases.
- Animals can touch the faeces with their mouths and bodies (e.g. pigs in the veldts) and carry some of the faeces sticking to their bodies and mouths to our water sources when they go to drink from them.

2.2.3 Poor personal hygiene

We ourselves can carry faeces from our hands, when we use the toilet, or clean up our children's faeces but neglect to wash our hands thoroughly before collecting, transporting, storing or consuming water.

2.2.4 Improper Use/Care of Water

Examples include:

- We treat our water very badly, e.g. we defecate and throw garbage in them;
- We do not collect it, transport it, store it or consume it carefully. For example, our children come in from playing outside, and without washing their hands put water dip cups into the storage container.

2.3 Household water Treatment Methods

Water can be treated to make it of acceptable quality and safe to drink. The means by which this is done depends on the convenience of method, objective, cost and volume of water to be treated.

2.3.1 Boiling

This is a method that aims to kill the germs in water. We all know about boiling but not all of us practice this method of taking care of our water. This might be for the following reasons:

- Boiling needs some form of fuel which might have cost implications;
- Boiling requires a period of cooling;
- Some people complain about the ‘flat’ taste of boiled water.

Points to be noted about boiling:

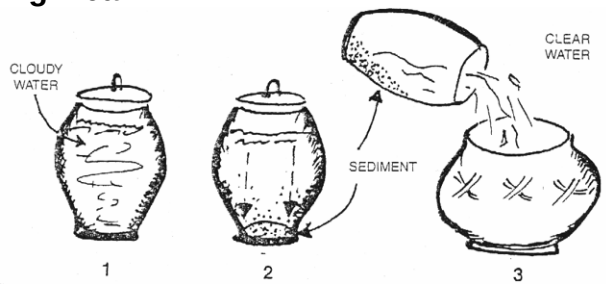
- Boiling is only practical for small quantities of water;
- There is nothing to prevent the water getting bad again if not cared for properly;
- Water must boil for at least 5 minutes to ensure that the pathogens are killed.

2.3.2 Storage

The simplest method of treating water is to store it in a covered tank. Some treatment may be obtained by careful design of storage tanks to ensure a slow and even movement of water from the inlet to the outlet, as in a sedimentation tank. This will permit some silt to settle out, and allow time for some pathogens to die off. If water is stored for at least 48 hours, for example, bilharzia will become non-infective.

A way of achieving this is known as the **'Two pot storage method'.**
To use this method you need 2 storage containers and to follow these steps, shown diagrammatically in **figure 10a**:

Fig. 10a



Step 1: Water is stored in container 1 and left untouched for 24 hours, after which:

Step 2: The top part of the water is poured into container 2. The bottom part of the water in container 1 is poured out and can be used for washing or watering plants, after which:

Step 3: Container 1 is rinsed;

Step 4: New water is put into container 1, & it is left covered for 24 hours. In the mean time:

Step 5: The water in container 2 is used for all purposes, until it is almost finished. The bottom part is then poured out on the garden. Then:

Step 6: New water is put into container 2 and left covered and untouched for 24 hours;

Step 7: The household then begins to use container 1 and the cycle continues.

This method ensures that water in each container has stayed for 24 – 48 hours before being used, by which time there will have been a considerable reduction in the amount of germs in the container.

Points to be noted about storage:

- It does not kill as many germs as boiling
- It means that a household must have 2 storage containers
- Water must be stored carefully with a cover.

2.3.3 Filtration

There are many methods of filtration, some of which will be discussed here. These can be very effective at removing dirt, bacteria, and parasitic eggs, but the smaller germs (viruses) will pass through. The water should therefore be used for cleaning and washing rather than drinking. Only boiling or chemical disinfection are truly effective.

2.3.3.1 Simple Filtration

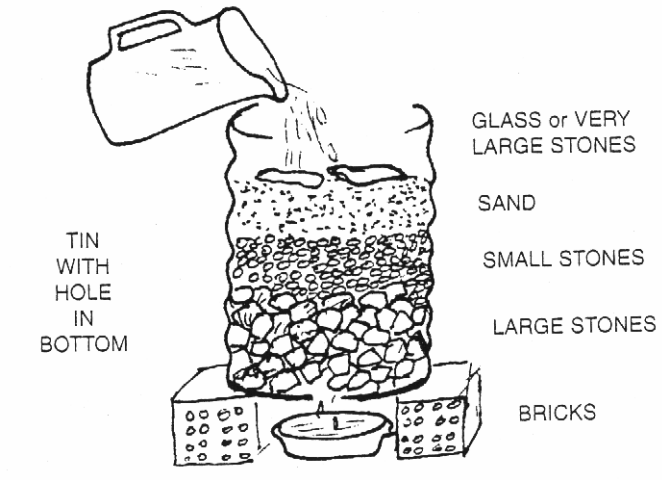
In this method a piece of clean white cloth is stretched over a pot and the water to be filtered is poured through the cloth into the pot. The filter retains large particles and some disease causing organisms. This method of water treatment will not take care of all germs.

2.3.3.2 Domestic Sand Filtration

A domestic water filter can be made for virtually no cost by using a container filled with layers of stones and sand, such as a one-metre deep topless barrel. The barrel should be thoroughly cleaned and a hole made in the bottom into which a tap is placed. The barrel should then be mounted on bricks high enough for the household collection container to receive the tapped water.

The first layer, of 15-20cm, should consist of stones 2-3cm in diameter, placed in the bottom so that they do not block off the pipe opening. Smaller stones the size of peas should be spread over the first layer to a similar thickness. Then a 50cm layer of fine sand is put on, followed by flat stones or large (clean) pieces of glass to keep the sand from being stirred up in the water. The barrel can then be filled up with water (up to 3-5cm from the top) and covered. The filter will need cleaning every two or three weeks. (**Figure 10b**)

Fig. 10b Domestic Sand filtration



2.3.4 Solar disinfection

This is a method by which water is put in the sun for a period of time and the water kills the germs in the water. Water can be put out in the sun in a clean, transparent covered container, the shallower container 2 is more appropriate as it has greater surface area. (**Figure 11**)

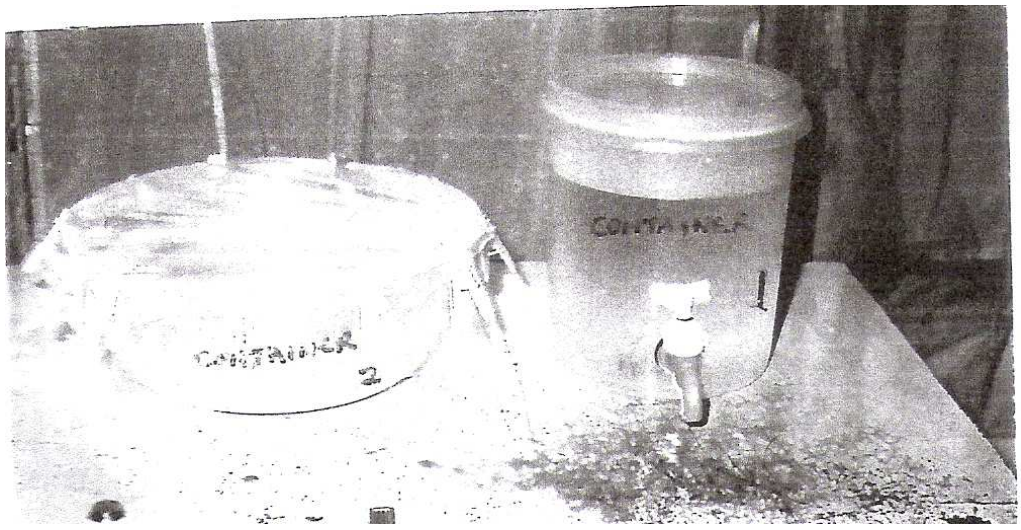


Fig. 11 Solar disinfection

The disinfection can be even more effective if the container is placed on an elevated surface e.g. a corrugated sheet roof.
Points to note about solar disinfection:

- Water must be put in the sun for a sufficient period of time, (period will vary with climate).
- Solar disinfection might not kill germs in very dirty water;
- Some types and materials of containers and covers are better for solar disinfection (i.e. transparent white colour and plastic material is best as container);
- This method can still be used when it rains if the period of sunshine during that day is long enough.

2.3.5 Chemical

Certain chemical substances can be added to water to improve the quality. Examples of these are iodine, alum and chlorine.

2.3.5.1 Iodine

- It is available in tablet form, and as a purple liquid;
- High doses are needed to disinfect water
- It is highly effective against viruses
- It might give a medicinal after taste

2.3.5.2 Alum

This is a small hard stone like substance, which is added to water in order to reduce cloudiness. The alum makes dissolved and suspended substances in water stick together making them heavier and thus causing them to settle to the bottom. This method can be unpopular for two reasons:

- It might make it more difficult for soap to form a lather;
- It might cause treated water to have a noticeable taste.

2.3.5.3 Chlorine:

Chlorine, if added to water in the right quantities, not only kills the germs but also remains in the water to kill other germs that comes into contact with the water after the chlorine was added.

Points to note about chlorine:

- It is important to know the amount of water to be treated as the amount of chlorine needed varies with the volume of water;
- It is important to reduce the amount of dissolved solids in the water. This can be done by filtering or leaving the water to stand for a while, so that sediments settle to the bottom;
- Chlorine is a very strong substance so care should be taken when handling it;

- It should be stored properly in dry, tinted well sealed, containers;
- Metals should not be used to store or to dispense it. Plastics are preferable;
- Contact with skin and prolonged exposure to the fumes should be avoided;
- Water that has been treated with chlorine should be allowed to stand for at least 30 minutes before use to allow time for the treatment to be effective.

