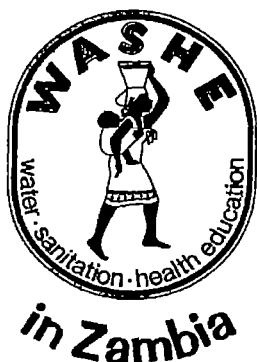
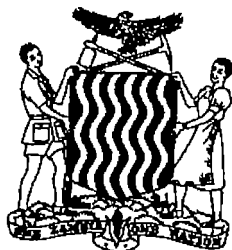


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PROGRAMME CO-ORDINATION UNIT

FIRST EDITION

Coverage Parameters For Rural Water Supply In Zambia

Supplementary Module 1a

204.1-96CO-14412



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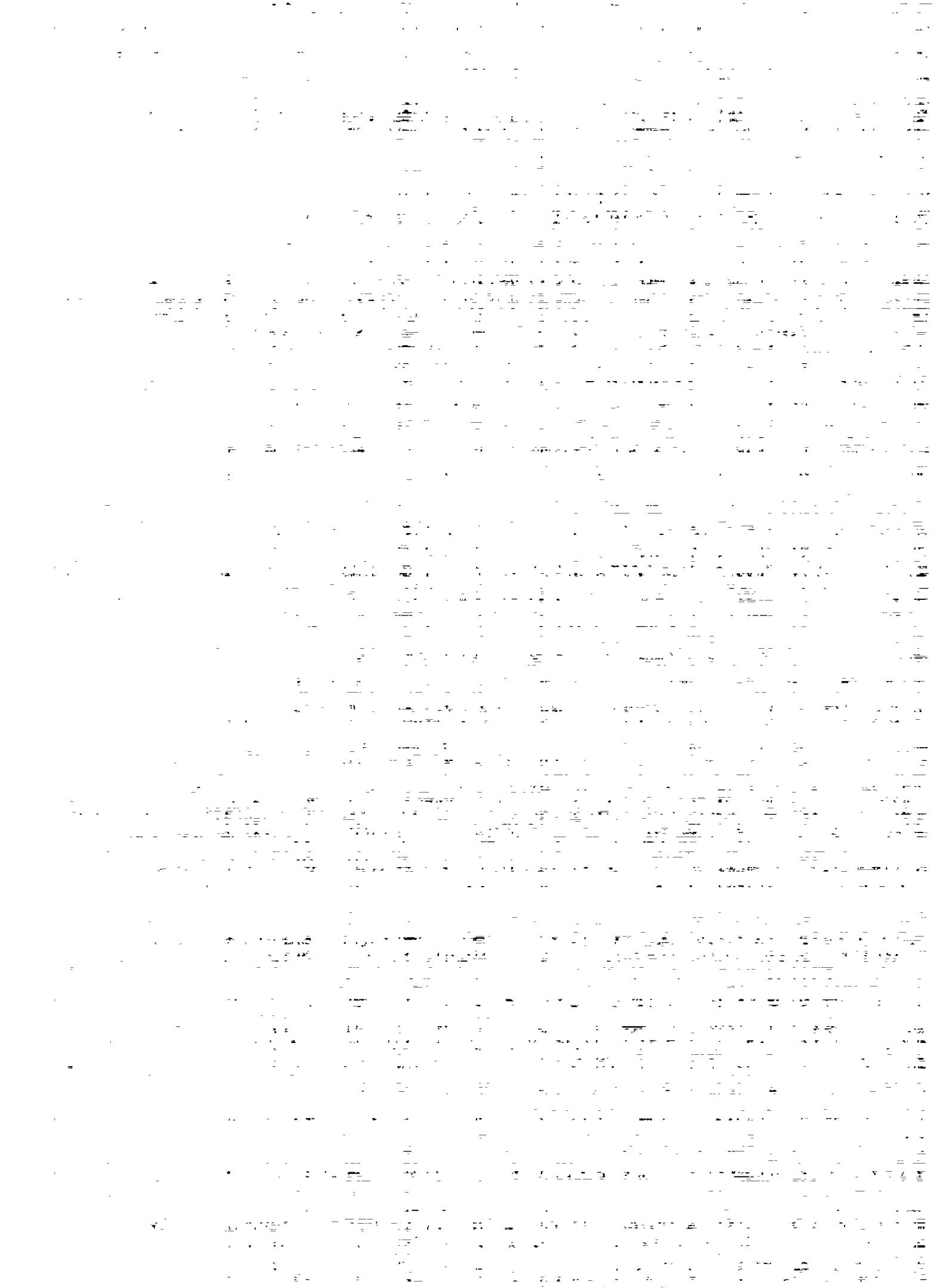
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PREFACE

