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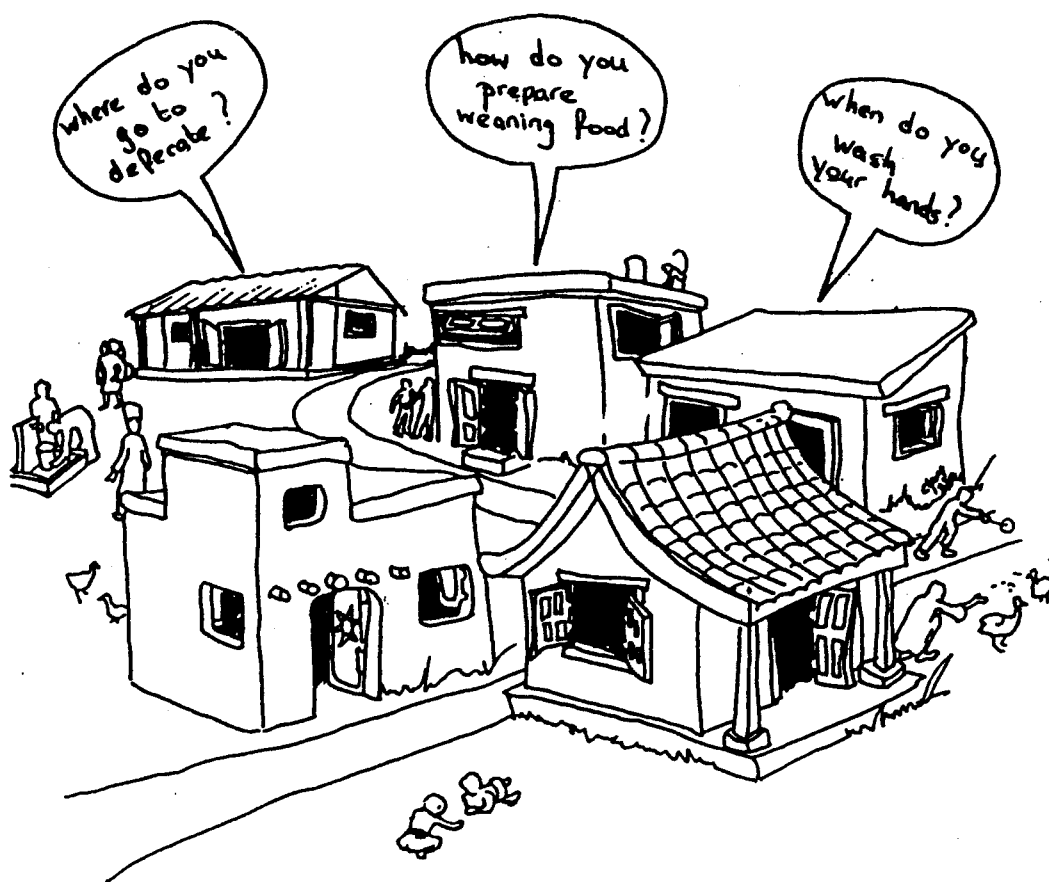
International Water and Sanitation Centre

WHO Collaborating Centre



# Actions Speak

The study of hygiene behaviour in water and sanitation projects



**ODA**



**WHO**



**undp**



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# *Preface*

This book arises from a workshop on the measurement of hygiene behaviour which was held in Oxford, England, in April 1991. It was organized by the London School of Hygiene and Tropical Medicine with support from the International Development Research Centre of Canada, the IRC International Water and Sanitation Centre, The UK Overseas Development Administration, the United Nations Development Programme, the Water and Sanitation for Health (WASH) and Applied Diarrheal Disease Research Projects of the US Agency for International Development, and the World Health Organization. A list of the participants is included as Annex 1.

The workshop's objective was to capture the experience of a number of specialists (44 in all), mostly from the research community, so that their distilled ideas could be put at the disposal of those engaged in water, sanitation and hygiene education programmes in the field. Participants were asked to bring short papers describing their experiences and the lessons they drew from them; these are listed in Annex 2. The papers, which are to be published in a separate volume, have been used extensively to illustrate key points throughout this book.

While the editors accept full responsibility for errors and shortcomings, any credit for the book's content is shared by all the workshop participants. Initial drafts were circulated to them, and many made substantial contributions to its improvement. In this connection, special acknowledgements are due to Ursula Blumenthal, Bill Brieger, Elena Hurtado, Sharon Huttly, Carol Jenkins, Eva Kaltenthaler, Claudio Lanata, Carol MacCormack, Jose Martines, Melissa Parker, John Pinfold, Sandra Saenz de Tejada, Mayling Simpson-Hébert, Jim VanDerslice, Gilbert F. White, and Carl Widstrand. Valuable contributions were also received from Astier Almedom (London School of Hygiene and Tropical Medicine), Michael Sachs (UNDP Health Adviser), Yasmine Motarjemi and Fritz Käferstein (World Health Organization, Food Safety Unit), James Tumwine and Ben Fawcett (Oxfam) and Wilma van Driel and Christine van Wijk-Sijbesma (IRC International Water and Sanitation Centre).

The editors would like to thank the sponsors of the workshop for their support, and above all to express our gratitude to the participants, who gave so willingly of their time, their energy and their ideas. We also acknowledge the inputs of Brian Appleton in the editing and lay-out of the book and of Lauren Wolvers in the text processing.

*Marieke Boot*  
*Sandy Cairncross*  
*Editors*





# *Executive Summary*

*Where do you go to defecate?*

*Where do you collect your family's drinking water?*

*How do you clean your baby's bottom?*

*What happens to the faeces?*

*When do you wash your hands?*

*How do you prepare weaning food?*

## **Why do you ask?**

These are not exactly the sort of topics that come up in everyday conversation. But finding answers to this type of question is what the study of hygiene behaviour is all about.

It is through the hygienic use of new facilities that improved water supply and sanitation systems seek to deliver the health benefits for which they are designed. That means developing approaches which bring about changes in human behaviour. To find out whether our approaches work, we need information about some of the most personal aspects of people's lives.

It is not enough to know that a project has provided 100 new handpumps and 300 latrines. If, in addition, we find that most people make regular use of the pumps and latrines, we have good reason to hope that the investment will achieve its main purpose – improving the health and well-being of the project 'beneficiaries'. Regrettably, that is not always the case. In some cases, as few as 10% of the target population may end up actually using the new facilities. Clearly, in those cases, something is going wrong; but what? To find out, and to make sure that future projects are more successful, we watch and we ask questions. We don't just want to know how people behave; we also need to know why. So we try to understand the socio-economic and cultural influences which affect hygiene behaviour.

Studying hygiene behaviour is also the way that we learn more about how certain diseases are spread. Water and sanitation-related diseases account for a high proportion of deaths and sickness in rural and peri-urban communities. Prevention depends on intercepting a whole range of transmission routes by which disease organisms pass from one infected person to another. To help people to protect themselves and their children, we have to understand and recognize the multiple links between human behaviour and disease transmission.

## **How do you find out?**

Observation and interviews are the sources of information for hygiene behaviour studies. In such a sensitive area, success depends on the right people having the right approach, asking the right questions, and putting the right interpretation on the information gathered. It can be done: growing experience is helping us to recognize the most important features of successful hygiene behaviour studies, and the mistakes to be avoided. In this book, we attempt to consolidate the lessons of past successes and failures into guidance on the formulation, implementation and analysis of a successful study of hygiene behaviour.

### ***The people involved***

There is a widespread misconception that hygiene behaviour studies have to be undertaken by highly trained specialists. Not so. Most studies benefit from the guidance of a person with a social science background, and the more sophisticated studies, involving analysis of links between behaviour and health, for example, need expert advice from specialists such as epidemiologists. For the actual information-gathering though, it is the social communication skills and sensitivities of the observers/interviewers which matter most. Properly oriented project staff or other professionals can play leading roles in the studies. They will usually need help from field workers who are culture- and gender-sensitive and able to establish a mutual respect with the people they observe and interview. Participation of intended project beneficiaries gives an added dimension to hygiene behaviour studies. Community members can help both in designing the study and in gathering and evaluating the information, and their involvement increases the likelihood of the results being put to effective use.

### ***Looking and listening***

The highly personal nature of many of the behaviours we want to find out about calls for special care in the way that we go about our research. People will be naturally sensitive to the presence of observers and to the motives of interviewers. Their actions and responses are likely to be conditioned by the study itself, and the study needs to be designed to account for these distortions.

This book describes a wide variety of different observation and interview methods, and suggests ways of deciding which combination will be most appropriate in particular circumstances. It is possible to overcome most of the perceived constraints on information gathering, but it requires detailed advance planning, pre-testing, flexibility during the data collection, and expertise in the combination and analysis of observations and interview responses.

The limitations of questionnaires are acknowledged. Their use is by no means discredited, but complementary and often more effective methods are suggested. These include both structured and unstructured observations, interviews with selected respondents

and key informants, and focus-group discussions. Helpful examples illustrate the use of the tools – and some of the pitfalls associated with them. As not many of the study tools described have been widely used yet in the water and sanitation sector, it is hoped that this book will act as a catalyst to their further refinement.

### *Importance of planning*

As with most studies, advance planning is crucial. In a hygiene behaviour study carried out before water and sanitation improvements are implemented, the aim is to identify those aspects of human behaviour which are most hazardous to health, and which can be modified through improved facilities and hygiene education. Post-project studies need to assess the extent to which anticipated behavioural changes have taken place, and to identify whether further intervention is necessary to accomplish greater health benefits.

As an aid to planning, hygiene behaviours are grouped into five 'domains', each with its own specific activities which may need to be studied:

- disposal of human faeces;
- use and protection of water sources;
- water and personal hygiene;
- food preparation and storage;
- domestic and environmental hygiene.

The combination of observation and interviews and the choice of behavioural indicators influence the timing, costs and success of a study. We can never measure everything; nor do we need to. Sometimes, conclusions can be drawn from secondary evidence that is much easier to collect than direct proof (there is no need, for example, to post observers for 48 hours to prove that a latrine is unused, if the access path is completely overgrown and the surroundings are scattered with faeces). That is why a hygiene behaviour study always consists of two phases: a preliminary exploratory phase, in which we seek to increase our understanding and find out what to study in detail, and how to study it; and a main study phase with further information gathering, data analysis, and production of useful results.

### **How long does it take?**

Study of hygiene behaviour need not be an especially time-consuming affair. The exploratory phase for a 'rapid study' may last from a few days to two weeks per community. More in-depth exploratory studies may extend to four to six weeks per community. The main study itself can be expected to last anything from a few weeks to a few months, and may have to be repeated, at least in part, if there are seasonal factors involved.

Information gathering is not the end of the exercise. Analyzing the results and developing conclusions and recommendations can take just as long. Nowadays, microcomputers can make a big difference to the time needed for data processing and

analysis, but processing power is not a replacement for interpretative skills. Comparisons of data collected by different observers/interviewers and matching of observations with interview responses require human insights and possible follow-up questioning.

Sampling is a way of reducing the amount of data to be collected and processed. Again there are a variety of methods used to ensure that samples are representative, and these have to be matched to the specific case under study.

## **Looking ahead**

In this book, we have tried to bring together a wealth of information, based on experiences of a lot of hygiene behaviour specialists, including in particular the 44 participants of the Oxford Workshop. This has been combined with documented knowledge on the links between hygiene behaviour and health, and with some specialist guidance on sampling. The result, we hope, will be of value to all those who need to consider the applicability of a hygiene behaviour study for their water supply and sanitation programme.

There remains a great deal to learn. Some of the experiences documented here will amuse you; some will depress you; some may appear to contradict one another; some may be in direct conflict with your own experience. Whatever your reaction, and whatever results you may achieve with your own hygiene behaviour studies, we hope you will share your experiences, so that our knowledge can increase and our work can improve.

If this book has increased your awareness of the need for hygiene behaviour studies, or helped you to design or implement such studies in the future, it can be judged to have been a success. If it has converted you from a sceptic to an advocate, that will be a bonus. Let us know what you think.

# 1. Introduction

*To evaluate how successful we are with water supply and sanitation improvements, and the likelihood of achieving health benefits, it is not enough to know whether facilities are working. We also need to know whether they are used, and if so, by whom, to what extent, for what purpose, and how. This poses further questions about the kind of changes in human behaviour which may have a positive impact on health.*

*To be successful in our hygiene education programmes, we have to spotlight human behaviour. At the beginning of a programme we need to investigate what behaviours are posing health risks and so should be addressed by hygiene education activities. At the end, we need to assess what changes in behaviour have occurred that are beneficial to health.*

*Before starting new water supply, sanitation and hygiene education activities, we need to understand present human behaviours in their social, economic and cultural setting. These are the foundations to build on for successful water supply, sanitation and health improvements.*

*If we can increase our understanding about the links between human behaviour and the transmission of water and sanitation-related diseases, we can develop better programmes with more impact on health.*

These are four important reasons for the study of human behaviour in relation to water supply and sanitation. The need for these studies is readily recognized. Actually doing the studies is not so easy. This is partly because human behaviour is complex, sensitive and culture-bound. It is also due to a lack of knowledge, experience, and readily available tools to study behaviour.