Types of chlorine:

- HTH - in a powder form and usually supplied in drums;
- Chlorine gas – it is available in a gaseous form and not suitable for use on a household level. It is usually used by well trained people in bulk water schemes;
- Bleaching powder/ chlorinated lime – a whitish powder used at household level;
- Sodium hypochlorite – in liquid forms. Brand examples include Jik, Parazone and Milton;
- Chlorine tablets – in tablet form. Never use swimming pool tablets - they contain poisons!

Preparation of 1 litre of 1% chlorine solution:

A stock solution of 1% chlorine can be prepared by taking quantities of chlorine specified in the **table 1** below. The stock solution is kept and the required amount of the solution is added to the water to be disinfected. The stock solution should not be kept for more than one month. Any portion unused after a month should be thrown away. 3 drops of 1% solution can be used to .95l of water (take 1 table spoon away from 1 litre coke)

Table 1. Making 1 litre of 1% chlorine solution

Chlorine source	% of available chlorine	Quantity required	Approximate measures
HTH	70	14g	1 heaped tablespoon
Bleaching powder	30	33g	2heaped tablespoons
Stabilised tropical bleach	25	40g	3 heaped tablespoons
Liquid household disinfectant	10	100ml	7 tablespoon
Liquid laundry bleach	5	200ml	14 tablespoons
Antiseptic solution e.g. Milton	1	1 litre	no need as it is already 1 % solution

Table 2. Chlorine Doses for Common Containers Found in Communities:

Size of container (litres)	Volume of 1% chlorine solution prepared (ml)
12	33.75 (7 tablespoons)
25	67..5 (13 $^{1/2}$ table spoons)
250	675
500	1350 (1 $^{1/3}$ coke bottle)

- a coke bottle = 1 litre = 1000ml
- Plastic medicine spoon = 5ml
- Metal household teaspoon = 2.5ml

2.4 Bulk water treatment

This is how water authorities treat large volumes of water:

Step 1: Millions of gallons of the untreated water (sometimes from a river and thus very dirty) is directed though large pipes to the water treatment plant;

Step 2: The water is then directed to flow into large sedimentation tanks as alum is added;

Step 3: The top clear water is then directed to flow into large sedimentation tank and more alum is added. (Alum as was explained before, allows the tiny particles to stick together, so they can be heavy enough to sink to the bottom;

Step 4: The clear water from the sedimentation tank is filtered by slow sand filters to remove more germs out of the water. The filtered water is then directed into large tanks and chlorine is added to kill any remaining germs;

Step 5: The water is tested in the laboratory to make sure that it does not contain germs.

Step 6: The clear, clean and germ free water is pumped through the main pipes to the taps of the consumers;

Step 7: Open your tap and clean water flows.

PART 3 - Water-Related Ill Health

Learning Objectives

At the end of PART 3 of the training Participants should have achieved the following Learning Objectives, and be able to:

1. Explain how Man's behaviours can lead to water-related ill-health;

2. Understand the key differences between water-borne, water-based, water-related, and water-scarce diseases;

3. Investigate with the target groups:

3.1 Their experience of what diarrhoea is;

3.2 Whether it is perceived as a problem in their communities;

3.3 Locally appropriate and effective treatments for diarrhoea.

4. Recognise the signs and symptoms of dehydration;

5. Demonstrate how to make oral rehydration solution with the preferred method of a preparatory sachet of salts, or with the correct proportions of home-made ingredients;

6. Explain how the increased household use of water can prevent the transmission of diseases;

7. Recognise the potential for chemical contamination of household water from source to consumption.

PART 3 - Water-Related Ill Health

CONTENTS

PART 3 - Water-Related Ill Health

Improper care of water can result in poor water quality and this in turn leads to problems for consumers, many of these problems are related to health, in terms of disease suffered, and to finance, in terms of money spent on health care.

Bad water can make us ill in different ways:

- When we drink bad water;
- When we bathe in streams that are polluted;
- When we neglect personal hygiene, or use less water than we should because of cost or effort required to get the water;
- When we neglect our surroundings and allow standing water to form, in which disease causing insects breed.

1. Water-borne disease

Water-borne diseases are diseases that you get when you drink water that has been contaminated with germs.
The germs get into water in various ways:

- When we don't dispose of refuse properly, rain washes it into our water sources;
- Faecal matter that is left exposed on the ground can also be washed into our water sources;
- Flies land on exposed faecal matter and carry the faeces to our water if not stored properly.

Examples of water-borne disease are: Cholera, gastroenteritis, amoebic dysentery, hepatitis, typhoid, leptospirosis.

The main way to prevent water-borne diseases is by preventing faeces from coming into contact with food and water. This can be done by:

- Improving water quantity and quality;
- Washing hands when you have defecated or cleaned child's faeces
- Covering food and water;
- Washing hands before eating;
- Disposing of faeces properly, in well-maintained toilets;
- Disposing of refuse properly in well-maintained sites or by burning.

1.1 Diarrhoeal water-borne disease

Water-borne diseases, like cholera, and dysentery all have a common symptom in addition to other symptoms of these diseases. The common symptom is known as diarrhoea and so these diseases are jointly known as 'diarrhoeal diseases'.

What is Diarrhoea? (Urhudo)

Diarrhoea, also referred to as runny tummy/stomach, is the body's way of getting rid of germs in the intestines that have been taken in through the mouth. Examples include bacillary dysentery, salmonellosis, amoebiasis, giardiasis and cholera. Although the germs may have been swallowed in small quantities, many find the conditions in the intestine ideal for their multiplication. Diarrhoea is the way the germs can best contaminate the environment and find their way to their next 'host'. These germs follow the so-called 'faecal-oral routes of transmission' which are explored in the 'contamination routes & barriers' tool.

Most people experience loose stools from time to time will no ill effects. However, if young children pass more than 3 fluid stools in a day the loss of water and essential salts can cause dehydration. There will be no other symptoms in the early stages, other than the diarrhoea, perhaps with nausea and vomiting.
Examples of diarrhoea causing diseases include:

1.1.1 Dysentery (urhudo oluna matheke theke)

This can be of 2 types:

1.1.1.1 Amoebic Dysentery.

This is recognised by the following symptoms:

- Loose stools with blood, mucus and unpleasant odour;
- Periods of loose stool might also alternate with constipation. (hard stool). There is usually no fever.

1.1.1.2 Bacilliary dysentery;

This is recognised by the following symptoms:

- The diarrhoea starts suddenly; this sudden looseness of stool might come after a period of constipation;
- Bloody stools;
- Mucus in stools;
- Fever;
- Vomiting, headache, joint pins, sore throat, loss of appetite, abdominal pains.

Treatment:

- Take a lot of liquid to replace the one the body has lost from passing frequent stools;
- Use a sugar and salt solution (ORS) which can either be bought or prepared at home;

- Liquids like, boiled rice water, pap, water boiled on leaves can also be used;
- Don't stop breastfeeding and don't stop eating.

Refer to hospital immediately if:

- The patient is malnourished;
- If illness is severe;
- There is no improvement after 3 days;
- If there is dehydration (see below for signs of dehydration);
- If the diarrhoea does not stop, it is important to see a health professional.

If not treated, the disease may lead to other serious diseases such as:

- Inner ear infection;
- Intestinal bleeding and maybe perforation or hole in the intestine;
- Infection of the lining of the brain;
- Pneumonia.

Prevention:

- Make sure you drink clean water, treat it if necessary;
- Wash hands thoroughly before handling food;
- Cover food to prevent vectors like flies contaminating food;

1.1.2 Cholera (ikholera)

This is a water-borne diarrhoeal disease spread by consumption of food or water that is contaminated with the pathogen, usually from contamination with faeces.

This is recognised by the following symptoms:

- Abrupt, painless severe watery diarrhoea;
- Vomiting with intense thirst;
- Small quantity of urine;
- Muscle cramps;
- Rice water stool.

Treatment:

- Prevent dehydration;
- Prevent the spread to other people;
- Refer serious cases to hospital.

1.1.3 Giardiasis

Is a water and food borne disease.

Recognition:

- Bulky offensive, greasy, frothy, stools;
- It is unresponsive to normal treatment.

Refer to hospital immediately if:

- The patient is malnourished;
- If illness is severe;
- There is no improvement after 3 days;
- If there is dehydration (see below for signs of dehydration).

1.1.4 Re-hydration treatment for diarrhoea

Dehydration means loss of liquid from the body. There are signs by which you can assess how severe the dehydration is, as shown in **table 3**:

Table 3. Signs of dehydration, and their severity

Degree of Dehydration	Signs (two of the signs in each category should be present to classify the severity of the dehydration)
Moderate	Irritable
	Sunken eyes,
	Thirst
	Loss of skin rigor- when you pinch the skin on the abdominal wall and it takes longer than two seconds for the skin to return to its position
Severe	Delayed capillary refilling
	Apathetic/unconscious
	Sunken eyes
	Loss of skin rigor- when you pinch the skin on the abdominal wall and it takes longer than two seconds for the skin to return to its position

Other signs of dehydration include:
Vomiting, fever, stomach discomfort or pains, headache, fever and general feeling of being unwell.