THE CORE TRAINING MANUALS AND SUPPLEMENTARY MODULES

The Core Training Manuals and Supplementary Modules have been produced to support the implementation of WASHE in Zambia.

WASHE

Water Sanitation Health Education

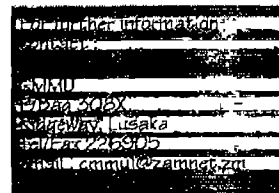


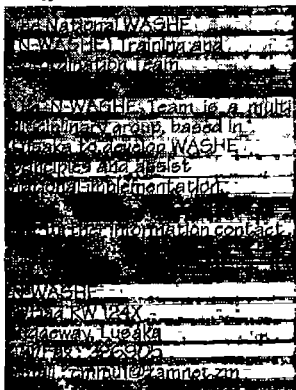
WASHE has been developed in Zambia over the last ten years. Learning mainly from the experiences of Western and Southern Provinces, it is now recognised to be a sustainable approach to rural water supply and sanitation.

The Core Training Manuals provide the background to this development and explain its context in view of decentralisation. The Manuals are intended to provide flexible guidelines to assist the growth of WASHE primarily at district level.

The Supplementary Modules provide community management guidelines for use at all levels; national to community. The series includes technical, participatory health and hygiene education and community management titles. Each module has been written to 'stand alone' or be used as part of an overall community management approach where each title in the series complements the next. It is helpful to get to know the titles and become familiar with the contents to enable you to make informed decisions.

At the back of this module is a list of the titles that compile the Core Training Manuals and Supplementary Modules Series. Full details of the contents of each title can be found in *The Community Management and Monitoring Unit Publications List*. All titles are available from the CMMU.





The guidelines and materials form the basis for the advocacy and training work of the National WASHE Co-ordination and Training Team (N-WASHE).

The Core Training Manuals and Supplementary Modules have been developed and written by the Community Management and Monitoring Unit (CMMU).

This is Supplementary Module 1a :

Coverage Parameters for Rural Water Supply.

WHO THE SUPPLEMENTARY MODULES ARE FOR

The Supplementary Modules are written for people who are intending to develop community management as part of their overall objective for rural water supply and sanitation. These people are likely to represent :

- district councils and D-WASHE committees
- specific line ministries
- NGOs
- Donors
- volunteer agencies
- development organisations

The individuals are likely to be :

- rural and peri urban extension officers from WASHE line ministries
- environmental health technicians
- community development workers
- community health workers
- teachers
- project personnel

The guidelines have been developed within a Zambian context but can easily be adapted to meet the needs of other developing countries.

Throughout the Core Training Manuals and the Supplementary Modules, *the Community* refers to a group of people with a common present or potential interest in WASHE. A single family unit is referred to as a *household*.

By *Community Management* we mean: the ability of the community to have the *responsibility, authority, accountability and control* of the WASHE process that exists for their benefit.

The CMMU believes that community management will only become a reality if issues of gender are seen to be integral to the project cycle and participatory process. By *gender* in rural water supply and sanitation we mean: *the context and reality of both women's and men's lives that can together affect self determined change. Gender is not a women's issue alone.*

HOW THE SUPPLEMENTARY MODULES WERE DEVELOPED

CMMU was mandated in 1993 to address issues of long term sustainability in the rural water and sanitation sector. CMMU began a programme of participatory research throughout the country and it was during this time that it became evident that some regions had a greater chance of sustainability than others. The approaches being used by projects involved in the sector varied from one area to the next. Whilst projects agreed that a community management approach through participation was appropriate there was little or no standardisation. The absence of a standardised community management approach for Zambia meant that the quality of delivery and ultimate level of choice for the community was at best patchy.