This book provides an introduction to the study of human behaviour in relation to water and sanitation. It is not a manual, but the reader will find practical information to carry out behavioural studies which are useful for the planning, implementation, monitoring and evaluation of water supply, sanitation and hygiene education programmes.

People active in the water supply and sanitation sector - mid-level and above - are the main intended users of this book. We assume that most of our readers are fairly familiar with general sector issues, but less so with doing research. Therefore, this book focuses on methods for studying hygiene behaviour that can be applied without too much expert

knowledge and skills. At the same time, the book also seeks to be useful to those with a research background, but less familiar with the water supply and sanitation sector.

For project-related hygiene behaviour studies it is highly desirable to involve someone with a social science background, to help in planning the study and to provide back-up support throughout the study process. If a more sophisticated research study is indicated, expert guidance and support may be needed from an experienced social scientist and, if appropriate, an epidemiologist. For more sophisticated research on human behaviour, a number of references are included in Annex 3.

## Definitions

The subtitle of the book refers to the study of hygiene behaviour. An extended glossary is attached as Annex 4, but for convenience these central terms are briefly introduced below.

The term **behaviour** in this book relates to human behaviour, that is *the way people act in general, especially in relation to the situation they are in or the people they are with*.

The term **hygiene** is derived from the Greek word *hygieinos*, meaning healthful, relating to health. The term hygiene as we use it, is *the practice of keeping oneself and one's surroundings clean, especially in order to prevent illness or the spread of diseases*.

Putting the terms behaviour and hygiene together we can broadly define good hygiene behaviour as a wide range of actions that promote health, from eating a healthy diet to washing hands after defecation (Bateman, WP 1991). In this book, the scope is limited to hygiene behaviours associated with the prevention of water and sanitation-related infectious diseases.

The term **study** refers to *the process of systematic learning about a particular subject*, in our case hygiene behaviour. There are many types of studies, such as baseline studies, health impact studies, and evaluation studies. Each study that will be carried out needs to be defined in terms of expected results/outcomes for a specified group of people. This makes the term 'study' more complicated than it appears at first sight. This issue will receive further attention in Chapters 3 and 7.

## How to use this book

This book covers many aspects of the study of hygiene behaviour in relation to water and sanitation. The seven chapters can be read either in sequence or selectively.

**Chapter 7** covers the **design and organization of hygiene behaviour studies** and so can be used as a framework for the other parts of the book.

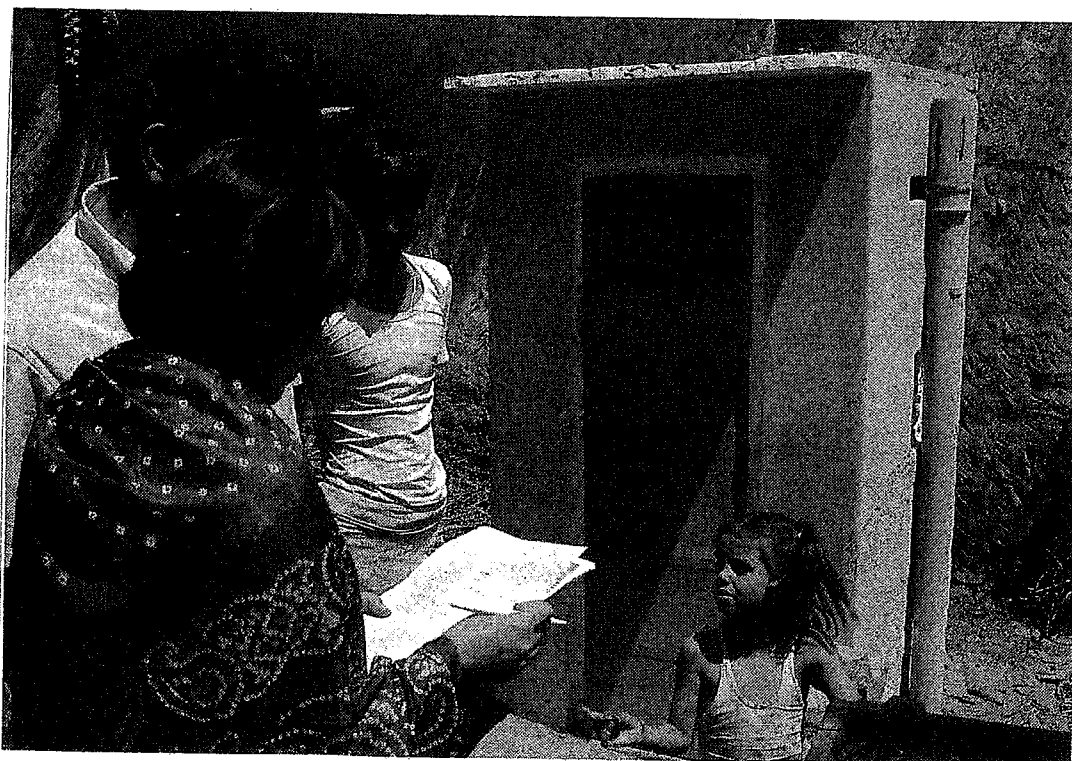
**Chapter 2** explores the **links between hygiene behaviour and health**.

**Chapter 3** discusses **why hygiene behaviour studies are important** and what kind of behaviours belong to the study of hygiene behaviour. It stresses that hygiene behaviours can only be studied meaningfully if put into their **socio-economic, cultural and demographic context**.

**Chapters 4 and 5** present an overview of the main ways of gathering information in the study of hygiene behaviour: observation and interviewing.

**Chapter 6** continues with information about some general methodological issues, such as the involvement of various groups of people in the different stages of the study, the selection and combination of observation and interview methods, sampling issues and the use of microbiology as a supportive tool in hygiene behaviour studies.

Extensive use is made of illustrations from a series of hygiene behaviour studies. These illustrations are meant to highlight and reinforce the text with examples from the field. The Workshop papers are referred to by the letters "WP" between the author and the year. Annex 2 lists all the Workshop papers, which are being published by Cairncross et al. (1992).



*How can we find out whether this latrine is used all the time by everyone in the family?  
Photo: IRC/Boot.*

## 2. *Hygiene behaviour and health*

Human behaviour is an important factor in the transmission of water and sanitation-related diseases. Hygiene behaviours, such as the use of a hygienic latrine and the frequent washing of hands, help to reduce disease transmission. In this chapter we explore the links between hygiene behaviour and health.

### 2.1 Prevention of water and sanitation-related diseases

#### *General preventive measures*

Water and sanitation-related diseases include various types of diarrhoea, worm infestations, skin and eye infections and vector-borne diseases. Over the years many studies have been carried out to increase our insight into prevention of the transmission of these diseases (Esrey et al., 1990). These studies indicate that, dependent on the type of disease and local circumstances, the preventive measures listed in Box 1 are particularly helpful in interrupting disease transmission:

#### **Box 1: Major preventive measures**

1. safe human excreta disposal
2. personal hygiene
3. domestic hygiene (and animal management)
4. food hygiene\*
5. water hygiene/consumption of safe water
6. safe wastewater disposal and drainage

The list makes clear that improved water supply and sanitation facilities are important measures. It is not just water quality that matters. Having the right quantity of water available is even more important. Reliable and easily accessible water sources are a precondition for satisfactory personal, domestic and food hygiene.

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\* *Food hygiene is the term most frequently used in the water and sanitation sector, though the specialists prefer to describe it as food safety. It is defined as all conditions and measures that are necessary during the production, processing, storage, distribution, and preparation of food to ensure that it is safe, sound, wholesome, and fit for human consumption (WHO, 1988). In this document the focus is only on those aspects of food hygiene/food safety which overlap or are related to problems of water and sanitation.*



Each preventive measure in the list involves a series of hygiene behaviours. For example, personal hygiene includes behaviours such as washing of hands after defecation and before food preparation and eating, as well as bathing and face washing, washing of clothes, use of a clean towel. To take account of this complexity, we call each major preventive measure a 'domain of intervention'. The boundaries between the domains are rather fluid, as the same behaviours may appear in several domains. Thus, handwashing after defecation is indicated both for personal hygiene, and for the safe disposal of human excreta.

### *Priority preventive measures*

Research has shown that behaviours and facilities associated with the safe disposal of human excreta and the use of more water for personal, domestic and food hygiene are among the most important measures for cutting off transmission of several important diseases (Esrey et al., 1986). Having said that, the particular transmission pattern of each disease and the particular local circumstances in an area will always determine what will be the best preventive measure at a certain point of time.

Table 1 summarizes the main transmission patterns and major preventive measures according to type of disease. The transmission patterns can be complex. For example, various disease organisms that cause diarrhoea follow multiple routes from faeces to mouth.



*Safe excreta disposal and handwashing after defecation are two important hygiene behaviours. Drawing: WaterAid, Ghana.*

*Table 1: Transmission patterns and preventive measures for water and sanitation-related diseases*

<i>Infection</i>	<i>Transmission pattern</i>
Various types of diarrhoeas, dysenteries, typhoid and paratyphoid	From human faeces to mouth (faecal-oral) via multiple routes of faecally contaminated water, fingers and hands, food, soil and surfaces (see Figure 1). Animal faeces (from pigs and chickens) may also contain diarrhoeal disease organisms.
Roundworm (Ascariasis), Whipworm (Trichuriasis)	From faeces to mouth: Worm eggs in human faeces have to reach soil to develop infective stage before being ingested through raw food, dirty hands and playing with things that have been in contact with infected soil. Soil on feet and shoes can transport eggs long distances. Animals eating human faeces pass on the eggs in their own
Hookworm	From faeces to skin (especially feet): Worm eggs in the faeces have to reach moist soil where they hatch into larvae which enter the skin of people's feet.
Beef and pork tapeworms	From faeces to animals to humans: Worm eggs in human faeces are ingested by a cow or pig where they develop into infective cysts in the animal's muscles. Transmission occurs when a person eats raw or insufficiently cooked meat.
Schistosomiasis (bilharzia)	From faeces or urine to skin: Worm eggs in human faeces or urine have to reach water where they hatch and enter snails. In the snails they develop and are passed on as swimming "cercariae" which penetrate the skin when people come into contact with infested waters. In the Asian version of the infection, animal faeces also contain
Guinea worm	From skin to mouth: The worm discharges larvae from a wound in a person's leg into water. These larvae are swallowed by tiny "water fleas" (cyclops), and people become infected when they drink this contaminated water.
Scabies, ringworm, yaws	From skin to skin: Both through direct skin contact and through sharing of clothes, bedclothes and towels.
Trachoma, conjunctivitis	From eyes to eyes: Both direct contact with the discharge from an infected eye and through contact with articles soiled by a discharge, such as towels, bedding, cloth wash basins, washing water. Flies may also act as transmission agents.
Louse-borne typhus, Louse-borne relapsing fever	From person to person: Through bites of body lice which travel from person to person through direct contact and through sharing clothes and bedclothes, particularly when underwear is not regularly washed.
Malaria, yellow fever, dengue	From person to person through the bite of an infected mosquito. The mosquito breeds in standing water.
Bancroftian filariasis	From person to person through numerous bites by infected mosquitoes. The mosquitoes breed in dirty water.

## HYGIENE BEHAVIOUR AND HEALTH

<i>Infection</i>	<i>Major preventive measures</i>					
	<i>safe human excreta disposal</i>	<i>personal hygiene</i>	<i>domestic hygiene (and animal management)</i>	<i>food hygiene</i>	<i>water hygiene/ safe water consumption</i>	<i>wastewater disposal and drainage</i>
Various types of diarrhoeas, dysenteries, typhoid and paratyphoid	●	●	●	●	●	
Roundworm (Ascariasis), Whipworm (Trichuriasis)	●	●	●	●		
Hookworm	●		●			
Beef and pork tapeworms	●			●		
Schistosomiasis (bilharzia)	●	●	●			
Guinea worm					●	
Scabies, ringworm, yaws		●	●			
Trachoma, conjunctivitis		●	●			
Louse-borne typhus, Louse-borne relapsing fever		●	●			
Malaria, yellow fever, dengue			●			●
Bancroftian filariasis	●		●			●

A diagram providing a simplified illustration of the various routes of faecal-oral transmission is presented in Figure 1. Faecal contamination of water, fingers and hands, and the environment sets the stage for transmission of disease to a new person. Contaminated water may be ingested directly; it may be used in the preparation of food, leading to contamination; or it may be used to wash utensils, drinking and water storage vessels, as well as foods themselves, thereby contaminating drinking water or food. Contaminated fingers and hands may lead to faecal-oral transmission of diseases through direct contact with the mouth, through contamination of drinking and cooking water, contamination of foods, and contamination of cooking utensils and vessels for drinking water and water storage. Contaminated soil and surfaces are also links in the transmission chain. Flies may contribute to the transmission of diarrhoea as they frequent both faeces and food (Bateman, WP 1991).