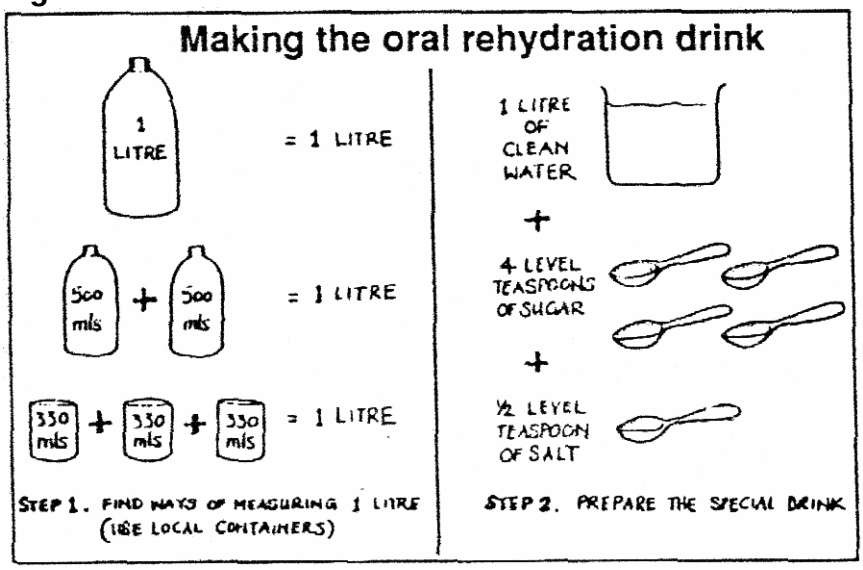
Rehydration by drinking Oral Re-hydration Solution (ORS)

This is available as sachets in the clinics but a homemade solution can be made by:

- ½ level teaspoon of table salt;
- With 4-8 level teaspoons of sugar (no more);

Dissolve it in 1 litre of boiled then cooled water.

Fig. 12



1.2 Non diarrhoeal water-borne diseases

1.2.1 Hepatitis A (Isibindi)

This is a water and food borne disease, e.g. you can get it by eating contaminated or raw shell fish.

Recognition:

- Minor flu like illness;
- Upper abdominal pains or discomfort;
- Fever;
- Jaundice (yellowness of the eyes) may not be present in children;
- Loss of appetite.

1.2.2 Typhoid Fever

It is transmitted frequently by water and food, which has been contaminated by healthy carriers during its preparation, or flies, can spread it from faeces to food.

Recognition:

- Severe abdominal pains and tenderness;
- Prolonged or high fever in a previously healthy person;
- Fever with a slower pulse than expected;
- Headache and possible convulsions.
- Diarrhoea may occur late in the illness, accompanied by continuous bleeding.

Treatment:

- Prevent dehydration;
- Prevent spread in the household and the rest of the community;
- Notify;
- Refer all cases to hospital.

Prevention:

- Health education;
- Chlorination of drinking water.

2. Water based diseases

These are the diseases caused by infective agents spread by contact or ingestion of water. Examples are schistosomiasis, guineaworm and thread worm.

2.1 Schistosomiasis

This is caused by a type of worm, which has to develop in a snail which breeds in vegetation in slow moving water bodies. Human beings are infected when they bathe, wash etc. in these polluted rivers and streams. The worms are able to burrow through the skin and get into the blood system. It is possible, although less common to get schistosomiasis by drinking contaminated water. (**Figure 13**)

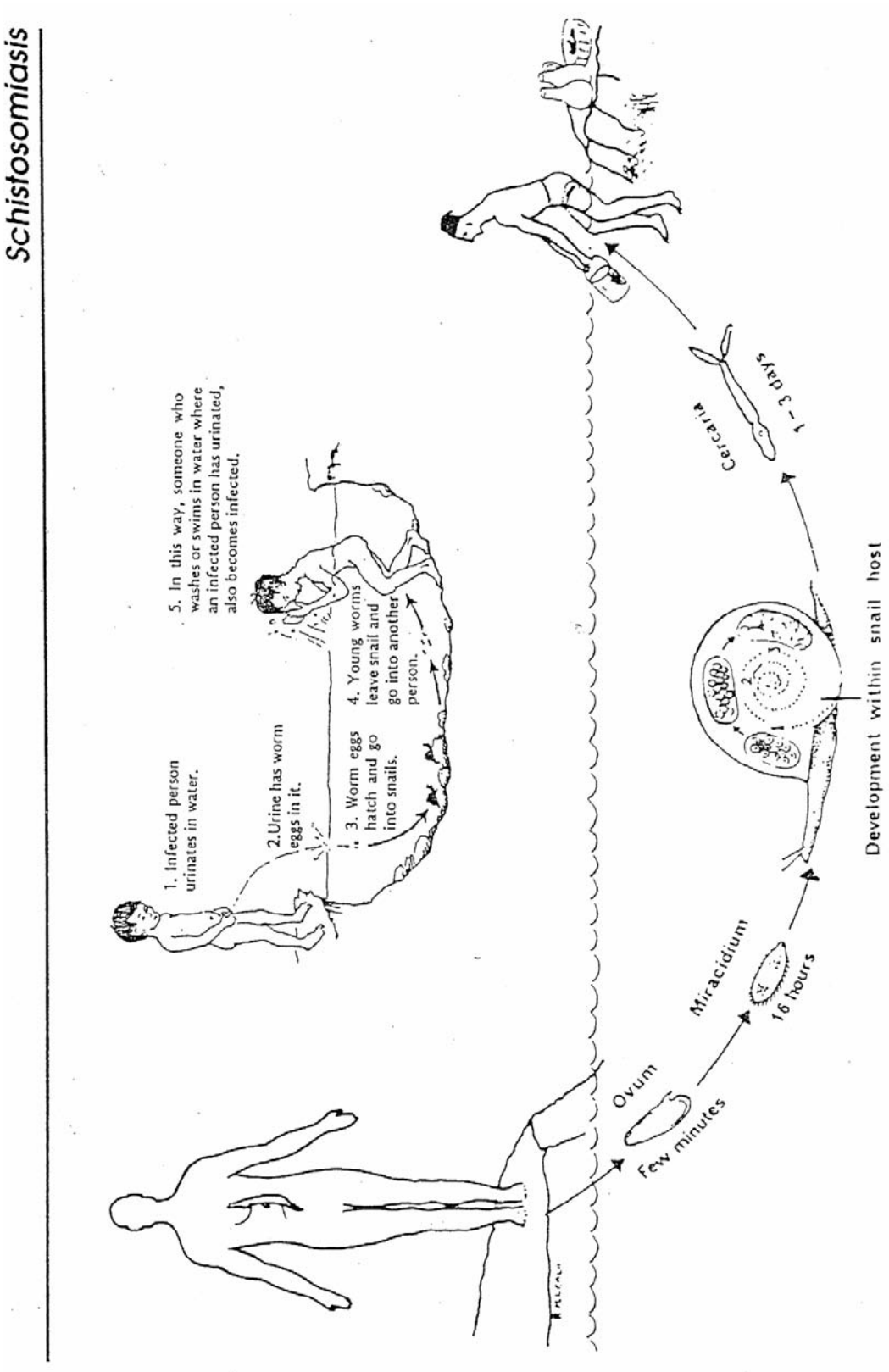


Fig. 13 The transmission of schistosomiasis

Recognition of schistosomiasis:

- Symptoms vary with location of the parasite in the body;
- Initially a rash and itching occurs, weeks later it worsens and develops to:
- Blood in urine;
- Abdominal pains;
- Low grade fever;
- Recurrent bladder infection.

This might progress if not treated into collapse of the kidneys and other organs. Another type of schistosomiasis pathogen occurs as diarrhoea, abdominal pains and blood and mucus in the stools.

Prevention:

- The disease can infect others when an infected person urinates in or near water bodies. Therefore everyone in the community must dispose of faeces and urine safely;
- Use piped or rainwater sources for drinking and bathing;
- By clearing vegetation near slow moving rivers. A less practical and potentially more environmentally damaging measure;
- Prevention of swimming in polluted rivers;
- Use logs to make bridges to cross small streams;
- Water can be collected from rives and dams at sunrise when the risk of infestation is lowest. Then keep the collected water (without snails) in a container for 48 hours. Within this period the worms will have died.

Treatment:

- The disease can be treated in the hospital.

2.2 Thread worms

Recognition:

- White and thread like;
- Anal itching which is worse at night;
- Self infection is common.

Treatment:

See Part 4, Sanitation

3. Water related diseases

These are diseases contracted from insects, which live close to water:

3.1 Malaria

Malaria is caused by mosquitoes**,** which breed in stagnant water in poorly maintained environments, or in poorly maintained toilets. Mosquitoes bite man and transfer an infection that causes fever, chills and muscle pain. In the Eastern Cape mosquitoes are prevalent during the rainy season from October till June, but malaria does not occur as far south in this country.

Recognition:

- Severe headache;
- Sweating, fever above 38^0C;
- Muscular and joint pains;
- Nausea;
- Shivering and sweating, and in severe cases there may also be:
- Diarrhoea;
- Fatigue (weakness);
- Difficulty in breathing and cyanosis;
- Compilations can occur in high-risk groups such as pregnant women and children under 5 years of age.

Prevention:

- Reducing contact with mosquitoes can prevent malaria;
- Don't allow standing water to form around your environment;
- Prevent contact with mosquitoes by using protective gear. (bed nets, window nets, creams), spraying with chemicals.

Treatment:

- Refer all patients to hospital.

3.2 Onchocerciasis

This is caused by a type of fly the black fly. It breeds around surface water. It infects people by biting. If left untreated this disease can lead to blindness. It is not a problem in the Eastern Cape. In Africa it occurs as far South as Angola to the West, and Malawi to the east.

Prevention:

- By clearing vegetation;
- Spraying the water bodies with chemicals and preventing human contact with the flies.

Treatment:

- The disease can be treated in hospital.

4. Water scarce diseases

These are those diseases that when people use less water and neglect personal hygiene as a result of the considerable effort to obtain water. Examples of this are trachoma and scabies.

4.1 Trachoma

Trachoma: is an external eye disease, which left untreated, will cause blindness. There are cycles of infection and re-infection. It is a very common eye disease in dry, dusty areas and is more common in the northern parts of South Africa. The disease starts with irritation of the eyes.