In order to address this the CMMU set about collecting "best practice" ideas, knowledge and materials from around the country. It concentrated on participatory techniques, technology options and community management issues for rural water supply and sanitation. The result, through a series of consultative workshops, committees and core working groups, is the current series of supplementary modules.

ACKNOWLEDGEMENTS

Many people and organisations were involved in the development of the Core Training Manuals and Supplementary Modules. In particular the CMMU would like to thank the D-WASHE committees in Mansa, Mwense, Kawambwa, Nchelenge and Siavonga Districts for their inputs and constructive criticism during the elaboration of the methods. Additionally we would like to acknowledge our appreciation of all Government, donor and NGO field workers at community, extension, district, provincial and national level for their invaluable experience, ideas and opinions.

The research and development required and the production of these publications would not have been possible without considerable financial support from the European Union, NORAD and UNICEF, for which we are most grateful.

The Core Training Manuals and Supplementary Modules have been produced entirely within the CMMU.



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**Section
1**

INTRODUCTION



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SECTION ONE ABOUT THE MODULE

This module provides information in relation to coverage parameters for rural water supply in Zambia. It is divided into the following sections :

- Section 1 Introduction
- Section 2 Definition of Parameters
- Section 3 Summary

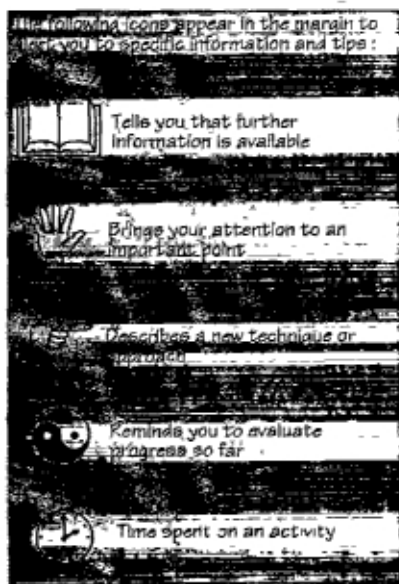
The format is designed to help you

- find things quickly
- work systematically through the contents
- familiarise yourself with the concepts currently being developed in relation to coverage for rural water supply

In Section 2, Definition the Parameters, you will find large amounts of text in italics. This text has been transcribed from a number of sources and has been duly acknowledged.

Remember the supplementary modules are intended as guidelines. Achieving true coverage as it is suggested in this module is a long term objective. None the less, it should be the objective of all actors involved in the sector, to work towards meeting these goals in the long run.

In the margin of each page you will find useful information and tips.



THE APPROACH

To equip you with the information which will help you to :

- understand what is meant by the term coverage and the parameters which are used to describe this concept

 **OVERALL
OBJECTIVE OF
THIS MODULE**

The information in this module is the result of a review undertaken by the CMMU to establish standard definitions and understanding of coverage for rural water supply appropriate to Zambia.

 **DEVELOPMENT
OF THIS
MODULE**

There has been considerable global debate regarding what exactly is meant by the term coverage in the context of rural water supply and sanitation. Terms such as “access”, “safe” and “distance” have all been referred to but no attempt has been made to define these parameters in Zambia.

The CMMU reviewed current publications and thinking on the issue of coverage. In 1994 a discussion paper was prepared pertaining to the coverage issue and was circulated to Government, Donor and NGOs working in the sector for their comments and inputs.

These reviews and consultations revealed that there are as many definitions of coverage as there are actors in the sector. This module suggests some limits for these parameters and, in fact, defining these parameters infers minimum service level standards for rural water supply and sanitation.

It is intended that the reader becomes **the facilitator** of the process of community management. This means that the information acquired from this module becomes **shared knowledge** between the reader and the community so that community based decision making becomes a reality.

 **FACILITATION**



Section
2

DEFINING THE PARAMETERS

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SECTION TWO

DEFINING THE PARAMETERS

By the end of this section you will have:

- been introduced to a global definition of the term coverage
- gained an understanding of the parameters that make up the concept of coverage
- gained an understanding of how these parameters are defined

For more information see (1) WHO, WSSCC and UNICEF, (1993); **Water Supply and Sector Monitoring Report 1993; Sector Status as of December 1991.** UNICEF, New York; WHO, Geneva.