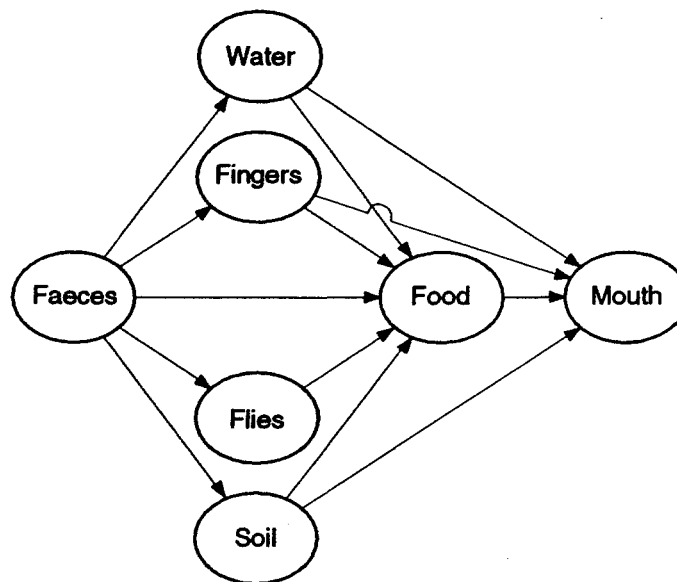


Figure 1: Faecal-oral transmission routes.

It is very important to be familiar with the various transmission patterns, so as to be able to identify which particular hygiene behaviours and measures can help to interrupt disease transmission. In general, preventive behaviours and measures can be grouped under two types of barriers:

- (A) The *primary* barrier to disease transmission prevents infectious organisms from getting into the environment in the first place. In the case of faecal-oral disease transmission, the primary barrier is adequate sanitation, such as the proper use of a well maintained latrine. Effective isolation of faeces eliminates the possibility of faecal contamination of water, soil and surfaces, food, and flies. Prevention of contamination of the environment with animal faeces, through corralling or removal of animals, can also be considered a primary barrier to transmission.

- (B) When there is no primary barrier to keep infectious organisms out of the environment, or when, as is typically the case, the primary barrier works imperfectly, *secondary* barriers must be relied on to prevent the transmission of disease. These secondary barriers include: (a) avoiding infectious organisms – for example by avoiding unsafe sources of drinking water and (b) removal or destruction of infectious organisms – for example by thorough cooking of food (Bateman, WP 1991).

For the effective interruption of each water and sanitation-related disease it is usually necessary to perform a series of hygiene behaviours (Table 1, under “Major preventive measures” read horizontally). A singular exception to this rule is Guinea worm, which is effectively interrupted simply by avoiding drinking contaminated water. The opposite is also true: one single hygiene behaviour may interrupt the transmission of several diseases at the same time (Table 1, under “Major preventive measures” read vertically). Handwashing is an obvious example. Whereas handwashing may help to interrupt both some diarrhoeal and eye diseases it is only one measure in disease prevention. This duality has to be kept in mind when deciding on the study of specific hygiene behaviour.

**Box 2: Duality in the links between behaviour and the prevention of diseases**

*ONE disease:*

a series of hygiene behaviours will usually be required to reduce one disease

*ONE hygiene behaviour:*

a single hygiene behaviour may help to reduce the transmission of several diseases

## 2.2 Evidence of links between behaviour and health

Whereas on a general level we have a fairly good impression about the main transmission patterns and preventive measures of water and sanitation-related diseases, our knowledge about links between *specific hygiene behaviours* and health is much more limited. Below are some examples of studies which show evidence of links between specific behaviours and health. They do not claim to provide more than a first insight into the present state of the art. From the available literature it appears that handwashing has been subject to many studies, whereas other specific behaviours have received much less attention. More studies were carried out in Asia than in Africa and South America.

### *Safe excreta disposal*

Safe excreta disposal is one of the primary barriers to the transmission of diarrhoeas and worm infections, as it helps to prevent the disease organisms from getting into our environment. Several studies confirm the importance of preventing faecal contamination

of the living environment. Rahman et al. (1985) concluded that in households without a latrine, where faeces would be left where first deposited - whether among the bushes in the case of adults or in the courtyard in the case of children - infant mortality was 2.76 times higher than in households where a latrine was used. Clemens et al. (1987) and Han et al. (1990) also found that open defecation by young children in the family living area was associated with a higher incidence of childhood diarrhoea.

Muller et al. (1989) wanted to know how important it is to have a high standard of latrine construction for the safe disposal of human excreta. *Ascaris* eggs in the soil of the yard and in the faeces of household members were taken as the indicator. It appeared that there was no significant difference between the type of latrine in use and the presence of *Ascaris* eggs. There was a high count of *Ascaris* eggs in the yard and in household members, where young children practised open defecation in the living area. Whereas the type of latrine seems to be of little importance, its cleanliness has been shown to be a key factor in reducing disease transmission. Koopman (1978) carried out a study in 14 primary schools and found that unhygienic toilet conditions were related to diarrhoea. It was estimated that if all schools could reach even a modest level of hygiene, diarrhoea could be reduced by 44% and vomiting by 34%.

### ***Contamination of hands and the effectiveness of handwashing***

Hands are generally believed to be important vehicles in the transmission of diarrhoeal diseases (Aziz et al., 1981). Han et al. (1986) demonstrated that hands readily become contaminated after defecation. Interestingly, mothers who used water for anal cleaning had more contaminated hands than those who used paper.

Kaltenthaler et al. (1988) point to several other factors that influence the contamination of hands. High humidity correlates with high counts of faecal coliforms and faecal streptococci on hands, showing the need for more frequent handwashing during the humid seasons. Household members with an infant have significantly more contaminated hands, as do mothers who don't have time to attend to hygiene in the family because of extreme poverty.

A person's activity also effects the bacterial counts. People involved in outdoor agricultural activities appeared to have the highest counts on their hands. Those involved in activities using water, such as bathing children, washing clothes and washing dishes had low counts, even though the water would probably be quite contaminated bacteriologically from the child's body, the clothes or the dishes. Whereas Kaltenthaler et al. did not investigate the relation between hand contamination and diarrhoeal disease, this was part of a study by Henry et al. (1990). Their results show a correlation between childhood diarrhoea and the degree of contamination of a child's hands. A study by Pinfold et al. (1988) points in a similar direction. They found a significant tendency for there to be less faecal contamination on the hands of family members with in-house water connections than of households which had to carry their water home. Many studies have shown that in-house water supplies are also associated with greatly reduced rates of diarrhoea.

Handwashing with soap after defecation and before taking food proved to be effective in reducing the incidence of diarrhoeal diseases in a study by Khan (1982). Han et al. (1989) arrived at a similar conclusion in their study on the prevention of diarrhoea by handwashing with soap. Studies by Alam et al. (1989) and Clemens et al. (1987) indicate that handwashing by mothers is one of the major factors contributing to a lower incidence of childhood diarrhoea. Daniels et al. (1990) concluded that the introduction of latrines produced an overall reduction of 24% in the incidence of reported diarrhoea, but that the impact appeared to be greater in households where mothers reported handwashing after defecation and the use of larger quantities of water.

Results of a study by Lanata (WP 1991) indicate a relation between the use of more soap and larger quantities of water for handwashing by mothers, and a lower diarrhoea incidence in infants of 6-18 months. An interesting outcome was that the number of handwashings per day appeared to be more important than the reasons for it, whether before cooking or eating, or after defecation. This is probably because handwashing works in two ways. First, it washes off potentially dangerous bacteria from contaminated hands. Second, it also removes material ('dirt') which could harbour such bacteria; this reduces the survival time of bacteria which get onto hands by subsequent contamination.

*Feachem (1984) examined the effectiveness of handwashing with soap on diarrhoea rates by reviewing three studies from Bangladesh (Khan, 1982), the USA (Black et al., 1981) and Guatemala (Torun, 1982). All three studies showed an important impact of handwashing on diarrhoea rates:*

- *a 35% reduction in the incidence rate of shigellosis among all ages in urban families in Bangladesh;*
- *a 37% reduction in the incidence rate of non-shigella diarrhoea among all ages in urban families in Bangladesh;*
- *a 48% reduction in the incidence rate of all diarrhoea among children aged 6-29 months in daycare centres in the USA;*
- *a 14% reduction in the incidence rate of all diarrhoea among children ages 0-71 months throughout the year in a Guatemalan village;*
- *a 32-36% reduction in the incidence rate of all diarrhoea among children aged 0-71 months during the peak diarrhoea season in a Guatemalan village.*

More recently, a study by Wilson et al. (1991) in Indonesia found that the promotion of handwashing by mothers and their children reduced the prevalence not only of diarrhoea, but also of conjunctivitis.

Hoque et al. (1991) compared the cleanliness of hands after handwashing using ash, soap, clean mud or plain water only. The results show that all three washing agents were more or less equally effective in reducing faecal coliform hand contamination, while reduction of hand contamination by water alone was not significant. Their conclusion is that the most important factor is not the washing agent itself, but the time spent on handwashing, the rubbing of hands probably doing the trick. Past research by Lowbury et al. (1964) and Sprunt et al. (1973) and a more recent study by Kaltenthaler et al. (1988)

also point in this direction: more time spent on handwashing with some vigour may be as effective as handwashing with soap. Kaltenthaler et al. add that unless the price and availability of soap is a major obstacle, it is advisable to promote handwashing with soap, as this is easier to implement than prolonged rubbing of hands with water only. A still unpublished study by Pinfold et al. indicates that the quantity of poured water, the length of rubbing and the use of soap all help to increase the cleanliness of hands.

### ***Washing and bathing***

Personal and domestic hygiene practices play a significant role in reducing the spread of eye and skin diseases such as trachoma and scabies. Prost et al. (1989) reviewed a number of studies on the transmission of trachoma. These studies indicate that daily face washing can reduce both the prevalence and the intensity of trachoma in children. More water for personal hygiene is the crucial factor. This is also clear from the finding that a shorter distance to a water source is associated with a lower frequency of trachoma. Thus, a trachoma survey in Mozambique found a 19% prevalence of trachoma in a village with a water supply, while the prevalence was twice this figure in another village with no supply (Cairncross et al., 1987). The quality of water does not seem to have an effect on the prevalence of trachoma.

A study on the incidence of scabies by Stanton et al. (1987b) showed that, apart from economic factors, the overall level of hygiene in a family was associated with the risk of scabies. Unfortunately the study did not determine which hygiene factors were strongest related with the incidence of scabies. It has been suggested in various studies that scabies and other infections of the skin can be prevented or reduced by regular body washes, but evidence is not conclusive.

### ***Water hygiene***

Safe drinking water is especially important for the prevention of Guinea worm disease and various types of diarrhoea. Guinea worm has only one transmission route and can be successfully interrupted to zero prevalence, just by drinking only uncontaminated water (Huttly, 1990). On the other hand, safe drinking water is only one measure in the prevention of diarrhoeas, and unlikely to be effective on its own (Henry et al., 1990; Rahman et al., 1985; Victora et al., 1988).

Lindskog et al. (1985) found that water easily becomes contaminated between the tap and consumption at home. Other studies, as summarized by Burgers et al. (1988) confirm the risk of water contamination between collection and use through various behaviours, such as collection and storage of drinking water in open vessels, and in vessels which are not cleaned regularly, use of communal cups to draw water, and hands touching the water during collection, storage and use.

The role of such domestic water contamination in the transmission of disease is not clear. For example, Kirchhoff et al. (1982) found that disinfection of heavily contaminated



water stored in the home has no effect on diarrhoea incidence, while Deb et al. (1986) did find that the use of long-necked water storage jars, preventing contamination of the stored water, did help to protect families from cholera. Yeager et al. (1991) reported that diarrhoeal incidence of children was lower in households using water reservoirs with a tap, and higher when a bucket had to be used to retrieve the water. A study by VanDerslice et al. (1991) indicates that water source contamination is a more important transmission route for enteric pathogens (disease-causing organisms) than contamination of water between collection and use. One reason may be that pathogens contaminating the water source come from 'outside' and therefore create the risk of initiating new infections in the family, whereas pathogens contaminating collected water come from "inside" as they are already present in the household environment.

### *Food hygiene*

Food acts as another important vehicle in the transmission of various diarrhoeas and worm infections (Käferstein et al., 1990). Esrey et al. (1989) reviewed available literature on studies about the relation between food hygiene practices and diarrhoea. They conclude



*Food hygiene and handwashing before eating help to prevent the transmission of various types of diarrhoeas and worm infections. Drawing: KWAHO, Kenya/Waterkeyn.*

that there is still a lot to learn about how diarrhoea incidence may be influenced by food handling, preparation and storage practices.