Recognition:

- During childhood as chronic conjunctivitis – stage I
- Visible conjuctival follicles and papillae – stage II
- Severe scarring of the conjuctiva under the upper eyelid – Stage III
- Folding of the eyelashes – Stage IV
- Corneal scarring and blindness – Stage IV

Treatment:

- Prevent spread to others;
- Notify authorities;
- refer to clinic.

Prevention:

- Improvement of personal hygiene (handwashing);
- Provision of adequate quantities of soap and water;
- Washing the face every day with water and, if possible, soap;
- Avoid cleaning the face with a cloth (e.g. towel or handkerchief) which has recently been used by an infected person;
- Keep flies away from the eyes. They are attracted by the infected fluid discharge, and can carry the disease to the eye of another person.

The technique used for hand washing is important. For greatest effectiveness the hand should be washed with soap by rubbing both hands for at least 10 seconds and rinsing off under a stream of water either poured form a container or under a tap, not in a container.

4.2 Scabies

Scabies is a skin disease, which is highly contagious i.e. it spreads easily and usually more than one person in the house is affected. It is caused by small mites under the skin. **Figure 14** shows how easily scabies can spread.

Recognition:

- Little marks will appear on the skin and cause intense itching especially at night. This itching leads to scratching and consequently to other infections;
- Small burrows where the parasite has dug under the skin between fingers, toes, elbow areas and skin folds;
- Sores with pus due to scratching, and sometimes swollen lymph nodes or fever.

Treatment:

- All members of the household should be referred to clinic for treatment at the same time.
- If the clinic has no ointment make the following from 15 parts vaseline (petroleum jelly) and 1 part lindane. In many countries lindane is sold as cattle 'dip'.
  I. Wash the whole body vigorously with soap and hot water;
  II. Heat the vaseline and lindane and stir well;
  III. Smear the ointment on the whole body, except the face. Leave for one day and then bathe well;
  IV. Wash all clothes and linen in hot water and hang them in the sun;
  V. Repeat this treatment a week later.

Caution: Lindane is very strong and can cause poisoning if used too often. Do not apply more than once a week and be sure to bathe well after treatment.

Prevention:

- Cut finger nails and keep them clean;
- Bathe and change clothes daily;
- Avoid touching the skin, clothes or bedclothes of an infected person;
- Health education and reinforcement of the messages of good hygiene and proper treatment.

Fig. 14 A picture story illustrating the transmission route of scabies

5. Chemical water poisoning

These are diseases that are chemically related to water pollution e.g. Methaemoglobinemia and lead poisoning.

5.1 Lead Poisoning

This is a chronic disease that has many sources. It is a non-classical water disease and it can be contacted when water is stored, boiled, or beverages brewed in lead lined containers e.g. drums. Other possible sources include painted wood battery casing etc or traditional medicines containing lead compounds.

Recognition:

- Adults: personality changes, headache, loss of appetite, vague abdominal discomfort ends with vomiting, constipation;
- Children: clinical symptoms start with vomiting, ataxic gait, Seizures, alteration in consciousness, seizures and coma.

Treatment:

- Refer to a Clinic.

5.2 Methaemoglobinemia

This is a disease that affects young babies mostly, and it is caused by drinking water that has a high amount of nitrates. The babies have breathing related difficulties.

PART 4 – Good Sanitation

Learning Objectives

At the end of PART 4 of the training, participants should have achieved the following learning objectives, and be able to:

1. Show a broad understanding of sanitation;

2. Investigate with the target groups:

2.1 What “good” sanitation means to them;

2.2 The motivational factors which encourage good sanitation;

2.3 Examples of hazards caused by the poor disposal of waste;

2.4 Examples of “good” storage and disposal of waste practices;

2.5 How the community could work together to minimise the hazards.

3. Relate previous learning of diseases spread by faeces with the transmission routes and barriers illustrated in the “F” Diagram;

4. Assess if the transmission routes are being adopted by the community;

5. Understand the characteristics of the range of worms that can thrive in unsanitary conditions;

6. Differentiate between the solid waste and refuse management options more practical in urban as opposed to rural areas;

7. Explain the different options for hygienic human waste disposal and assess their suitability for promotion in the community.

PART 4 – Good Sanitation

CONTENTS

1. The definition of Sanitation

Sanitation refers to everything that concerns the cleanliness of the surroundings. That is absence of human and animal wastes.
We must remember:

- A good standard of sanitation does not essentially mean toilets but waste disposal that meets the objectives of sanitation;
- In the case of human excreta, in some instances good sanitation can be accomplished without toilets. Although where there is overcrowding, and potentially a greater concentration of sanitation related diseases, it is safer to use toilets:
- Poorly maintained toilets can breed mosquitoes, flies and harbor germs.

1.1 The importance of Good Sanitation

Good Sanitation is important for several reasons:

I. Health – Wastes left lying around end up in our dams, rivers, springs and contaminates our water and gives us disease when we use this water;
II. Waste left lying on the ground provide a breeding ground for disease causing germs which people can be infected by;
III. Economic – we lose money when we are ill and cannot work;
IV. Aesthetics – Most cultures believe that wastes are unsightly and therefore good sanitation also aims to remove these from sight;
V. Privacy and Safety – good sanitation aims at privacy and protection when people relieve themselves.

1.2 How germs are spread when sanitation is poor

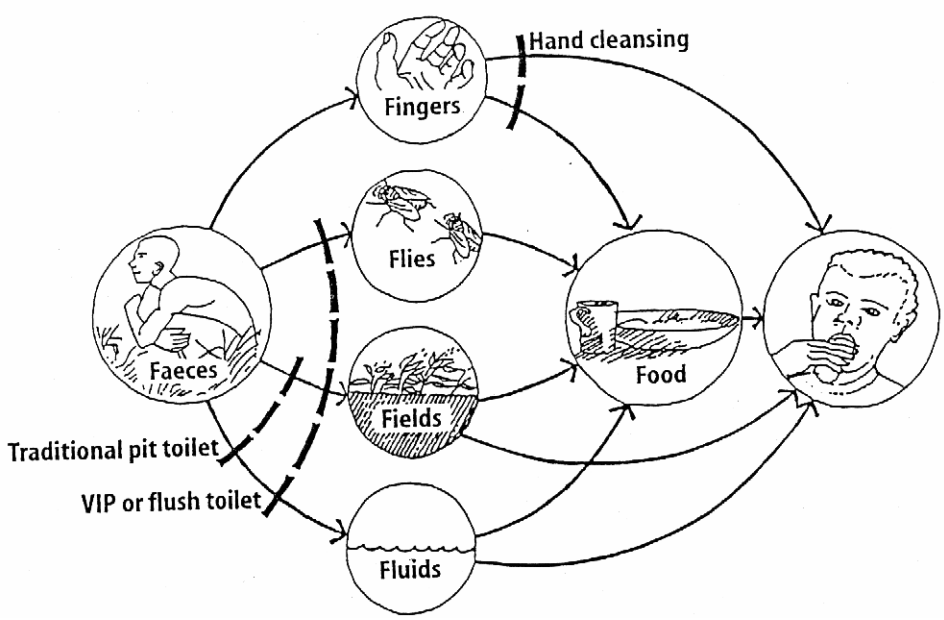
The so-called “faeco-oral route” spreads most diseases, caused by poor sanitation, or “anus to mouth”, illustrated below. This essentially means that germs in faeces need to get to another persons mouth, and be ingested, for the infection to spread.

Safe waste disposal is the goal of all types of sanitation, whether for solid wastes, domestic wastewater, or human and animal faeces. Whichever option is chosen, it must be managed in a way that ensures that wastes are kept away from water and food so that the germs that may be present do not end up in our mouths and cause disease.

Faeces, and the germs they contain, stick to our hands when we defecate or when we clean children’s bottoms and then don’t wash our hands. Minute traces of faecal material and germs can then get into our mouths when we make food for the house or take water from the storage container.

When we do not maintain toilets properly flies get a chance to come into contact with faeces. Faeces and germs stick onto the flies’ bodies and get into our food, and water (especially if we do not cover containers properly).

Fig. 15 The faeco-oral route of disease transmission



1.2.1 Examples of "anus to mouth" routes

- Anus→dirty hands→Mouth
- Anus→dirty hands→Uncovered food→Mouth
- Anus→Water Sources→Mouth
- Anus→Flies→Uncovered food/water→Mouth

1.2.2 Barriers to Faeco-Oral Routes of Transmission

A barrier refers to the measures you put in place to prevent faeces from getting to the mouth. Some barriers for each of the routes described above are shown below:

- Anus→Well washed hands→Mouth
- Anus→Well washed hands→Well covered food→Mouth
- Anus→Clean and well maintained toilets/well buried faeces→Mouth
- Anus→Clean and well maintained toilets/buried faeces→Well covered food→Mouth

1.3 Ways to assess if barriers are being adopted

- Finger cultures;
- Water quality spot checks on storage containers;
- Toilets. Are they clean?
- ✓ Is the slab free from faeces?
- ✓ Are walls free from faeces?
- ✓ Are flies absent?
- ✓ Is there water in the hand washing facility?
- ✓ Is there soap in the hand washing facility?

2. Sanitation and its relationship to health

It is already clear from earlier sections that many of the waterborne, water washed and water diseases depend on human wastes getting into water, food or people's mouths. Therefore, they may all be reduced by measures aimed at improving waste disposal as well as water supply. A number of infections, however, are only affected by improvements of sanitary facilities.

2.1 Infections reduced by good sanitation

Some of the diseases that are not reduced by improvement of water supply and only but by improvements in sanitary facilities are:

2.2.1 Hookworm

(All worms are known as intsulube although hookworm is too small to be seen with the eye)

Contact Route

Man→Soil→Man; penetrates the skin from damp faecal contamination soil, usually through the foot. In so doing they produce a dermatitis (ground itch). The hookworms are a major problem in damper tropics. They live in the small intestine and cause major blood losses into it acting as a cause of anaemia. One of the types, which are less tropical, may be spread when it penetrates the mucous membrane of the mouth when water containing the larvae is consumed.