The following broad definition of coverage in rural water supply and sanitation has been suggested by WHO 1993 and is considered appropriate for Zambia :

Safe drinking water coverage : proportion of population with **access** to an **adequate amount** of **safe** drinking water located within a **convenient distance** from the users dwelling.

For more information see sanitation coverage parameters as described in detail in Supplementary Module 5a



Sanitary means of excreta disposal coverage : Proportion of population with **access** to a **sanitary facility** for human excreta disposal in the dwelling or located within a **convenient distance** from the users dwelling.

In the context of rural water supply let us examine each of these parameters :

- access
- adequate amount
- safe
- convenient distance

DEFINITION OF ACCESS :

A person is considered to have access to a water supply if water is available at that source all day everyday. A person should not have to queue for long periods of time.

This suggests that there should be sufficient water available at the source at all times. Long queuing suggests that there is not sufficient water to meet the needs of the users or that there are not sufficient sources

in the area to meet their demands. Maximum queuing time should not exceed 15 minutes.

ADEQUATE AMOUNT :

In temperate climates it is estimated that the normal body requirement for an adult is about 2.2 l/day, some of this being obtained from food. In hot humid climates this requirement may exceed 9 l/day. Apart from this, water is required for personal ablutions, cooking and washing dishes, laundering, house cleaning, (toilet flushing, if any) and other uses such as watering gardens and animals. ⁽²⁾

In addition it is often felt that the proximity of a source to the users dictates the amount of water used. However :

An increase in the quantity of water used in the home is not an automatic consequence of a new water supply, even if it provides water closer to people's houses. Several studies in Africa have found a surprising relationship between the quantity of water carried home and the distance it must be carried. Intuitively, one would expect that when the distance is reduced the amount of water would increase. Beyond a distance of about one kilometre, equivalent to a round-trip water collection journey of 30 minutes this does occur. At lesser distances, however a plateau is reached beyond which water consumption only increases when water is supplied directly into individual houses. This means that if the traditional source of water is less than one kilometre away, the provision of a new water source may not lead to an increase in water use and this may not affect the water-washed transmission of disease. ⁽³⁾



For more information see
 (2) Dangerfield, Bernard J (editor), (1983): **Water Supply and Sanitation in Developing Countries;**
 The Levenham Press Ltd, Suffolk, England.



For more information see
 (3) Kerr, Charles (editor), 1990: **Community Health and Sanitation;**
 IT Publications, London, UK.

Figure 1

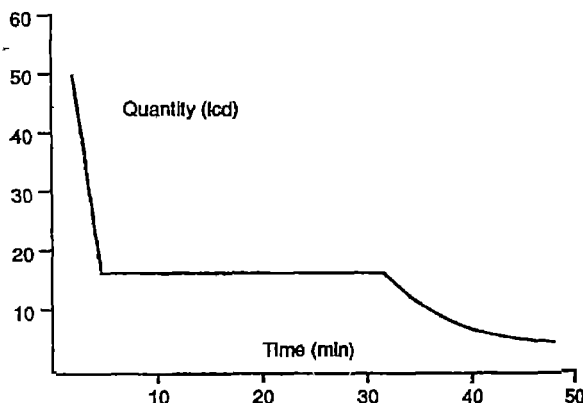


Fig 1. Schematic representation of how the time taken to collect a bucket of water affects the average quantity used for domestic purposes in litres per capita per day (l/c/d). Note the plateau for times less than 30 minutes. Although the exact height of the plateau depends on local circumstances, the general shape of the curve seems not to vary. ⁽³⁾

Now consider typical values for water consumption in the following table:

Table 1 : Typical consumption values (litres/capita/day)*

For more information see
(4) IRC, (1986): **Small
Community Water
Supplies: Technical
Paper Series 18**; IRC, The
Hague, The Netherlands



COMMUNAL WATER POINT	TYPICAL CONSUMPTION	RANGE
- at considerable distance >1,000m	7	5 - 10
- at medium distance 500 - 1 000m	12	10 - 15
Walking distance < 250m	20	15 - 20

* Adapted from (4)

These figures are consistent with observations made by various project personnel in Zambia and with personal observations of CMMU staff. They probably represent a range of consumption rates typical for rural water supply sources in Zambia.