Their literature review showed evidence that poor food hygiene practices contribute to the contamination of food. Handwashing and cleaning of kitchen and eating utensils may result in reduced contamination. Cups and spoons are likely to be less contaminated than bottles and teats. Cleaning of the food preparation area may reduce cross-contamination. Undercooked food or inadequately reheated food may be highly contaminated, not only because bacteria do not get killed but also because with the 'right' temperature bacteria may rapidly multiply. Food is best consumed as quickly as possible after preparation, because food stored outside a refrigerator (as will usually be the only possibility in large parts of the world) will suffer from rapid multiplication of bacteria.

The conclusion of the review is that food is easily and frequently contaminated, and that this contamination may be linked to specific food hygiene practices. The levels of faecal contamination found in foods are often many orders of magnitude greater than usually found in contaminated water. In the circumstances, it is remarkable that relatively few studies were able to demonstrate an association between food hygiene practices and diarrhoea. One of the reasons may be that since diarrhoea is transmitted by many routes, a reduction in food contamination may be offset by the ingestion of disease organisms from other sources, such as water, hands or objects. This is further discussed in the last part of this section.

In a study by Black et al. (1989), it was found that samples taken from raw foods indicated that cereals, dairy products, and meats were the most frequently contaminated with *E. coli*. Samples of evaporated canned milk taken within one hour of opening had a lower frequency of contamination (3%) than those taken after an hour or more of storage at ambient temperatures (43%). Furthermore, after one hour, some of the samples had a very high *E. coli* colony count (20% > 1000 per ml), indicating extensive multiplication of bacteria in the can. Milk and food items specially prepared for infants (cereals and purée) were more likely to be contaminated than foods prepared for the entire family (such as soups, stews and fried foods). However, for most food items, the frequency of contamination was related to the amount of storage time since initial preparation. Teas, which were often given to infants beginning in the first month of life, had a low frequency of contamination after preparation by heating and if served in a cup, but high levels of contamination if served in a baby bottle. Also, a high proportion of baby bottles and bottle teats were contaminated. Other potential sources of food contamination were the utensils used and the hands of mothers or other persons responsible for food preparation.

A literature review by Motarjemi et al. (1992) shows that weaning food is a major risk factor in the cause of diarrhoea and associated malnutrition. Infants and young children are very vulnerable, and if they consume contaminated weaning foods they are likely to contract diarrhoeas. The interaction between diarrhoea and malnutrition is complex, but it is generally accepted that diarrhoeal diseases affect children's growth once weaning is initiated. The sources of weaning food contamination are numerous, the storage of cooked food at ambient temperature probably being the most critical one. The authors therefore

conclude that it is of the utmost importance to promote breast feeding up to two years and beyond and to promote the safe preparation and handling of weaning food to protect the health and nutritional status of infants and children (see also Annex 5).

### *Water contact*

Schistosomiasis is a water-contact disease and the duration of water contact seems to be an especially important factor in its prevalence. A study by Klumpp et al. (1987) revealed no infections in the 0 to 4 year age group, a rapid build-up of infection to age 14, the peak between age 15 and 19, and then a rapid decline. This curve paralleled the curve for water contact duration. Also, in all age groups above the age of four, water contact for males was of longer duration than for females and included more time playing and wading, and this finding correlated with much higher incidence and prevalence rates of schistosomiasis in males.

Water contact patterns have, however, been shown to vary according to occupational, social and cultural factors. In many studies, female water contact has been higher than that of males, and domestic activities have been important in exposing women to infection. In St. Lucia (Dalton, 1976), washing clothes resulted in the highest duration of contact and the number and duration of all contacts were significantly correlated with the number of persons infected with intestinal schistosomiasis. At the Volta Lake, Dalton et al. (1978) found that both domestic water contact activities and activities associated with fishing canoes were significantly related to infection with urinary schistosomiasis. In other studies, swimming has been shown to be important in the acquisition of infection (Kvalsvig et al., 1986).

The correlation between exposure and infection is not straightforward, and comparisons between infection profiles and water contact profiles can be misleading (Bundy et al., 1990). The risk of infection is influenced by factors other than the duration of water contact: the activity performed, the extent of body surface exposed, the site of contact and the time of day all influence the exposure that occurs. Studies in Kenya (Butterworth et al. 1985) and The Gambia (Wilkins et al., 1987) have shown that water contact patterns alone are not adequate to explain the pattern of infection in older children and in adults. In The Gambia, while the intensity of reinfection increased with increasing exposure in children aged 2-9 years, less increase in reinfection occurred in adolescents (10-14 years). In adult females, even individuals who have high levels of exposure had a low intensity of reinfection. It appears that adults are less susceptible to infection than children and an immune response can be built up slowly through repeated infection. Behaviours leading to exposure may be a major determinant of schistosome infection in childhood, so reducing exposure through changes in such behaviour could be used to reduce infection (Bundy et al., 1990).

In another study on the relation between water contact and the prevalence of schistosomiasis, the influence of a change in working hours of canal cleaners was investigated, based on the knowledge of the life-cycle of the cercariae. The cercariae

emerge from the snail during sunlight, with a peak at noon. As they are only infective up to twelve hours, the water does not contain infective cercariae in the early morning. The working hours of the canal cleaners were shifted from mid-day to early morning, and this resulted in a significantly lower prevalence of schistosomiasis infection. However, the results would have been even better if the canal workers had not used the canals for bathing and domestic purposes in the afternoon. The authors conclude that changing the working hours is helpful, but clear information on why to avoid canal water in the afternoon should also be provided (Tameim et al., 1985).

### ***Soil contact***

Killewo et al. (1991) provide us with an example that wearing some kind of footwear can be effective in interrupting the transmission of hookworm, as the prevalence of hookworm among schoolchildren who had to wear shoes was significantly less than among children not attending school. Yeager et al. (1991) found that whether or not the child was seen eating soil (as reported by the mothers) had significant effect on mean diarrhoeal incidence.

### ***Flies***

Flies are generally believed to play an active role in the transmission of diarrhoea, and a number of studies point in that direction. For example, in two studies in the USA, towns sprayed with DDT insecticide had significantly lower fly densities and lower incidence rates of shigellosis and diarrhoeal disease in children, than did matched control towns without fly control (Lindsay et al., 1953). These studies indicate that it is well worthwhile to keep flies away from the living environment (but not by the use of DDT, because of the damaging effect on the environment and the resistance of houseflies to this insecticide). Oo et al. (1989) also conclude that it is worth keeping flies away from kitchens and food to reduce the risk of diarrhoeal diseases, as their study revealed that flies can be carriers of enteric bacterial pathogens, such as cholera, shigellosis and Salmonella infections. Cohen et al. (1991) found that in military camps where intensive fly control measures were implemented (mainly by using fly traps), the soldiers suffered significantly less from diarrhoeal disease, than soldiers in camps where no such measures were taken.

A systematic review of evidence that flies contribute to the transmission of diarrhoea has been carried out by Esrey (1991). The reported studies (mostly conducted prior to 1960) indicate that many pathogens causing diarrhoea in humans can survive on flies for up to 10 days. They can also be carried in the gut of the flies and deposited on the food. Although from the reviewed studies Esrey could not conclude that flies play a role in the transmission of diarrhoeal diseases, it is still a fact that flies are a potential source of contamination of food and water (Motarjemi et al., 1992).

Flies are also known to play a role in transmitting conjunctivitis in various settings, and there is strong circumstantial evidence to suggest that they can also transmit trachoma (Jones, 1975; Prost et al., 1989). It is probably for this reason that improvements in excreta disposal have also been found to be associated with reduced prevalence of trachoma.

*Animal contact*

There are many open questions and conflicting information about the role of animals in the transmission of water and sanitation-related diseases. Cows, pigs, chickens and other animals in the living area may or may not influence the transmission of diarrhoeas. Black et al. (1989) found that in the study households more than half of the chickens and cats and 25% of the dogs were infected with *Campylobacter jejuni* and that the infants in these households were significantly more likely to acquire *C. jejuni* infection, indicating that animal faeces is likely to be an important source of infection, transmitted either through direct contact or by family members, objects or food in the house. Clemens et al. (1987) could not find a relation between the incidence of childhood diarrhoea and whether animals were allowed to be in the kitchen.

Lenata (WP 1991) reported that corralling of animals was not effective in reducing diarrhoea rates, suggesting that it is not a primary transmission route. Huttly et al. (1987) surprisingly found that where animals were allowed inside the house, there was a significant reduced risk of diarrhoea, particularly among older children. There seems to be no explanation for this finding. In a study by Jenkins (WP 1991) it was found that the most significant risk associated with the transmission of diarrhoeal diseases was the mother and child sleeping with the family pigs. An observation study by Marquis et al. (1990) showed that children (< 5 years of age) are likely to touch chicken faeces with their fingers when these are present in the living area. They also readily put their fingers in their mouths. The results of this study indicated that children in families where household chickens were infected with *C. jejuni* were 12 times more likely to have diarrhoea than those in homes without chickens. Thus the authors recommend that, to reduce faecal-oral contamination, all poultry should be corralled and not allowed access to the house.

*Combination of behaviours*

Though in the above studies we have tried to provide evidence of links between particular behaviours and health, more often than not a reduction in water and sanitation-related diseases can only be achieved by a combination of hygiene behaviours (Briscoe, 1984; Esrey, 1991). We have already made this point in Section 2.1 and it is re-emphasized in various recent studies. For example, a study by Alam et al. (1989) shows that a combination of the use of clean water, the absence of child's faeces in the yard, and mother's handwashing after defecation and before food handling, resulted in a reduction of more than 40% in the incidence rate of diarrhoea compared with when only one of these behaviours was observed. Huttly et al. (1987) conclude in their study on the epidemiology of acute diarrhoea that a combination of personal and domestic hygiene and hygienic weaning and feeding practices of young children are important to prevent diarrhoea.

Hurtado (WP 1991) found that the following five behaviours were significantly associated with higher rates of diarrhoea in children: 'mother's hands dirty'; 'water containers in house uncovered'; 'baby bottle on ground or floor'; 'human faeces in living area'; and 'animals in living area'. Several studies indicate that a general high level of a



*The multiplicity of health threats means that a series of hygiene behaviours is usually required to reduce disease transmission.*

*Drawing: KWAHO, Kenya/Waterkeyn.*

series of hygiene behaviours is most effective in preventing water and sanitation-related diseases, and that specific behaviours, such as handwashing or washing and drying of kitchen utensils are to be considered as indicators of the general hygiene situation. We will come back to this in Chapter 7.

The significance for health of a specific behaviour depends particularly strongly on the other behaviours which precede or follow it – in other words, on the sequence of behaviours. To take a trivial example, washing one's hands *after* eating is very different from washing them beforehand. Any study of hygiene behaviour therefore needs to consider each action, not in isolation, but as a part of a sequence of activities. In Section 3.3 this issue will receive further attention.

### **2.3 Cultural perspectives on hygiene and health**

Irrespective of bio-medical evidence, everybody has notions about what is good and what is bad for our health. Also, everybody has notions about what is clean, hygienic, or pure, and what is dirty, unhygienic or polluting. These notions may differ per family, local community, nation, or religious, socio-economic or ethnic group. What these notions have in common is that they influence our daily practices and hygiene behaviours.

*“Hygiene behaviour is likely to be related to fundamental issues about cleanliness that are inculcated and absorbed at a very early age so that one of the first things that small children are taught is the distinction between what is clean and what is dirty. This knowledge becomes almost instinctive and it may therefore be hard for people to (...) be aware of their own patterns of behaviour” (Zeitlyn, WP 1991).*

### *Concepts of purity and cleanliness*

Purity can be defined as a state of ritual cleanliness, whereas cleanliness itself refers to a physical state. In Hindu and Moslem worlds, concepts of clean and dirty and purity and impurity are well developed and have a strong effect upon personal and household hygiene. Thus, in some Hindu areas the wife will only enter the kitchen in a pure state, that is after she has washed herself and put on other clothes, and not when she is menstruating (Kochar, 1991). In the Moslem world, ritual impurity is the usual state in which one is found. Purification involves washing of one's hands, face, and feet before prayer, and taking a complete bath after sexual contact, menstruation, and childbirth (Simpson-Hébert, 1984). However, purity and cleanliness are not always two sides of the same coin. For example, a person can observe purity rites and wash hands before prayer, but not do this before eating.

*Kochar (1978) in his study on hookworm transmission provides us with an example of the relationships between purity and cleanliness. "Among rural people in Bengal, notions of the pure and the sacred, and of the polluted and profane, are in many ways the rules for personal hygiene as well as for ritual. A popular text on daily rituals for orthodox Hindus includes procedures, prescriptions and even sacred chants to go with cleaning the mouth, applying oil, bathing, grooming, and so on. The canons of 'folk hygiene' embody some very powerful notions of personal cleanliness."*

In many cultures and societies, human excreta are considered to be polluting and dangerous in ways far beyond or apart from the bio-medical model of disease transmission. At the same time, the excreta of babies and little children are often considered to be harmless in all respects. Also, among many groups of people, the left hand is used for anal cleansing, and no matter how well this hand is washed afterwards, it remains the 'dirty' hand and should never be used for handling and serving food, eating, shaking hands, etc.