Recognition:

No symptoms or pain, unless a massive number of worms are present, but causes severe anaemia.

2.2.2 Whipworm

Contact Route

Man →Soil →Man. Indirect transmission, particularly of through pica or ingestion contaminated vegetables. Eggs passed in faeces requires a minimum of 10 - 14 days in warm moist soil to become infective. Ingestion of infective eggs is followed by hatching of the larvae in the intestine and their attachment to the intestinal wall, where they develop into mature worms, producing eggs within 70-90 days.

Recognition:

If infection is light, there are no symptoms however heavy infections can show as:

- Abdominal pains/discomfort;
- Diarrhoea;
- Possible anaemia and rectal prolapse;
- Weight loss

2.2.3 Ascaris, or common roundworm

Contact Route:
Man →Soil →Man. This worm lays very numerous eggs, which escape in the faeces and mature in the ground. It becomes infective to man if taken in through the mouth. They usually get into the mouth from fingers or food. Both water supply and sanitation improvement reduce the spread of the disease. The adult worms are over 10 cm long and they make the infected person thin because they eat the food hosts and cause problems in the abdomen.

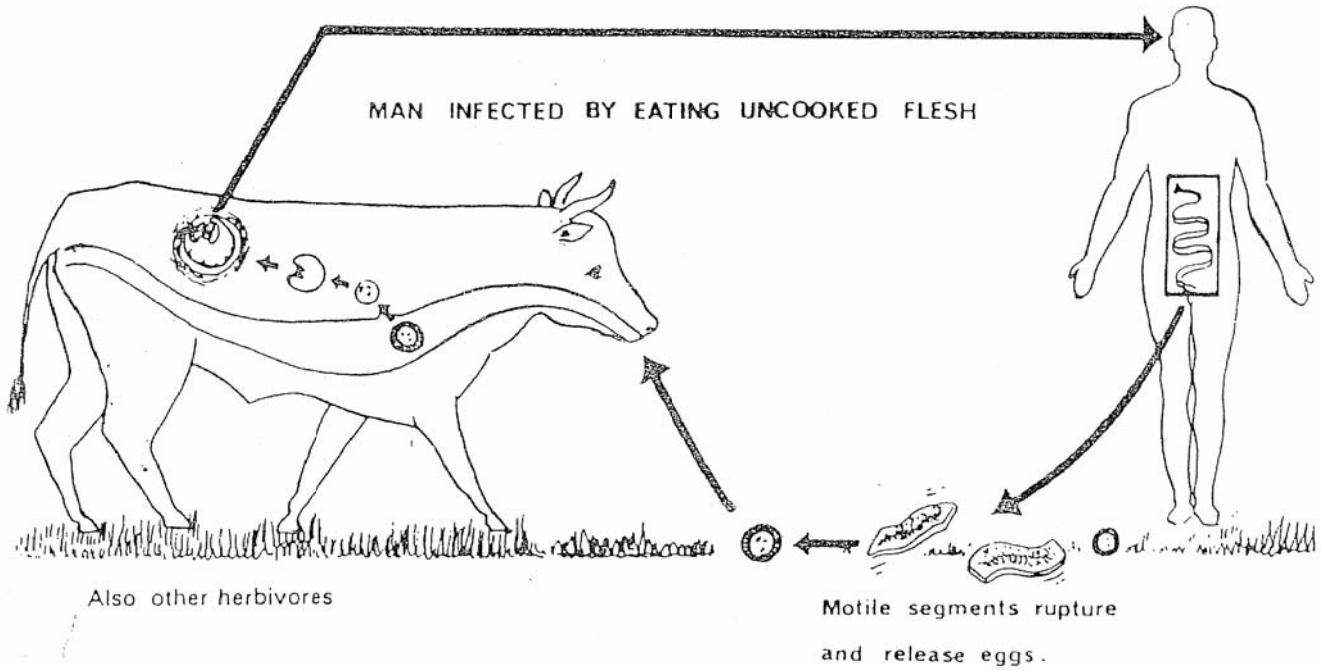
2.2.4 Tapeworms (Taeniasis)

There are two species of tapeworm. One completes the lifecycle in cattle (beef tapeworm, or *Taenia saginata*) and the other can spread via pigs (Pork tapeworm, or *Taenia solium*). The latter is more dangerous for humans as cysts can form in human flesh, including the brain, if the tapeworm eggs are swallowed.

The eggs of both species may remain viable in the environment for months. Unless treated, the worm can remain in the intestine for up to 30 years.

Fig. 16

The life cycle of the Beef Tapeworm, Taenia saginata.



Unlike Pork Tapeworm infections, man cannot infect himself by swallowing the Beef Tapeworm eggs he excretes. Beef Tapeworm cysts only form in the flesh of herbivores, as shown above.

2.2.4.1 Beef Tapeworm

Contact Route:

Man excretes tapeworm eggs $\rightarrow$ eggs in faeces eaten by cattle $\rightarrow$cysts in meat can survive if poorly cooked $\rightarrow$ meat eaten by Man, causing tapeworms to form in intestine. (see Figure 16)

Usually, the egg bearing sections of the tapeworms are passed in the stool and are ingested by the cattle. The eggs hatch in the cattle and invade the intestinal wall and are carried by the blood to the muscles where they form a hard shell. Humans are infected when they eat these hard shells as part of raw or poorly cooked meat.

The 'life-cycle of the Pork Tapeworm, Taenia solium
How this worm uses pigs to spread infections in man
cysts
When a person eats poorly cooked meat, the cysts become tapeworms in his intestines.
The cysts may cause headaches, fits, or death.
adult tape worm
segments
eggs
Eggs that enter the person's mouth from his feces, through lack of cleanliness, can form cysts in his brain.
The pig eats the eggs in the man's stools.
The worm eggs the pig has eaten form cysts in the meat.

Fig. 17

2.2.4.2 Pork tapeworm

Contact Route:

Man excretes tapeworm eggs →eggs in faeces eaten by pigs →cysts in meat can survive if poorly cooked →meat eaten by Man, causing tapeworms to form in the intestine. (see Figure 17)

Poor personal hygiene can cause the eggs in faeces → hands → mouth → embryos in intestine penetrate intestinal wall → travel in blood or lymph vessels → tissues where they form cysts, known as *Taenia* solium cystercersosis. If this occurs in the brain, it can cause epileptic symptoms.

Recognition:

- Flat white worms segments seen in stools;
- Vague abdominal pains;
- Diarrhoea;
- Weigh loss;
- Seizures and/or loss of vision, headaches (in cystercercosis);
- Nausea and vomiting

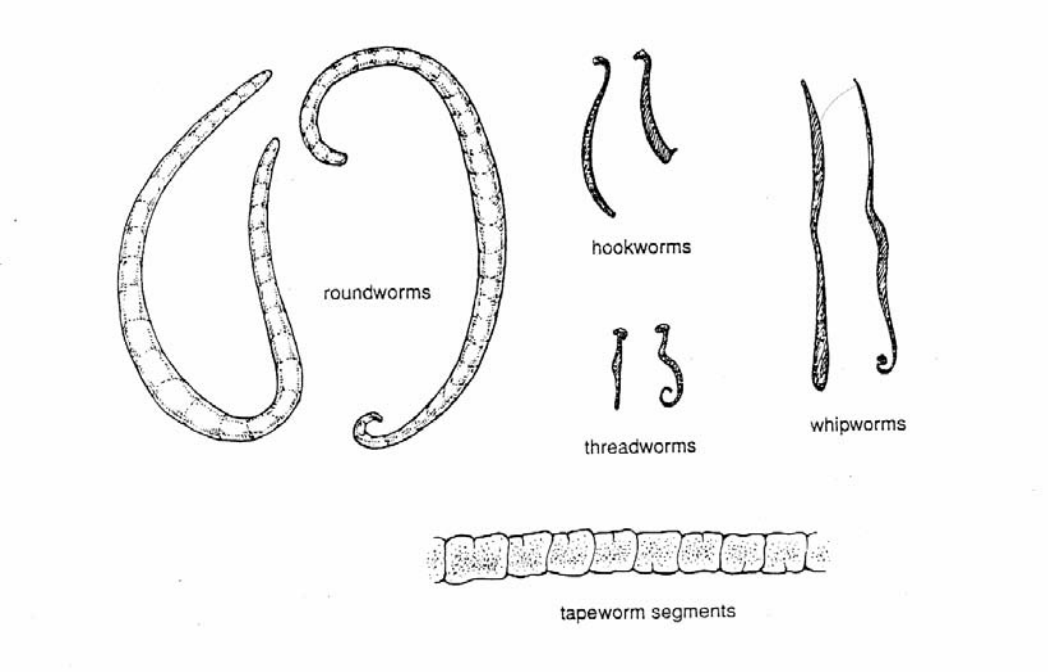
General Prevention of Intestinal worms:

- Education and counselling;
- Wash hands with soap and water;
- Keep finger nails short;
- Wash vegetables well or cook;
- Keep toilet seats clean;
- Do not pollute soil with faecal related matter;
- Dispose of faeces properly;
- Wear shoes.

Treatment:

- Refer patients to a clinic if they have abdominal tenderness, pain and vomiting and refer all pregnant patients. CNS cystercersosis is treatable in hospital.

The appearance of these worms is illustrated in the figure below.



3. Types of Sanitation

3.1 Solid waste & refuse management

This refers to all activities involved in disposal of refuse. Refuse is the collective name for all the parts of solid wastes (industrial and domestic), which may be found in the human environment. It consists of leftover, paper, unwanted metals, ashes and dust, dead animal's etc. The management of refuse consists of storage, collection, transportation and disposal.