Whether or not 20 l/c/d is adequate (sufficient to meet all needs and maximise health benefits), this amount is considered to be "adequate" in the context of current practices. This is not to say that this amount would not increase with greater education or increased coverage, rather 20 l/c/d should be considered as the minimum "adequate" amount when considering actual coverage of rural water supply in Zambia, given current practices and traditions.

DEFINITION OF SAFE :

A rural water supply can be considered "safe" if the quality meets the following parameters :

the water should be free from:

- *visible suspended matter*
- *excessive colour*
- *taste and odour*
- *objectionable dissolved matter*
- *aggressive constituents*

- *bacteria indicative of faecal pollution*

For drinking water supplies the water must obviously be fit for human consumption i.e. potable, and it should also be palatable, i.e. aesthetically attractive. ⁽⁵⁾



For more information see
(5) Thebbutt, Thy (1983).
Principles of Water Quality Control;
Pergamon Press, Oxford, UK.

Although these parameters are considered valid for rural water supplies in Zambia they must be tempered with reality. If the pH of a source is corrosive or a well provides water which has a high concentration of iron which precipitates out, staining clothes or cooking utensils, little can be done to alleviate this in remote rural areas.

In reality the quality of water available from any source must be of an acceptable quality if other sources are not available.

... people in developing countries who must use surface sources or open wells are often drinking water with >1,000 faecal coliforms/100ml... ..to apply standards as stringent as those laid down (referring to WHO 1977 ⁽⁶⁾) would be to condemn the water supplies used by the great majority of the population of most developing countries. ⁽⁷⁾



For more information see
(6) WHO, (1971):
International Standards for Drinking Water Quality, 3rd Edition;
WHO, Geneva.



For more information see
(7) Cairncross, S. and Feachem, R.G., (1983):
Environmental Health and Engineering in the Tropics: An Introductory Text;
John Wiley and Sons Ltd,

Therefore for bacteriological quality the following is suggested :

In the case of a **hand dug well** with bucket and windlass the acceptable level of contamination would be 0 - 10 faecal coliform (FC) per 100ml in 75% of cases analysed and between 11 and 50 FC per 100ml in 13% of cases. (60% of these cases falling into category 0 - 10 FC/100ml would have 0 FC per 100ml).



Faecal coliform counts are derived from extensive laboratory analysis carried out by the Kasama Water Project (Irish Aid, Northern Province) WASHE in Western Province (supported by NORAD), Rural Water for Health Project (SNV, North Western Province) and Village Water Supply (GTZ, North-Western Province)

Similarly, for **tube wells** (with bucket pump) the acceptable level of contamination would be 0-10 FC/100ml in 94% of cases analysed and 11-55 FC/100ml in 5% of cases (78% of those cases in the 0-10 FC/100ml would have 0 FC/100ml).

Although not yet defined it is expected that **boreholes and jetted wells** fitted with hand pumps would provide water of a higher quality than set out here.



Much more information is required regarding the quality of water from boreholes. All information will be gratefully received by the CMMU.

DEFINITION OF DISTANCE :

As already indicated it would appear that if a person has to walk more than 30 minutes round trip to fetch water the benefits from that water supply, particularly health benefits, diminish to the extent that they are probably non-existent. Therefore it is suggested that convenient distance should be considered as no greater than about 1 Km if any benefits are to be achieved.

Use this page to make your own notes



Notes :



Section
3

SUMMARY

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SECTION THREE

SUMMARY

Let us review our original definition of coverage

Safe drinking water coverage : Proportion of population with **access** to an **adequate amount** of **safe** drinking water located within a **convenient distance** from the users dwelling.

We are now in a position to define these individual parameters for Zambia.

ACCESS 

A person is considered to have **access** to a source of water if water is available all day every day with a maximum queuing time, at peak demand, of 15 minutes.

ADEQUATE AMOUNT 

The minimum **adequate amount** of water available per person per day should be 20 litres.