*Hall et al. (1991) report in their study on water, sanitation and health that "the faeces of a child that is only breast-feeding are not considered to be "dangerous" (when it has diarrhoea) by the vast majority of interviewees. Only four respondents said that infants' faeces were dangerous "from birth". The rest offered different ages (ranging from about two to six) but stressed that faeces become dangerous once a child starts to eat solid foods and the faeces begin to smell. This, they stressed, was the sign of danger. As for the cause of faeces becoming dangerous, a few interviewees suggested the mixing of foods in the stomach. Others said that young children's faeces were not dangerous until they have suffered from serious diseases such as tuberculosis."*

What is considered as being clean is also not the same everywhere and for everybody. Kendall et al. (WP 1991) noticed in their study on health behaviour that people considered a face recently wiped by a dirty rag also as being clean, and that mothers did not

differentiate dipping hands in water from washing hands. Fukumoto et al. (1989) discovered that mothers perceive three kinds of 'dirtiness' that may lead to handwashing:

- *Perceived 'dirtiness': when hands look, feel or smell dirty to the mother. She washes her hands when they are visibly soiled, smell strongly, for example of kerosene, or when they feel sticky. This is the most common type of hand-washing. Essentially the hands are washed because they feel uncomfortable.*
- *Contaminating 'dirtiness': when the hands have been in contact with anything considered dirty, such as money, garbage or adult human faeces. All of these are felt to be vehicles of different illnesses. Although mothers report that they wash their hands on these occasions, observation shows that this is not always the case. Baby stools are also not considered to be dirty or contaminating.*
- *Social 'dirtiness': when mothers wish to improve their general physical appearance. This type of handwashing is very common and occurs before going out, or receiving guests at home. It is associated with aesthetic or social values.*

### ***Perceptions about transmission of diseases***

There are many local perceptions about causes, and thus about treatment and prevention of water and sanitation-related diseases. For example in northern Ghana, Guinea worm is generally believed to be in the blood of people, and inherited. It is thought to depend on the resistance of the individual whether or not a person is able to suppress the worm. This explains why although all people drink the same water, some get Guinea worm year after year while others never get it. People also differentiate between natural and supernatural Guinea worms. The former are easy to cure, the latter may be very dangerous and last a long time (Murre, personal communication).

Weiss (1988) made a global review of ideas about causes of diarrhoea and concluded that in a wide variety of cultures, one or more of the following causes are acknowledged:

- foods that are fatty, not cooked adequately, or heavy;
- imbalance of hot and cold that may be associated with foods, exposure to draughts or seasonal changes;
- normal or poor quality breast milk;
- physical factors, such as a fall (in case of a sunken fontanelle due to dehydration), or poor caretaking;
- supernatural causes, including possession, sorcery, witchcraft, divination or evil eye;
- pollution from exposure to or inauspicious contact with ritually impure persons or things;
- moral misbehaviour, including deeds of the sick person or a sick child's parents, for example sexual intercourse or pregnancy while breastfeeding;
- natural consequence of milestones, especially teething, crawling and walking;
- infection, which may be associated with hygiene and sanitation (but which may be difficult to distinguish from ideas about pollution).



These cultural perceptions about causes of water and sanitation-related diseases result in behaviours for the prevention and treatment of these diseases that may differ from behaviours based on the biomedical perspective. For example, Sinhalese women in Sri Lanka will try to avoid an overconsumption of “hot” and heavy foods during pregnancy and breastfeeding, to prevent their babies from getting diarrhoea (Nichter, 1988). This is quite a different type of avoidance behaviour from the ones discussed as a “secondary barrier” to disease transmission under Section 2.1, eg. the avoidance of unsafe drinking water, or the avoidance of putting unclean objects in the mouth. The opposite may also apply, as some behaviours that we would consider as hygiene behaviours may be practised for quite different reasons. Thus, Kaltenthaler et al. (1988) state that when they asked why handwashing was important as many as 53% of the people mentioned reasons unrelated to the prevention of disease. And Gwairisa (WP 1991) reports that the persons interviewed in her study attached much more importance to the availability of toilets for convenience and privacy reasons, than for reduction of diseases.

Cultural perceptions about causes of water and sanitation-related diseases will often vary between different groups of people and may change with time.

*“We found that very few mothers buried their children’s faeces. However, from some very old people, we learned that in the past (and in a very limited way today) mothers ‘always’ used to bury the faeces of breast-feeding infants for a rather peculiar reason. They believed that if a dog ate such faeces the infant would then be inflicted by a serious case of red, foamy diarrhoea (this view is in keeping with more widely held beliefs that a person’s excreta, hair, nail clippings and so on, may be used by another to inflict harm against them). These old people claimed that in their youth (i.e. when they were young mothers) there was not so much diarrhoea as one finds today. They attributed this to the consistent burial of infants’ faeces.*

*A young mother told us that one day she ‘tested’ the idea by throwing out her child’s faeces onto the ash-heap so that a dog could eat them: ‘Sure enough, my child soon had very bad red diarrhoea’. From then on she was very careful to bury them. This mother was an exception. The vast majority simply discard their children’s faeces on the ash-heap regardless of the age or health of the child. In other words, old beliefs which inspired (for whatever reason) a sanitary practice are no longer held and the message about burying children’s faeces (spread by PHC staff and VHWs) had not been given an equivalent credency” (Hall et al., 1991).*

### ***Beliefs about water and health***

Mukherjee (1990) provides us with an example of people’s beliefs about good and bad water. Based on a country-wide study in India she concludes that the popular definition of ‘good drinking water’ is water that is visually clear, tastes sweet (free of unpleasant flavours and odours) and cooks food well and quickly. Conversely, bad water or water unfit for drinking is that which is visually unclear, has a tinge of colour, salty or metallic

taste or smell, and water in which grains and pulses take a long time to cook. Thus, the criteria people presently use to distinguish 'good' water from 'bad' can at times cause people to reject safe sources as 'unfit for drinking', for example handpump water which may have a metallic taste or rusty appearance.

The study also revealed that there is a large variety of ideas about how health is affected by bad drinking water. Across the various states of India, 88-95% of the people believe that bad drinking water causes health problems. However, when asked what these health problems are, the majority mentioned fever, cough and colds, sore throats, etc., which are not directly related to drinking water quality. Only 10-18% of the people were aware that unsafe water can cause diarrhoea and stomach disorders. Also, only 11% of the people in fluorosis affected areas were aware of the fluorosis - drinking water link. Some 13% of the people erroneously linked malaria with bad drinking water (Mukherjee, 1990).

In their study on the use of soap and water in two Bangladeshi communities, Zeitlyn et al. (1991) present another example:

*"An important characteristic of water is its temperature and its capacity to cool. Many substances are classified according to their inherent hot or cold qualities. Cold temperatures are believed to cause many health problems, so people are anxious not to suddenly cool their bodies. Villagers in the Chandpur community never bathe in water from tube wells because they perceive it to be more cooling than pond water. Similarly, a mother whose baby has a cold will avoid drinking well water lest her breast milk becomes too cool. Mothers avoid using soap on their babies because they believe soap makes the water colder. Soap is also seen as an expensive, foreign product to be used as a luxury rather than an everyday necessity".*

Cultural attitudes and beliefs are important motivators for behaviour, but these are not fixed and may be adapted because of other changes. For example, in northeast Thailand the taste of water is an important criterion for selection of a drinking water source. Open shallow wells are the traditional drinking water source, but these are often located well outside the village at a special site where water is said to be 'tasty' (milk colour and sweetish taste). Water from newly made household rainjars is not thought 'good' for drinking as it is flavoured by cement, but the time and effort saved by using this rainwater generally overrules the taste criterion (Pinfold, personal communication).

### ***Implications for study***

People's behaviour, hygienic or otherwise, has a meaning and a purpose. We can only understand this meaning and purpose when we take into account the cultural setting in which people live. This requires us to try to see behaviour not from our own point of view but from the point of view of the persons who perform the behaviours. Only then we will be able to carry out a meaningful study. As people's views on hygiene and health will vary, even in homogeneous communities, this should be part of the study, and attention has to be paid to what people in communities already know about disease transmission and

how to prevent water and sanitation-related diseases. There is usually a lot of such knowledge in a community, even though it may not be widely shared. Anthropologists are trained to investigate people's culture as the people themselves see it, and it will usually be worthwhile to involve an anthropologist in a study of hygiene behaviour. An important measure which will help to ensure that people's cultural perspective is taken into account is to involve the people themselves in studying their own behaviour. This 'participatory research' approach is discussed further in Section 6.2.

### **2.4 Socio-economic determinants of hygiene behaviour**

Our health-related behaviour is not only determined by a complex mix of our knowledge, beliefs, attitudes, norms, and customs. Socio-economic determinants and even political factors also play a dominant role. Mukherjee (1990) put it as follows: "Among the rural population in India, 'cleanliness' is understood as a holistic concept, emanating from within the person - from one's thoughts and behaviour and extending to one's physical self, home and environment, in that order. However, time and money are seen as major constraints to achieving the desired level of cleanliness. Poor families see cleanliness as a desirable but improbable ideal, to be pursued by those who can spare the effort and resources."

#### ***Access to water supply and sanitation facilities***

Without the resources to construct and maintain water supply and sanitation facilities it is difficult to attain levels of personal, domestic and environmental hygiene conducive to health. Resources relate not only to money, but also to the availability of land, time, materials, and technical and management skills for achieving improved facilities. There are still a billion or more people who suffer from the lack of safe water and sanitation facilities close to home. Water collection, often a responsibility of women - and usually also children - can be very time-consuming and arduous work. Water carrying over long distances can absorb a quarter or more of the daily food intake. The task thus leaves less time and energy for other essential activities.

*Water availability is a major factor in facilitating improvements in hygiene practices. A comparison of domestic water use in two villages in Mueda, Mozambique, indicated that a reduction in the length of the water collection journey from 5 hours to 10 minutes was associated with an increase in average water consumption from 4.1 to 11.1 litres per person per day. Bathing and washing clothes accounted for 70% of the increased total. Bathing of children was a regular nightly event in the village with a water supply but almost unknown in the other. Water used for food preparation also increased, suggesting that scarcity of water may also influence it (Cairncross et al., 1987). But an improved water supply alone does not always lead to the use of more water, as people may not be accustomed to doing so, or there may be other constraints.*

Where public/community facilities are present, socio-economic criteria may determine whether people are allowed and can afford to use them. Sometimes, particular socio-economic groups are excluded from access, notably by local elites or political or religious power groups (Burgers et al., 1988). In a number of cases, people lack the money to buy, or the time to collect, sufficient quantities of water for daily needs. The hard fact is that, especially in urban areas, water supply and sanitation in the poor neighbourhoods is often of a much lower standard and at a much higher price than in the well-off neighbourhoods. For example, urban poor who have to rely on water from water vendors pay up to twenty times as much for the same amount of water as the better-off who are connected to the city's piped supply and sewerage systems.

### *Other socio-economic factors*

Hygiene behaviour and the prevention of water and sanitation-related diseases are influenced by socio-economic factors, such as proper housing, nutrition, clothing, education, and time. Although the precise links are difficult to establish, it is not difficult to imagine that families with better housing find it easier to maintain personal and domestic hygiene than do people with poor housing, especially when poor housing is combined with crowding. More and better clothing can be washed more regularly. Better nutrition provides a barrier against disease transmission (although there are many unanswered questions about the relation between diarrhoea and nutrition). Education is a somewhat more difficult factor on the list. Some argue that better education will allow us to develop hygiene behaviours as we are made aware of the biomedical links between behaviour and health. Others see education as a mere indicator of belonging to a higher socio-economic class – a more crucial factor.



*The availability of time may be just as important as the availability of water. Sometimes there are too many tasks and responsibilities to have time and energy left for hygiene.*

*Drawing: CHETNA, India.*

The factor of time has already been touched upon. Where poverty causes families, including mothers of small children, to make every effort to earn a living, insufficient time will be left to spend on behaviour conducive to the prevention of water and sanitation-related diseases. Quarry (WP 1991) emphasizes that people make reasoned choices with respect to hygiene behaviours, based on cost-benefit decisions linked to their circumstances. An example from Egypt shows how many factors influence choices for hygiene behaviour, in this case related to clothes washing and wastewater disposal:

*“In the observation sample of 46 households, 43% in the one village and 87% in the other village choose to take their clothes to the canal to wash, even though 32% of them have a water tap connected to the village supply. Their reasons are complex but discernable. The canal water lathers more readily and yields whiter clothes than the ground water pumped in the village pipes. Given the limited capacity of the latrines, septic tanks where they exist, and other sullage facilities, the disposal of wastewater in the latrines, septic systems or the street carries the hazard of weakening the foundations of adobe houses and pooling water in areas adjoining both adobe and brick houses with subsequent complaints from neighbours. Water quality, cost, and the difficulty of sullage disposal are important factors. The women know that washing in the canal has a risk of exposure to bilharziasis but feel there is no viable alternative when they take into account the time and energy of carrying waste water back to the canal, the high premium placed by women and men alike on very white clothes, the objections by neighbours to dumping water in the street and value attached to water quality for washing. All of these considerations enter into the choices made by the women who carried their wash to the canal. These choices might be altered by changes in drainage, in waste collection, in standards of clothing appearance, or in information about health hazards of the canal.” (El Kaisha et al., 1989).*

### *Unusual factors*

Sometimes, the factors that determine hygiene behaviour may lie outside the usual spheres of culture and socio-economy. For instance, a study of infant health and growth carried out in Ethiopia at the height of the civil war revealed that the prevailing repressive political conditions had caused the mothers' morale to deteriorate. These mothers adopted a “couldn't care less” attitude and failed to observe domestic and personal hygiene. As a result increased incidence of diarrhoeal illness was observed in their infants (Almedom, 1991).