3.1.2 Storage of Refuse

Refuse should be stored in a safe way before and during transportation to disposal sites. In the rural environment, a dustbin should be:

- Durable;
- Light;
- Water-tight;
- Easy to clean, and have;
- A fly proof cover.

The size of dustbin will depend on the:

- Number of people using it;
- Number of times it is emptied, and ;
- Method of collection. (It should not be too big if children are the ones emptying it)

3.1.3 Collection of refuse

In the rural environment, house-to-house refuse collection by the municipality is often not practicable or practiced. The lack of access roads for vehicles to collect refuses and the transportation costs are common reasons. Usually people carry their refuse themselves to the collecting depots.

Collecting depots take different forms:

- Open dumping spaces;
- Containers with or without wheels;
- Built structures at ground level or elevated with or without a roof.

3.1.4 Transportation of refuse

Vehicles are usually used to transport refuse to the disposal site. However, this is not practiced or practicable in rural environment. Often children carry wastes to the disposal site. It is important therefore to ensure that:

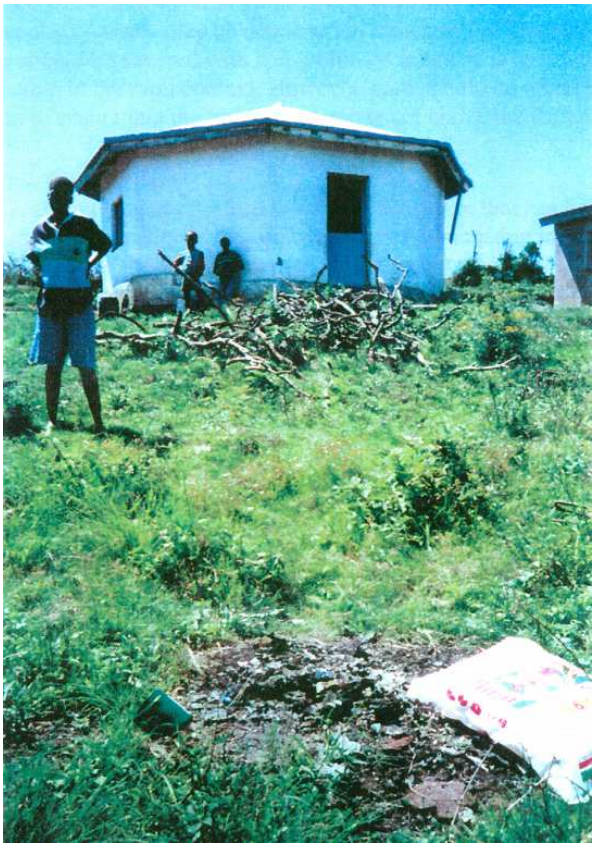
- The containers are not too big or too full for the children to carry;
- The refuse is thrown in sites designated for this purpose and not just around the house or along the way;

- Refuse is transported regularly to the disposal site before the refuse forms a breeding site for diseases carrying germs or insects.

3.1.5 Disposal of refuse

Refuse disposal is the term used to describe all the things that need to be done to ensure that refuse does not cause a nuisance to the human environment in terms of health, aesthetics, smell etc. Whatever the method chosen, it is important to prevent refuse coming into contact with food or water.

Fig. 18 A typical rural household refuse burning area



There are four main ways refuse can be disposed of:

I. Hide the refuse from the human environment;
II. Remove the refuse from human environment to other environment;
III. Stabilise the refuse, so that disease carrying germs are killed;
IV. Convert the refuse into other forms;
V. Reuse the refuse.

3.1.6 Controlled Tipping

This method is supposed to replace indiscriminate dumping onto any available space in the environment. In the method refuse is deposited at a place, it is compacted and then covered immediately with soil at least 15 cm deep. In the rural context - waste may be deposited in trenches. For complete sanitation the refuse should be covered with soil within 24 hours. It is uncertain if this is practicable in the rural context. However, care should be taken even in the rural context to ensure that the tip of the dump is not above surface of the ground.

3.1.7 Composting

3.1.7.1 Non-mechanical composting

In this method alternative layers of refuse and night soil are put in regular swallow pits. The materials are then regularly for about 10 weeks after which they are removed and put onto the ground for another period of 6 weeks. During this period, it also turned regularly.

Alternatively, another non-mechanical method may be used. The main difference being that the layers are thinner and the materials are not turned for up to 5months. However, because the compost is not turned, oxygen does not get in, making it more attractive for flies to breed and offensive odours form. The compost should therefore be covered up for aesthetic reasons.

3.1.7.2 Mechanical composing

The mechanical methods were designed to shorten the period of composing, loading, discharging. Turning may be done mechanically.

3.1.7.3 Incineration

This is the method of disposal where the refuse is burnt in order to reduce volume. The remainder of the wastes (those that can’t burn and the incinerated waste) has to be disposed of in the controlled tip. In developing countries, mud metal or concrete can be used to build incinerators, whilst in developed countries; the incineration is done in specially designed units. It is uncertain whether the practice of burning in the rural context can be classified as incineration, due to their inability to generate the very high temperature used in the furnaces.

3.1.7.4 Disposal at sea

Often coastal towns or towns near rivers often discard their refuse into these water bodies. This is not a good method of sanitation as it causes:

- Water contamination;
- Ill health;
- Death of organization e.g. fish that live these water bodies;

- Promotes the growth of unfavourable organism e.g. plants that reduce the use of the water;
- Disturbs fishing etc.

3.2 Human Excretal Disposal

There are many methods by which human faeces can be disposed. They can be classified into “on-site” sanitation. On-site sanitation refers to any method of sanitation where the waste is disposed of where it is generated. Off- site sanitation refers to the method of sanitation where the waste is transported to another location for treatment and disposal. The method chosen will depend on socio – economics, existing infrastructure, nature of ground rock and availability of water.

3.2.1 On-Site sanitation

Some examples of on-site sanitation include:

3.2.1.1 Simple pit latrine

This consists of a hand-dug pit, a slab, a riser and seat (optional) and a superstructure. The pit should be lined to prevent collapse of the pit. The slab is placed over the hole and used for squatting. Material for making the slab can be concrete or wood, though where wood is used cost and longevity have to be considered. Unfortunately, a strong slab of wood is difficult to make. Many such structures, in reality, are not safe or hygienic to use, as shown in **Figure 19**, below.

Fig. 19 A dangerous wooden slab and pedestal

The superstructure is a wall or shelter for privacy and may be made of mud, concrete, and masonry, depending on socio-economic level of the recipient. The ideal would be to have one latrine per family.

The Pit latrine is a minimum cost solution for a number of reasons:

- It provides for excreta storage;
- Allows seepage of urine and any water used for anal cleansing;
- Digestion of waste solids such that by the time the pit is ready for emptying the waste is no longer offensive.

A pit may take 4-15 years to fill up depending on the depth, materials used for cleansing etc.

3.2.1.2 Double pit latrine

This is a variation of the simple pit latrine, but consists of two pits under one superstructure. A pit is used until it is filled up, it is then covered up and the 2nd pit is used. This arrangement saves space and also allows for greater time for pit contents to become inoffensive.

3.2.1.3 Ventilated Improved Pit (VIP) latrine

Fig. 20 A VIP Latrine

This is another variation of the simple latrine. It consists of all the features of the simple pit latrine with the addition of:

- A ventilation pipe which extends upwards from the pit upwards out of the superstructure;
- A fly screen.

The vent pipe and the fly screen serve to reduce odours and flies in the pit. A vacuum is created in the vent pipe, which draws air up out of the pit. Flies in the pit are attracted to the light in the top of the pipe. They are then trapped by the fly screen and cannot find their way back and die.

3.2.1.4 The overhung latrine

An overhung latrine consists of a superstructure, with toilet seat or floor hole located above the tidal flat, river, canal and lake or sea beach. Defecation takes place either directly into the water for transport and eventual dilution or on the mud flat or beach to await the tide. Fishing villages have no alternative, as the only firm ground is usually many kilometers away.

This practice may be okay if the following conditions can be satisfied:

- Water is saline and therefore not used for drinking;
- There is sufficient current for dilution.

Unfortunately, often these latrines hang over freshwater rivers, which are used for drinking, and bathing. The saline waters are used for bathing, recreation and cleaning fish.

3.2.1.5 The bucket latrine

The collection of excreta in buckets, pans and baskets was common practice throughout the world, long before water borne systems were introduced. It used the principle of defecation into a container, which was removed for disposal, with or without treatment, at intervals into local surface water bodies or on the land.

The bucket latrine is perhaps the cheapest method as it does not require a huge capital outlay by the householder. However, it is undesirable as a method of excreta collection because:

- The collection procedure is nearly always aesthetically offensive;
- The bucket is often washed in the immediate vicinity of the house with the result that excreta is splashed over the pavement and the road;
- The open bucket causes smells and is accessible to vermin and insects;
- The disposal site is almost always offensive and unhygienic particularly where night soil is dumped and turned into the soil, and;
- There are less expensive methods of collection, which are also labour intensive and more suited to developing country urban conditions. e.g. vacuum truck and vault system.

3.2.1.6 The vacuum truck and vault

Vacuum truck and vault is used in China where excreta is thought to be a valuable resource and can be used for agriculture. It consists of a vault in which the excreta is deposited. On top of the vault is a low volume flush bowl with a water seal. The vault's

contents are collected by a vacuum truck once every two to fur weeks. Care has to be taken when using excreta in agriculture.