SAFE 

For a water supply to be **safe** it should be free from :

- visible suspended matter
- excessive colour
- taste and odour
- objectionable dissolved matters
- aggressive constituents

and from a bacteriological point of view :

- in the case of **hand dug wells** (bucket and windlass) : 0 - 10 faecal coliform per 100 ml in 75% of cases analysed (60% of these having a faecal coliform count of 0 per 100 ml) ;
- in the case of **tube wells** (bucket pump) : 0 - 10 faecal coliform per 100 ml in 94% of cases analysed (78% of these having a faecal coliform count of 0 per 100 ml) ;
- in the case of **sources fitted with a hand pump**: the bacteriological quality of water should be consistently better than the above.

CONVENIENT DISTANCE 

For the parameter **convenient distance** to be met a person should not have to walk more than 30 minutes, both ways to fetch water, a distance of about 1 kilometre.

In other words for a community to be 'covered' by a water point that point must be within a kilometre of their home and be capable of providing 20 litres water all day every day for each person, with the maximum queuing time of 15 minutes to a quality, standard already described.

It should be noted that technologies which are used for the provision of rural water supplies have their limitations in terms of the numbers of people they can support. That is to say that a borehole with a hand pump has the technical capacity to provide water for more people than, say, a hand dug well with bucket and windlass. Therefore it is necessary to remember this when calculating coverage.

The coverage parameters proposed in this supplementary module are the result of a considerable amount of consultation and review. It is hoped that they will be adopted by all parties concerned with the provision of rural water supply and sanitation services. Adopting these parameters will mean the rural communities will be provided with a service of a better quality which, should ultimately lead to an improved standard of living.



For more information see Supplementary Module 2a Technology Options for Rural Water Supply: Making the Right Choice



For more information see Supplementary Module 1b; The Status of Rural Water Supply In Zambia which describes coverage ratios for district, provincial and national levels.

All titles are available from
the CMMU. Ask for the CMMU Pub-
lication List



THE CORE TRAINING MANUALS AND SUPPLEMENTARY MODULES

No **TITLE/DESCRIPTION**

MANUALS

- Manual 1 Understanding the WASHE Concept
- Manual 2 Water Sector Reforms and Implications for WASHE
- Manual 3 Introducing WASHE at District Level
- Manual 4 Establishing WASHE at District Level
- Manual 5 Planning for WASHE at District Level

SUPPLEMENTARY MODULES

- 1a Coverage Parameters for Rural Water Supply in Zambia
- 1b The Status of Rural Water Supply in Zambia
- 1c Glossary of Terms for Rural Water Supply
- 1d Partners in WASHE
- 2a Technology for Rural Water Supply : Making the Right Choice
- 2b Technology for Rural Water Supply : Technology Costs
- 2c Technology for Rural Water Supply : Standard Construction Details (Hand Dug Well)
- 2d Technology for Rural Water Supply : Standard Construction Details (Tube Well)
- 2e Technology for Rural Water Supply : Standard Construction Details (Jetted Well)
- 2f Technology for Rural Water Supply : Standard Construction Details (Bore Hole)
- 2g Technology for Rural Water Supply : Family Well Upgrading
- 3a Hand Pump Standardisation
- 3b Guidelines for Meeting the Hand Pump Standards
- 4a Rural Water Supply Maintenance Options
- 4b Rural Water Supply Maintenance Guidelines
- 5a Options for Excreta Disposal Facilities
- 5b Latrine Construction Techniques
- 6a Participatory Health and Hygiene Education (Theory)
- 6b Participatory Health and Hygiene Education (Practical)
- 7a The Project Cycle for Rural Water Supply
- 7b Making Appointments
- 7c Community Mobilisation and Sensitisation
- 7d Conducting Community Assessment
- 7e Formation of a Village WASHE Committee
- 7f Site Selection
- 7g Planning for Construction and Rehabilitation
- 7h Community Participation During Construction
- 7i Village WASHE Committee Training
- 7j Community Problem Solving
- 7k Fund Raising and Management
- 7l Promoting Community Ownership
- 7m Community Participation in Monitoring
- 7n Well Completion Ceremony (Handover)
- 7o Community Management in Evaluation
- 7p Group Dynamics
- 8 WASHE and Gender