In studying hygiene behaviour it is also important to keep an open mind for the unusual or unexpected factors that may be influencing why people do or don't do certain things. Section 3.3 returns to these issues.

### 3. *The study of hygiene behaviour*

Experience with evaluation, hygiene education and programme development leads to the conclusion that hygiene behaviour studies are important for assessing and increasing the effectiveness of water supply, sanitation and hygiene education programmes. We have already touched upon the main reasons for the study of hygiene behaviour in Chapter 1. In this chapter we discuss in greater detail why hygiene behaviour studies are important. This is followed by an overview of what kind of behaviours belong to a study of hygiene behaviour, emphasizing that behaviour cannot be studied meaningfully, unless it is put into context.

#### 3.1 **Reasons for the study of hygiene behaviour**

<b>Box 3: Reasons for the study of hygiene behaviour</b>	
A. Checking on the success of water supply and sanitation projects	} <i>to improve the effectiveness of water supply, sanitation and hygiene education programmes</i>
B. Development of successful hygiene education	
C. Effective planning of new projects	
D. Learning about the links between behaviour and health	

#### ***A. Learning about success of improvements***

A major objective of water supply and sanitation projects is to improve the health status of the target population through reduced morbidity and mortality from water and sanitation-related diseases. Over the past twenty five years, many *Health Impact Studies* have been carried out to assess the health benefits of water supply and sanitation projects. We touched on the outcomes of these studies in Section 2.1, when we discussed the broad links between behaviour and the prevention of water and sanitation-related diseases. Most *Health Impact Studies* try to establish a relation between improved water and/or sanitation on the one hand, and reduced morbidity and/or mortality from diarrhoea on the other. There are also a number of *Health Impact Studies* about Guinea worm disease, schistosomiasis, ascariasis, and trachoma (see Esrey et al., 1990).

## THE STUDY OF HYGIENE BEHAVIOUR

Health Impact Studies have proved their value, but they also have shortcomings. One disadvantage is that the studies are expensive, time consuming, and extremely complicated to carry out. The other disadvantage relates to the outcomes. For various reasons, these studies often do not produce clear results. More importantly, even if they do, they do not provide us with practical information about how to improve the effectiveness of ongoing and new water and sanitation projects (Cairncross, 1991).

In contrast with Health Impact Studies, conventional project evaluations are generally short and directed towards providing recommendations for project improvement. Usually these studies cover institutional, technical, socio-economic, community and health aspects in relation to progress and achievements of the project. However, many of these project evaluations are handicapped by insufficient information about the actual functioning and use of the improved water supply and sanitation facilities.

The Minimum Evaluation Procedure (MEP), developed by WHO (1983) tries to accommodate this shortcoming and provides valuable guidelines for project evaluations in two consecutive steps (Figure 2).

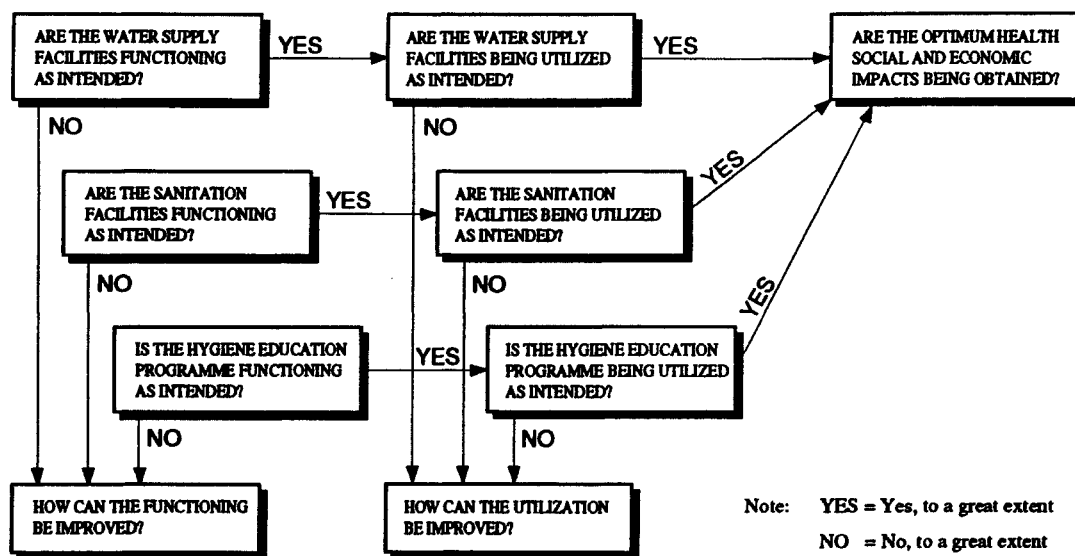


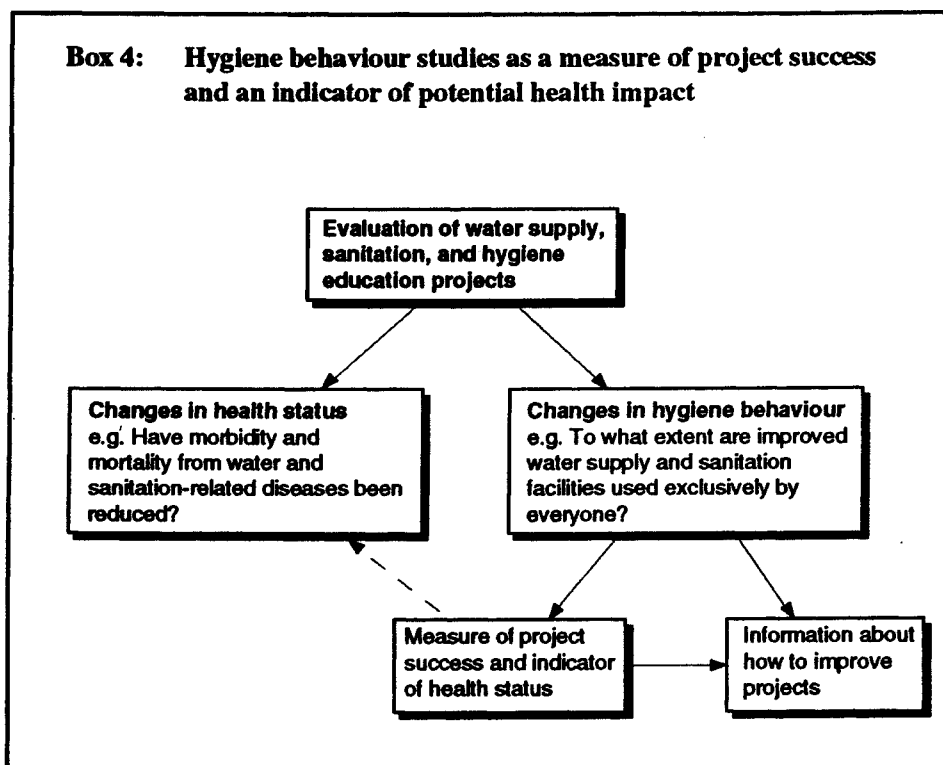
Figure 2: Abstract taken from Minimum Evaluation Procedure (WHO, 1983).

The first step is to find out the extent to which water supply and sanitation facilities are actually functioning. If the facilities are non-functioning, reasons have to be identified and remedial action taken. If the facilities are working, the next step in the evaluation is to find out how widely the facilities are being used. If the facilities are unused, or only partly used, the reasons for this problem need to be investigated and remedied. The MEP stresses that only when facilities are functioning does it make sense to look into their use. Likewise, only when facilities are used will it be worthwhile to consider a Health Impact Study, as only facilities that are fully used can help to produce an improvement in people's health. Also, information on the level of functioning and use of improved facilities can

more easily be applied to project development and improvement, than information on health and disease.

Using new water supply and sanitation facilities involves a change in behaviour. As we have seen in Chapter 2, Health Impact Studies have shown the importance for health of the changes in hygiene behaviour which the new facilities make possible or easier. Without such changes, water supplies and sanitation are not likely to offer health benefits. These views are supported by a recent overview of lessons learned from ten years of water and sanitation experience in developing countries (WASH, 1990). One of the lessons is that behavioural changes combined with greater access to facilities are the basis for health benefits through improved water and sanitation.

Thus, the conviction has grown that for a useful, practical and cost-effective evaluation of a water supply and sanitation project it is better to focus on changes in people's hygiene behaviour, than on changes in people's health status. If we know to what extent people made the change to the use of improved facilities, we have a measure of project success and an indication of possible health impact. Such an evaluation also will provide us with information about ways to improve projects. Box 4 shows how this links into the evaluation process.



At the same time, however, we have learnt that an evaluation of the use of improved facilities is much more complicated than first anticipated. For example, how do we know whether everyone in the family is using the new toilet exclusively and the whole year round? Even behaviours that are felt to be less private, such as household water consumption, prove to be difficult to measure. This is because human behaviour is always complex, with many actions and factors involved, as will be further discussed in Section 3.3.



### ***B. Development of successful hygiene education***

Recognizing the importance of hygiene behaviour for maximizing possible health benefits from improved water supply and sanitation facilities, many projects now integrate hygiene education in their programme activities. Hygiene education is defined as all activities aimed at encouraging behaviour which will help to prevent water and sanitation-related diseases. It aims not only to enhance the exclusive and proper use of improved facilities by everyone, but also to encourage additional hygiene practices which cut off alternative routes of disease transmission (Boot, 1991).

Development of an effective hygiene education programme requires a clear understanding of people's present behaviours, perceptions and priorities related to health problems. So, at the start of a hygiene education programme, a hygiene behaviour study is needed to learn more about how people behave and why they behave the way they do, what health problems they perceive and what difficulties they face in overcoming these problems. This provides a baseline, first for the development and later for the evaluation of a hygiene education programme. It should also mark the start of a participatory process between the population and project staff, as a hygiene education programme can only be successful when developed with full community involvement (Boot, 1991).

*"The baseline made it clear that defecation behaviour patterns varied such that any hygiene education programme would need to be targetted at different groups and patterns within the same community. The baseline also made it possible to identify people who were more likely to change their behaviour as a relationship was found between people who indicated having travelled out of town and having used a latrine before, and the willingness to build or use a latrine in future" (Brieger, WP 1991).*

After the implementation of a hygiene education programme it is equally important to carry out a follow-up study of hygiene behaviour, this time to evaluate the success of the programme in terms of behavioural change and if necessary to look into opportunities for possible improvements. The success of the programme is measured by comparing behavioural baseline data with behavioural evaluation data: "What changes in behaviour did occur that are beneficial for health".

*Brieger (WP 1991) reports on a hygiene education programme in Nigeria. "Hand washing was taught to mothers at the Oral Rehydration Therapy (ORT) Unit of the Igbo-Ora Hospital as a general measure for diarrhoeal disease prevention and as a specific step in the process of preparing home made salt-sugar solution. Home visits were conducted to evaluate mother's knowledge and skill retention after visiting the ORT Unit. Mothers were asked to prepare the salt-sugar solution. A checklist was used to record their correct performance of each step. Hand washing was the first step, and note was made whether soap was used or not. The practice of correct handwashing with soap was associated with attendance at the ORT Unit."*

### ***C. Effective planning of new projects***

A third reason for the study of hygiene behaviour is the need for comprehensive baseline data at the start of a water supply, sanitation and hygiene education project to support the development of a sound programme. Such a baseline usually includes hydrogeological, socio-economic and technical data, in addition to information about available water sources, water collection and water use patterns and sanitation practices. Information about sanitation is important because at the end of the day people will make a reasoned choice whether or not to switch over to use of new facilities, and to what extent they are willing to contribute to their costs, upkeep and maintenance. New facilities and related new behaviours are more likely to be adopted when they make life easier and solve felt problems, when they are affordable and when they are in line with cultural values and desired behaviours (Burgers et al., 1988).