3.2.1.7 The chemical toilet

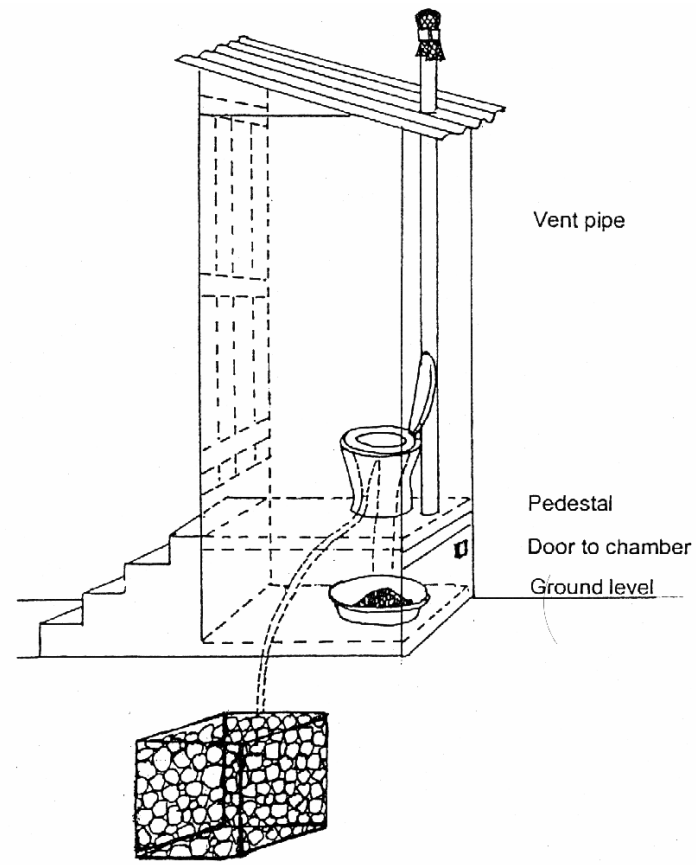
The chemical toilet utilizes a tank in which strong basic chemicals are used to digest excreta deposited directly into the chamber. The faeces are liquefied after the application of the chemicals, and the liquid is discharged to an underground cesspit or removed by vacuum truck.

This method has high capital costs, and complex engineering. Some require electricity. Also, chemicals have to be continuously obtained.

3.2.1.8 The compost toilet

The compost toilet is another method that enables excreta to be used as a resource. The toilet consists of a vault with a sloping floor and divided into compartments for excreta and urine separation. The excreta is deposited and ashes sprinkled over it, to hasten digestion. An example is the urine diversion or separator toilet in **figure 21.**

Fig. 21 A urine diversion toilet



3.2.1.9 The Pour Flush Latrine

A pour flush toilet is an improvement over the ordinary pit latrine in that the water seal, which is essentially a u-pipe filled with water, prevents odours and flies. The pour flush latrine does not have to be directly above the pit but can be connected by a short length of pipe and the pit covered permanently.

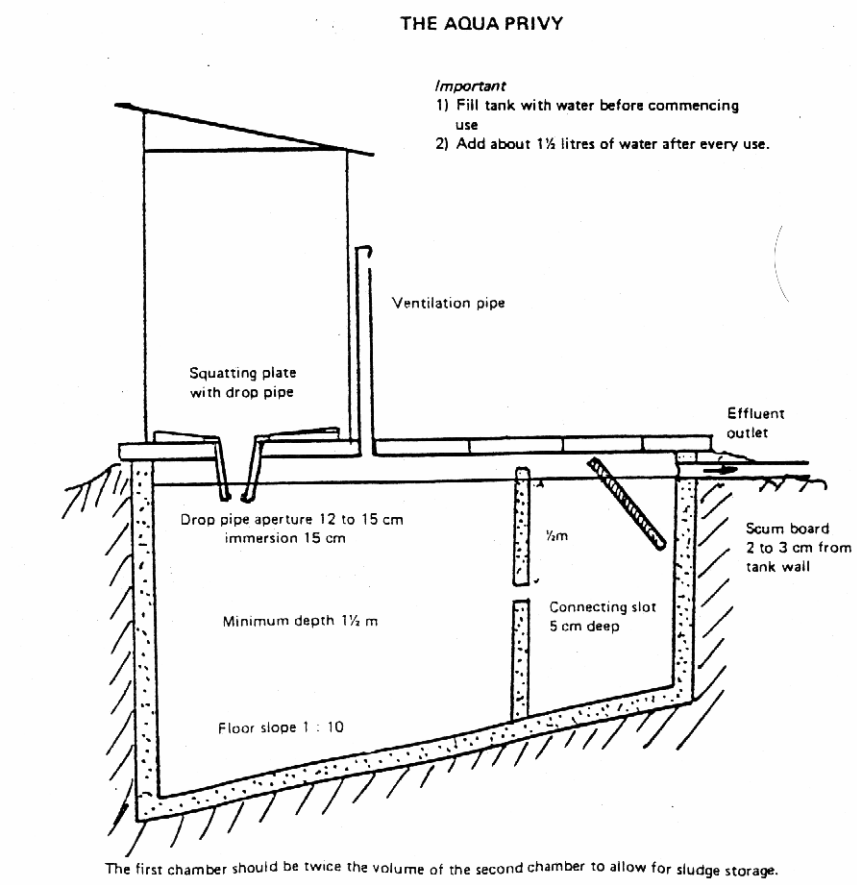
3.2.1.10 The aqua – privy

The aqua privy comprises of a watertight simple tank above which a toilet bowl is located. The household is protected from the contents of the tank by means of a vertical drop pipe extending from the toilet bowl down to and slightly covered in the tank contents. This ensures that defection is directly into the aqua privy tank. Waste solids sink to the bottom where they digest as sludge over a period to time. The sludge has to be removed periodically by vacuum truck.

The liquid used as flush water passes out of the tank into a soak away where it percolates into the soil. Some people are of the opinion that this water can be used for vegetable gardens.

The aqua-privy can be successfully used where water is used for anal cleansing, where the bowl is cleaned regularly and where the soil allows leaching of the liquid. However, it becomes a failure at good sanitation, where paper and other material rather than water is used for anal cleansing and where the bowl is not cleaned properly. This method also fails when water is not added to the tank causing the liquid level to fall below the vertical drop pipe. When this happens, flies gain access to the tank and odours arise. If the squat plates are soiled, germs are bred and the users prefer to defecate elsewhere.

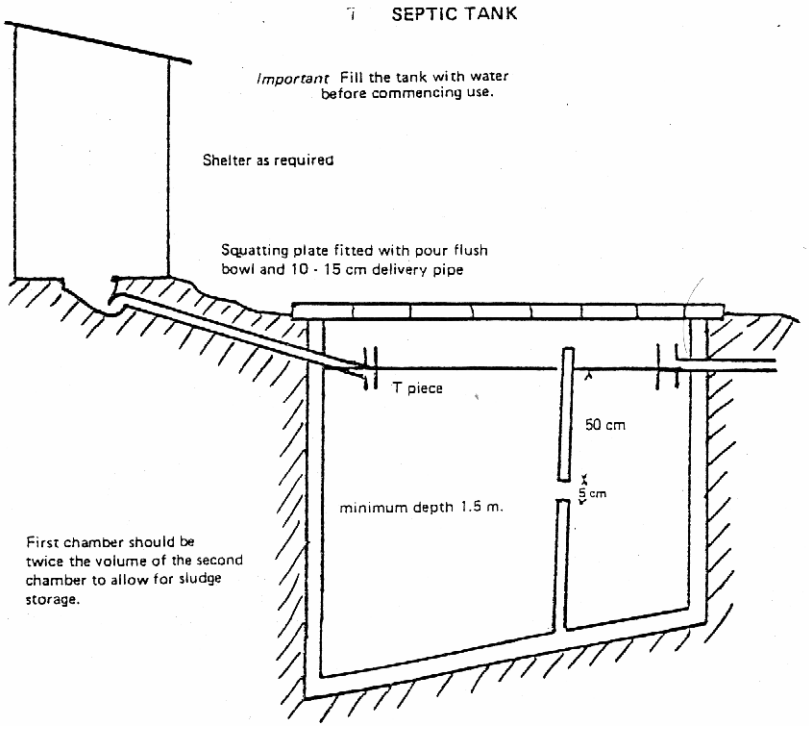
Fig. 22 The Aqua privy



3.2.1.11 The Septic Tank

This is an on-site method of waste disposal from the household. It consists of a large tank placed beneath the ground level close to the house, where it receives wastewater from the kitchen, cleansing and toilet wastewater. Most of the solids in the waste settle in the tank as sludge and digest (ferment) at the bottom. The liquid then leaves this tank by overflowing into an underground pipe or trench system that distributes it for percolation into the soil. (see **figure 23**)

Fig. 23 A Septic Tank



The septic tank, however, has serious disadvantages, which are:

- It is expensive
- It requires large areas of permeable subsoil for the liquid to permeate;
- In areas of high population density, it cannot be used as the amount of land needed is not available;
- Where septic tanks are built in areas near rivers, the subsoil is not permeable enough and results in flooding of surrounding areas with the liquid. So rather than preventing disease it spreads disease;
- Where septic tanks screens are not cared for properly they become a breeding ground for insects and thus endanger the health of the whole community.

3.2.2 Off-site sanitation

Conventional Sanitary Sewerage is “off-site” sanitation. This refers to the system of transporting faeces and other liquid wastes through a water medium through pipes to a point where it is treated or discharged into a stream/river/the sea.

The sewerage system begins upstream with the toilet, which is normally ceramic and requires 5-10 litres of water for flushing. Although this can be adjusted to reduce the amount of water used. The sewage, which is 99.9% water, enters the underground collection system outside the household via the house connection pipe leading to the street sewer.

Moving down the collection tree, the sewage passes through manholes, which provide access for inspection and cleaning into larger and larger lateral pipes, sub-branches and mains. As the flow builds up, the downward slope of the sewer provides a velocity of flow sufficient to maintain solids in suspension.

Conceptually the process is one of depositing wastes in a ceramic bowl, diluting them with treated water for purposes of transportation down a complex system of underground piping for eventual collection at one point downstream of the city. This huge volume of wastewater must then be dewatered for removal of sludge prior to its being treated. Although water-borne sewerage systems are socially acceptable and technically efficient, they are:

- Prohibitively expensive, on a household basis. They cost as much as a television set and very few developing countries can provide this service for all its citizens;
- They require large volumes of treated water, which is often not available in developing countries.

3.2.3 The safe disposal of infant faeces & personal hygiene

Contrary to popular belief, children's faeces can be just as hazardous to health as that of adults. Young children, particularly, have not learnt to practice good standards of hygiene and so are more susceptible to sanitation-related diseases. Hands exploring their environment will pick up germs, which will all too easily be swallowed when they are put to the mouth. This can happen directly, or via other objects.

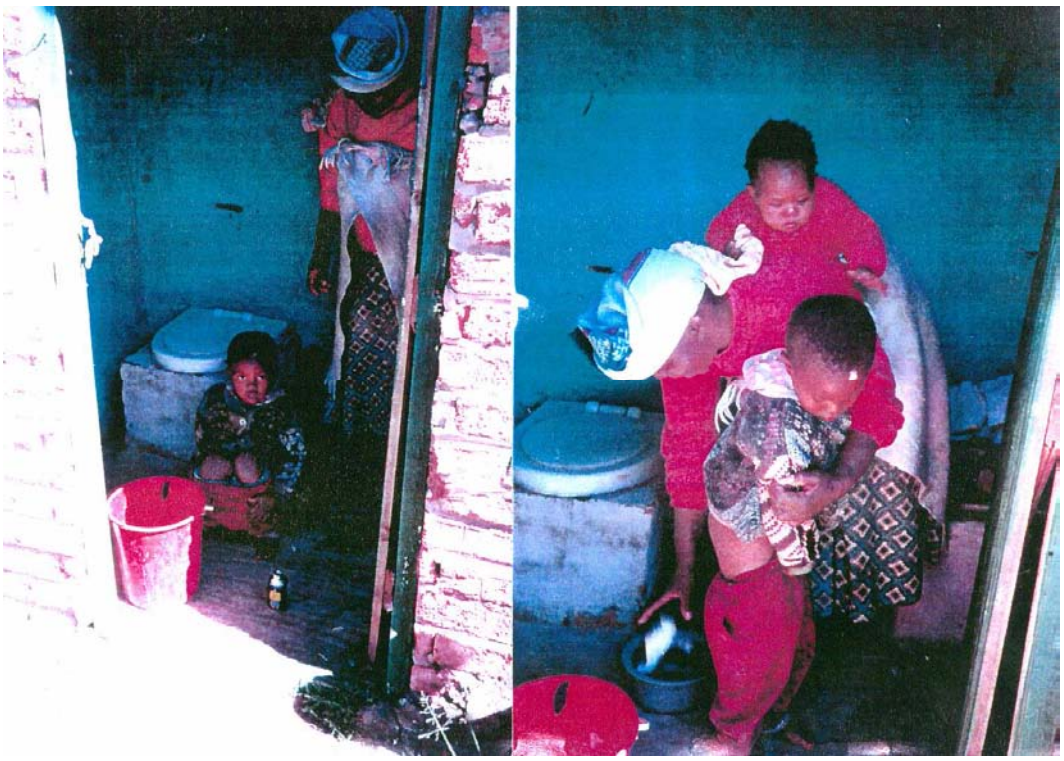
As the above chapters have related, the faeces of a *child or adult* with a sanitation-related disease will be infectious. Particularly large numbers of organisms can be present in diarrhoea, which is a common symptom. Urine, by contrast, is a sterile liquid, unless a person is suffering from a urinary tract infection, such as schistosomiasis, known as bilharzia. Of course urine can be contaminated with faecal organisms as soon as it leaves the body, especially if the person has poor bodily hygiene.

Care must be taken in relation to the safe disposal of infant faeces. The following issues are examples that can open discussions on dealing with this problem:

- How are infant faeces disposed of in that community? Discuss the benefits and the hazards of these methods?
- Are nappies used? If they disposable, how can they safely be disposed of? If they are washable, where is the water disposed of? Away from the food and water sources?
- If nappies are not used can likely contamination of the home environment be minimised? How?
- Are potties a practical option for children learning how to use a toilet? How can the contents be disposed of safely?
- What are the hazards to children trying to use a toilet designed for an adult? If toilets designed especially for children are not practical, how can an adult toilet facility be adapted for use by children? Examples include child seats fitted over adult seats, and fixed/movable steps installed.

Figures 24-25 show a child being supervised using a potty kept next to and adult toilet. The adult then empties the potty contents into the toilet. In **figures 26-27**, the child is taught the importance of hand-washing. The hand-wash water can then be poured into the potty to rinse it thoroughly.

Figs. 24-25 A child being supervised using a potty



Figs. 26-27 A child is taught the importance of hand-washing after defecation

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Appendix 2 TOOL 7C

X Water & Sanitation Project Latrine Slab Offer

The X Water and Sanitation Project makes the following offer to the households in Village X:
IF THE HOUSEHOLDER:

1. Registers a desire to obtain a latrine slab with the X Office;
2. Digs a round hole approx. 1.5m deep by 1m in diameter;
   - ✓ The hole must not be larger than 1m in diameter or the slab will not fit over it;
   - ✓ If you hit the water table, stop digging and seek advice from the Project Office.

THEN THE X PROJECT WILL:

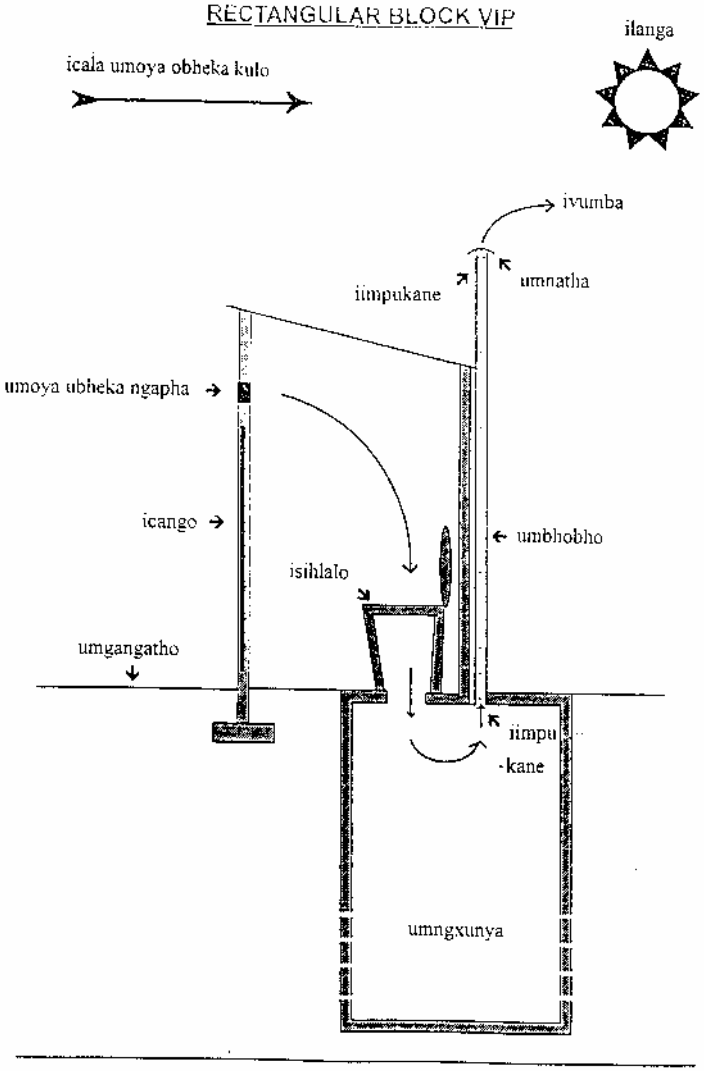
1. Line the pit with at least one layer of blocks;
2. Construct the slab, concrete seat and fit a vent pipe;
3. Paint the installation to produce an attractive and easily cleanable finish.

THE HOUSEHOLDER:
Must then provide and construct the latrine building of their choice complete with a door and a pedestal seat with a lid so that the toilet works properly to remove smells and flies.

LATRINE SLAB OFFER TO HELP YOU BUILD A TOILET

Advice on ways to construct the latrine building is available from the X Project Office

Supporting Water and Sanitation Development



Wonke umntu ekhayeni kumele akuqwalasele ukubaluleka koku sebenzisa indlu yangasese ukuze abantu bakhuseleke ekusasazekeni kwezifo

Build a toilet for better health

Everyone must have a clean toilet, which is pleasant to use. If everyone in the community uses a toilet, and washes their hands afterwards, it will prevent the spread of many different diseases.

Faeces may still contain harmful germ organisms even if the person no longer shows symptoms of disease. If their faeces is not buried, or the household does not have the use of a clean toilet, other people may come into contact with it. The germs could be swallowed and infect another person if contaminated hands touch the mouth or food or drink. If the germs irritate the stomach and gut, vomiting &/or diarrhoea and subsequent dehydration may result, as the body tries to fight infection.

Diarrhoea can kill those who are more vulnerable, particularly the elderly or the very young.

Using a toilet will prevent pigs eating faeces. This is a problem because faeces containing tapeworm eggs will form cysts in the pig's flesh, which cause tapeworm in people if the cysts in meat are not destroyed by thorough cooking.

Other advantages of a toilet include:

- Having a facility for visitors, rather than the veldt;
- Safety for users at night, from robbers and snakes.

Each household now has the opportunity to take advantage of assistance towards building a toilet.