*Brieger et al. (1990a) point at the need for a comprehensive baseline for any Guinea worm control programme. Interventions to solve the Guinea worm problem can be divided into four broad types: (1) barriers to ponds to prevent people entering the water; (2) treatment of pond water at the source or at home by filtering or boiling; (3) provision of alternative water sources (eg. wells or tanker services); and (4) treatment of open Guinea worm ulcers. "The choice of interventions depends on several factors. Geology determines availability of water both above and below ground. Geographical issues such as settlement patterns influence the concentration of people who may be accessible to a given intervention. Climate determines seasonality of water sources and transmission of disease. The economy puts limits on what control methods are affordable. Culture has an impact on which options may be acceptable. Politics enters into the allocation and siting of any new water source.*

*At issue is not only choice among multiple disease control technologies, but also the identification of human behaviours required for acceptance and utilization of the appropriate interventions. A careful assessment of these behaviours and the factors that may influence their adoption will lead to the selection of an appropriate mix of educational and promotional strategies".*

During programme implementation, hygiene behaviour should be monitored, to keep track of progress and to solve specific problems as they arise.

### ***D. Learning about links between behaviour and health***

Last but not least, the study of hygiene behaviour is important to help increase our understanding about the multiple links between human behaviour and the transmission of water and sanitation-related diseases. As is clear from the short overview in the previous chapter (Section 2.2) there is still a lot to learn about how behaviour relates to health.

For this type of study of human behaviour it is especially important to ensure expert guidance and support to prevent misleading results from giving false ideas about how hygiene behaviours may help to reduce disease transmission. For example, a study might

find that people who own televisions suffer from less diarrhoea than those who do not. This does not necessarily mean that watching television prevents diarrhoea, or even that a television hygiene education campaign has been effective. A more likely explanation is that families which own televisions are wealthier than average, and that high socio-economic status is associated with many other factors, such as better education, nutrition and housing, which do help to prevent disease.

## 3.2 Domains of hygiene behaviour

### *Five behavioural domains*

We have defined hygiene behaviour as a wide range of actions associated with the prevention of water and sanitation-related diseases. From the viewpoint of the people performing these actions, we can broadly divide hygiene behaviour into five clusters, or so-called 'behavioural domains':

**Box 5: Five behavioural domains**

- A. disposal of human faeces
- B. use and protection of water sources
- C. water and personal hygiene
- D. food hygiene
- E. domestic and environmental hygiene

The five behavioural domains more or less correspond to the six major preventive measures that help to interrupt disease transmission (see Section 2.1). The slight adaptation reflects the shift of focus from disease prevention to hygiene behaviour in a context that is meaningful to the people concerned. Thus, use and protection of water sources was included as a behavioural domain because many hygiene behaviours take place at the source. The preventive measure of wastewater disposal and drainage has been made part of the water sources and water and personal hygiene domains, because wastewater disposal is a behaviour which naturally follows water use.

An overview of the main behaviours in each domain is presented in Table 2. Clearly, the domains overlap. For example, handwashing appears under disposal of faeces, personal hygiene, and food hygiene; water treatment is found under water sources and water hygiene. To prevent too much overlap, we have included in the domestic and environmental hygiene domain only those behaviours that have not yet figured under the other domains. Thus, cleaning of the toilet or latrine is considered to be part of the disposal of human faeces domain, although it could be argued that this behaviour should also be mentioned as part of domestic hygiene.

Under each of the five headings below, we suggest behaviours, which – if performed hygienically – are likely to help prevent the transmission of disease. However, there is still much to be learnt about how diseases, especially diarrhoeal diseases, are transmitted (see Section 2.2). There is reason to believe that all the behaviours suggested below may have

Table 2: Overview of main behaviours in the five behavioural domains

<p><b>A: Disposal of human faeces</b></p> <ul style="list-style-type: none"> <li>- choice of place for defecation</li> <li>- disposal of faeces</li> <li>- anal cleansing</li> <li>- disposal of cleansing material</li> <li>- handwashing</li> <li>- cleaning of the toilet/latrine</li> </ul>		<ul style="list-style-type: none"> <li>- maintenance of the toilet/latrine</li> <li>- other activities related to faecal matter               <ul style="list-style-type: none"> <li>• use of faeces as fertilizer</li> <li>• use of faeces for fish production</li> <li>• animals eating faeces</li> </ul> </li> </ul>	
<p><b>B: Use and protection of water sources</b></p> <ul style="list-style-type: none"> <li>- choice of water source</li> <li>- water collection</li> <li>- water transport</li> <li>- water use at the source</li> <li>- wastewater disposal and drainage</li> <li>- water treatment</li> </ul>		<ul style="list-style-type: none"> <li>- water source protection and maintenance</li> <li>- other activities related to water source               <ul style="list-style-type: none"> <li>• water conservation by prevention of water pollution</li> <li>• water conservation by prevention of ecological degradation</li> </ul> </li> </ul>	
<p><b>C. Water and personal hygiene</b></p>			
<ul style="list-style-type: none"> <li>- water hygiene in the home           <ul style="list-style-type: none"> <li>• water handling</li> <li>• water storage</li> <li>• water treatment</li> <li>• water re-use</li> <li>• wastewater disposal</li> </ul> </li> </ul>		<ul style="list-style-type: none"> <li>- personal hygiene           <ul style="list-style-type: none"> <li>• washing of hands/cleaning of nails</li> <li>• washing of face</li> <li>• body wash/bathing</li> <li>• hygiene after defecation</li> <li>• washing and use of clothes, towels and bedding</li> </ul> </li> <li>- personal hygiene during natural events, such as menstruation, birth, death, illness</li> </ul>	
<p><b>D. Food hygiene</b></p>			
<ul style="list-style-type: none"> <li>- handling practices           <ul style="list-style-type: none"> <li>• cleaning of kitchen/food preparation area</li> <li>• handwashing/use of clean hands</li> <li>• use of clean work-top and kitchen utensils</li> <li>• use of clean dishcloths/kitchen towels</li> <li>• use of safe water</li> <li>• disposal of wastewater and garbage</li> </ul> </li> <li>- preparation practices           <ul style="list-style-type: none"> <li>• washing of raw food and fruits</li> <li>• temperature/length of cooking</li> <li>• temperature/length of re-heating</li> <li>• speed of cooling</li> <li>• time of preparation</li> </ul> </li> </ul>		<ul style="list-style-type: none"> <li>- storage practices           <ul style="list-style-type: none"> <li>• temperature/length of storage</li> <li>• location and coverage of stored food</li> <li>• storage of left-overs</li> <li>• storage of eating/kitchen utensils</li> </ul> </li> <li>- eating and feeding practices           <ul style="list-style-type: none"> <li>• handwashing/use of clean hands</li> <li>• use of clean eating utensils</li> <li>• feeding of babies and small children</li> <li>• times of eating and feeding</li> <li>• washing of eating/kitchen utensils</li> </ul> </li> </ul>	
<p><b>E. Domestic and environmental hygiene</b></p>			
<ul style="list-style-type: none"> <li>- household hygiene           <ul style="list-style-type: none"> <li>• wiping of surfaces</li> <li>• sweeping and cleaning of floors/compounds</li> <li>• removal of shoes before entering the house</li> <li>• cleaning of children's play objects</li> <li>• insect control</li> </ul> </li> </ul>		<ul style="list-style-type: none"> <li>- environmental hygiene           <ul style="list-style-type: none"> <li>• street cleanliness</li> <li>• wastewater disposal &amp; drainage</li> <li>• solid waste disposal</li> <li>• hygiene at public places</li> </ul> </li> <li>- animal management           <ul style="list-style-type: none"> <li>• control/corralling of animals</li> <li>• safe disposal of animal faeces</li> </ul> </li> </ul>	

emptied when full (or a new pit dug). The contents of the bucket and septic tank are likely to contain disease organisms. The same will hold true for pit contents, except when they have been left for more than a year to decompose. Only in the latter case will the contents be safe to handle without further treatment. In all other cases the contents have to be disposed in a safe way to a safe place so as not to create serious health risks. Off-site disposal means that the excreta are transported through a channel or piped system and will enter the environment either after treatment in a treatment plant, or untreated, in which there may be a health risk.

Babies and toddlers invariably defecate wherever they are when they feel the need. Often this will be on the ground in the living area, where the faeces are sometimes left, but more often cleaned away in one way or another by parent or caretaker. When babies and toddlers use nappies, these have to be changed and either washed or thrown away. When the little ones use a pot, the contents have to be thrown away, and the pot cleaned. In many cultures, the faeces of babies and toddlers are seen as harmless, and thus sometimes less care is taken to dispose of these faeces safely.

When the anus is cleaned after defecation, it is most commonly done with water, paper, maize cobs, stones, or the like. Cleansing materials are often disposed of in the same way as the faeces, except sometimes when a latrine is used and people wish to prevent blockages or the pit filling up too quickly. In those cases special action needs to be taken to dispose of the cleansing materials in a hygienic way, eg. by collecting them in a



*Babies and toddlers often defecate in the living area. The faeces may be left, or eaten by animals, or cleared away by a parent or caretaker.*

*Drawing: Ministry of Education, Nepal and UNICEF.*

some influence, but one cannot predict precisely what impact, if any, each is likely to have on disease incidence. Moreover, the significance for health of a specific change in behaviour will vary in different communities, depending on their prevailing patterns of disease and their existing behaviour.

Within the framework of this book, emphasis is put on individual and household level behaviours, but this is not to imply that behaviours at community level and beyond are less important. The discussion is meant to sensitize readers who are relatively unfamiliar with the domains to the many behaviours and behavioural aspects that may need to be taken into account in a study (others may wish to skip this part and continue with Section 3.3: Dimensions of behaviour). The descriptions are by no means exhaustive.

The actual choice of which behaviours to cover in a study will depend on the purpose of the study, on local conditions and priorities, and on the objectives of the water, sanitation or hygiene education project for which the study is to be carried out. This section is meant to provide the reader with a solid ground for such a choice. The process of selecting which behaviours to study is the subject of Chapter 7.

### *A. Disposal of human faeces*

The choice of a place for defecation is the first item under this domain. The choice will differ according to culture, opportunity and personal preference. Common places include toilets or latrines, compounds, bushes, open fields, river banks, above water, above drains, in or on the roof of a house. The place of defecation may thus be inside the house, in the immediate surroundings of the house, or quite far away, and this also applies to the location of a toilet or latrine. Sometimes, women and men do not, or cannot, use the same place, or there may be restrictions as to the use of the same place by certain family relations (e.g. father and daughter-in-law). The place of defecation may also depend on the time of the day or the fitness of the person. A latrine is sometimes not used at night, or not during illness, or sometimes only during illness.

At the worksite, for example the agricultural field, shop, office, workshop, or factory, and at school, an alternative place has to be used. In some cultures, women or men are not supposed to show that they have bodily functions, and thus have to defecate during the dark hours, or to find a secret place during daytime. In any case, defecation behaviour at night is often different from that in the day time. Children, especially boys, often just do it anywhere that suits them best. Also, children often do not like to use a latrine, because they are afraid of the dark or the defecation hole, or they dislike the smell.

The method of excreta disposal will partly depend on the place of defecation. If the house itself is used but has no latrine, the faeces are packed and thrown away. On the roof, the faeces may be left to dry in the sun and swept afterwards, or also packed and thrown away. After open air defecation, the excreta can be left or covered, or may be dropped into water or a public drain. In some countries, animals, especially pigs and dogs, may clean away the uncovered excreta. If a latrine is used, the excreta can be disposed of either on-site or off-site. On-site disposal is in a bucket, pit or septic tank, and these have to be

waste bin and burning or burying them regularly. Babies, toddlers and young children need the help of their parent or caretaker to get clean, although young children may be seen to squat, defecate and walk away without any anal cleansing.

Handwashing after defecation- if practised - may be a separate activity, or be part of the practice of anal cleansing or bathing after defecation. Water availability is a pre-condition for handwashing. Hands may be washed with water only or with water and soap, ash or mud. Whereas in some cultures, such as in Indonesia, handwashing after defecation is an ingrained custom, in other cultures, such as in parts of Zimbabwe, it is not an indigenous practice. Handwashing devices have sometimes been developed, under the assumption that when water (and soap) is readily available near the place of defecation, hands are more likely to be washed afterwards. Parents or caretakers who help to clean up babies' faeces also need to wash their hands afterwards. Children who start to defecate without parental help will need training to make handwashing after defecation a habit.

When the place of defecation is a hygienic latrine (one that isolates the faeces from the environment), regular cleaning and maintenance will be required. Cleaning of a latrine is not the same activity everywhere for everybody. Sometimes cleaning is considered to be the same as flushing or brushing of the pan only. In other cases, cleaning of the latrine includes the brushing of the pan/lavatory, slab/ground, the flush or flushing device, walls, door handle and door with a cleaning product. For pit latrines, ash is sometimes used on a daily basis to reduce the smell and increase the decomposing activity. Latrine cleaning (and ash throwing) is often seen as a woman's duty, and thus sanitation programmes often have an impact on women's workload in the sense that an uninviting activity is added. Occasional maintenance of a latrine, if done at all, pertains to the upkeep of the superstructure (including timely replacement of the fly-screen of a VIP latrine), the timely emptying of the pit or septic tank to prevent overflowing, and repairs after blockage, breakdown or failure. In crowded low-income areas cleaning and maintenance of public latrines is an issue requiring special attention, as its neglect readily leads to malfunctioning and health hazards. The same attention is needed for the cleaning and maintenance of school latrines.

Human excreta are sometimes used as fertilizer on the field. When the excreta have been treated first, little health risk may be expected, but untreated excreta can be a source of disease transmission, both through contacts during agricultural work and through contaminated fruits and food (see below: food hygiene). Human excreta are also sometimes used to fertilize fish ponds (Mara et al., 1990). When the excreta are dropped directly into the fish pond, and the pond is not used for other purposes, little health risk may be involved, provided the fish are sufficiently cooked before eating (see below: food hygiene).

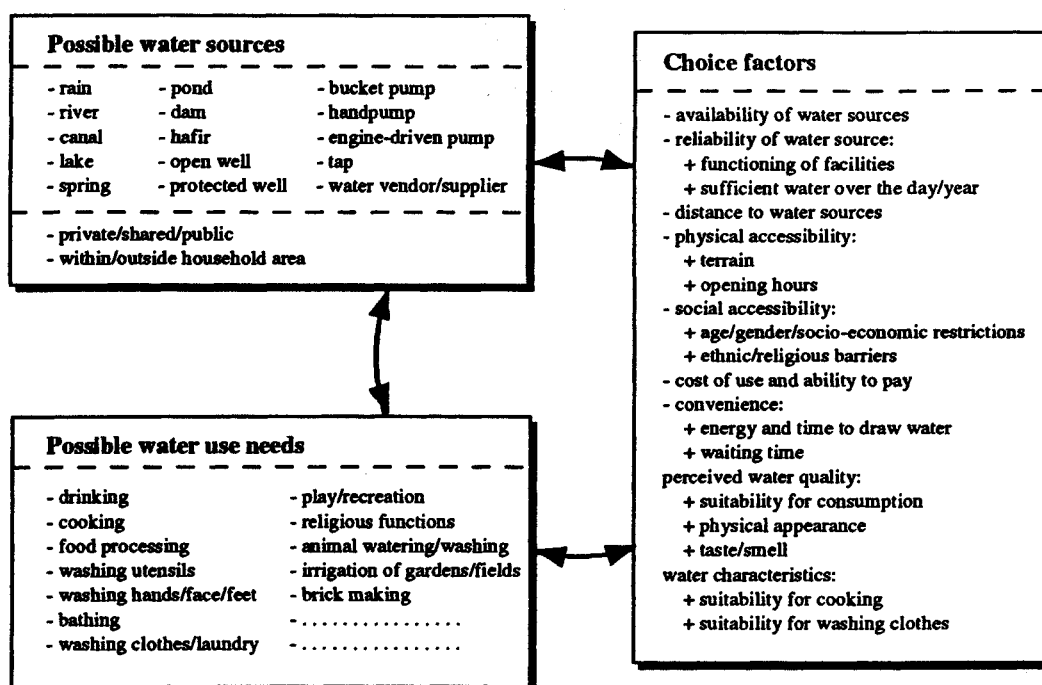
### ***B. Use and protection of water sources***

This behavioural domain relates to the choice of water sources for the various personal and domestic water needs and all hygienic activities at the source, including water collection, water use and source protection.

The choice of a particular water source (or water point in case of a piped supply) can be self-evident, for example when alternative sources are lacking, or when there is tap

water in the house. But more often than not, water source selection is governed by a number of factors, which are different for the various water use needs. A study in Cambodia, for example, showed that rainwater, well water and canal water were all used for human consumption, depending on availability, proximity and taste (Sophal et al., 1986). An overview of common water sources, choice factors, and water uses is listed in Table 3. Any combination may be found, depending on local circumstances and personal preferences. A general characteristic is that people make a reasoned choice of a particular water source for a specific water need, but that prevention of water and sanitation-related diseases is only one factor, if that, in their choice. Women are usually the main decision makers with respect to water source selection.

Table 3: Choice factors related to water source and water use



The bacteriological quality of water from unprotected wells and springs and of surface water is generally suspect and not safe for drinking except when treated first. Water treatment at the source may include a number of activities but they are not discussed here as they are beyond the scope of this book. Household level treatment of water taken from an unprotected source is discussed under Domain C: water and personal hygiene.

The bacteriological quality of water from improved water supply facilities should be relatively safe, provided the place is well protected and properly used. A number of behaviours and actions help to keep the risks of water contamination to a minimum. Water contamination is less likely to occur when animals are kept at a distance, for example by fencing, and when water that is wasted or spilled is prevented from draining back into the source. This can be achieved by constructing an apron around the source with a drainage



channel leading to a soakpit or garden, and by building washing and bathing facilities at some distance, also with proper drainage.

Contamination of water in a protected well is minimized when dirty things cannot fall into the well, and the water is only drawn with a clean bucket and rope or chain. For this reason, protected wells are sometimes locked, but this creates problems of accessibility. When a handpump needs priming, only safe water should be used. Regular cleaning around the water source, including the apron and the drainage channel, will further help to reduce the risks of water contamination.

For the safe collection and transport of drinking water, hands and containers have to be cleaned. Cleaning is not the same to everybody, and may range from mere rinsing to thorough scrubbing. Observing these cleaning activities only at the water source may give a false impression, as in some cultures it is custom to clean the water container thoroughly at home with the last bit of water, before collecting new. During water collection and transport, hands may easily touch the water, which may increase the risks of water contamination, as may putting twigs or leaves on top of the water in open containers to prevent spillage during transport. Not only do behaviours determine the risks of water contamination during collection and transport; some types of containers are easier to clean or less liable to contamination than others. Water collection and transport for private use is often the responsibility of women and children, whereas men are more often involved in water selling.

Entering open water sources for water collection, washing, bathing or pleasure may be a risky behaviour where Guinea worm or schistosomiasis is prevalent.

Behaviours related to water source protection and water conservation are becoming increasingly important in view of population increases and economic developments. Not only should latrines be constructed where the disease organisms in the excreta cannot come into contact with water sources, but also water pollution from agricultural fertilizers and pesticides and from industrial wastes should be prevented. Other water conservation behaviours pertain to the prevention of over-extraction of ground water, and of erosion by cutting forests without reforestation. Water conservation is a subject extending far beyond the individual and household level, and is not only related to water and sanitation-related diseases.

### ***C. Water and personal hygiene***

Water hygiene at domestic level firstly concerns the quality of water for drinking and food preparation. If water has been taken from an unprotected source, it cannot be expected to be safe for consumption unless treated first. There are various water treatment methods at household level and the most common are: boiling; purification with herbs or chlorine tablets; filtration; exposure of water to the light of the sun; and storage for more than twenty-four hours. After water treatment, or when water is taken from a safe source, hygiene behaviours can keep the water safe during storage and use. Water for drinking and food preparation is preferably kept in a covered pot in an elevated place to prevent water pollution from dust, domestic animals and small children. In some cases, families will



*Bathing, washing and playing at the water source. Photo: IRC/Boot.*

have a separate container for drinking water only; in other cases water from one container is used for all purposes. When the container does not have a tap or a spout, care has to be taken that the water is drawn with a clean dipper or cup, if possible with a long handle so that fingers cannot touch the water. The risk of water contamination is also minimized when the containers are cleaned before refilling.

Water for personal and domestic hygiene that is stored at home is better covered so as not to attract mosquitoes. Especially in water-scarce areas, women often have an elaborate system of water re-use in such a way that the total amount of water to be collected is kept to a minimum. In such cases there will be hardly any water left that has to be thrown away. In other cases, especially when a new water supply brings water into the houses, wastewater disposal might become quite a problem. In more and more places, flows of wastewater can be seen running from houses, causing health hazards and damage to roads. Some people have tried to find their own solution to this problem by guiding the water to a garden or a soak-pit, or by constructing a connection to a public drain. In crowded areas with piped supplies, hygienic disposal of wastewater will require action above household level.

Personal hygiene mainly includes the washing of hands, face and body, cleaning of nails, cleaning after defecation, and the regular cleaning of clothes and bedding. Frequent handwashing is probably the most important personal hygiene behaviour. Crucial moments for handwashing are: after defecation and after contact with children's faeces; before food preparation and after handling of high-risk food; before eating and child feeding; after work; and before collecting water. As handwashing cuts through various domains, it has

already been given attention under disposal of human faeces, and use of water sources. Cleaning of the nails can be seen as a part of handwashing, but might need to receive special attention, as dirt is not easily removed from under the nails.

The times and frequencies of washing, bathing and clothes washing depend on local conditions, cultural factors and personal preference and ideas. For example, when water is scarce or at a great distance people may wash and bath less often than desired. The same may hold true during the peak agricultural season due to time constraints, or when poverty dictates the daily activities. For cultural and religious reasons, some days of the week may be favourable for bathing or washing, whereas others are not. Usually people have specific cultural ideas and perceptions about bathing and clothes washing. Washing of clothes and bedclothes is sometimes postponed to prevent the material wearing out too quickly or because people lack a second set. The first is especially the case when clothes are washed by beating or rubbing them on flat stone. Other methods to clean clothes include brushing or spreading them out in the sun to get rid of lice.

In some regions and cultures, bathing and/or washing is practised at the sources, although nearly everywhere babies are bathed at home. In other regions, women and children collect and transport water for bathing of all family members and for clothes washing to the household area. Sometimes it is custom to start washing the face and upper parts of the body, sometimes the lower parts are washed first. Whether or not soap is used depends on the availability and affordability of soap and the perceived need to use it. Thus, the poorer households may occasionally buy half a piece of soap when money allows and there are many dirty things to wash. An alternative to using soap for a body wash is to rub a small flat stone over the wet skin.

The use and sharing of clothes, bedding, and towels is also related to custom and often determined by poverty. People may or may not change clothes during the night; they may or may not use sheets and/or blankets; family members may or may not sleep close to one another, using the same bedding; towels may or may not be available and be shared. Practices related to the use and sharing of clothes, bedding and towels are particularly important when trachoma or skin disease is prevalent. A further risk might be the common phenomenon that mothers (and fathers and other caretakers) frequently use a slip of their clothes to wipe their hands as well as the nose, eyes, and hands of their children.

### *D. Food hygiene*

The food hygiene domain includes food handling, preparation, consumption and storage practices. In most parts of the world, women are the main actors in the preparation of food in homes, but their actual behaviours vary greatly according to culture, personal interest and time, food and fuel available. Food preparation areas also vary widely, especially in relation to socio-economic conditions. In one household, the kitchen will be an open space with three stones as cooking place and a few pots and kitchen utensils, whereas in another we may find a fully equipped kitchen with tap water, a sink with worktop and a fridge.

The use of clean hands and clean eating and kitchen utensils are important behaviours under this domain. Washing of hands only before starting food preparation is often not

enough, as hands easily get re-contaminated, especially when the work is interrupted by other activities, like attending to children. An important moment for washing hands and utensils is after handling high-risk food such as poultry. Washing of hands before eating is common practice for some, while for others it is more common after the meal. Children are generally known for being neglectful if not reminded by the parent or caretaker, but adults also may easily forget about handwashing. When a meal is taken outside the home, handwashing may be more difficult because of lack of water. In many parts of Africa, it is customary to use one bowl of water for everybody to wash their hands in, with children always washing last. Although a scientific study is lacking, it is likely that the hands of the ones at the end of the row will get less clean, but it is probably still better than no handwashing. Hands, if dried after washing, are commonly wiped on a towel or a person's clothing. The cleanliness of these may influence the cleanliness of the hands.

Food hygiene also includes the use of safe water for washing of vegetables and fruit, and for preparing weaning food. From the food hygiene point of view, the most important behaviours are sufficient cooking (all parts of the food must reach at least 70°C) and then eating immediately after preparation. For practical reasons, the latter will not always be possible. Women may face time constraints and therefore wish to prepare food for the whole day early in the morning. Disease organisms easily multiply in standing food, especially when the food is not quickly cooled, and is left at ambient temperature. Thorough reheating of the food is required if it has been left for more than two hours, but time and scarcity of fuel may be a constraint in this respect.

Food may be taken at specific times or eating may spread throughout the day. Meals may occur together with the whole family, or with men eating apart from women and children, or everybody eating individually. When the food is taken together at set times it should be easier to apply hygienic eating and feeding with clean hands and utensils, and to have the meals soon after preparation. Hygienic food consumption is especially important for babies and weanlings, as they are more liable to get ill with diarrhoea. Weaning foods should be prepared with special care; basic principles for safe infant and young children's food preparation are summarized in Annex 5. Breastfeeding is much safer than bottle

*Hygienic measures in food consumption are especially important for babies and weanlings, as they are more susceptible to diarrhoeal diseases.*

*Photo: Ministry of Health, Uganda, Danish Red Cross, UNICEF, Essential Drugs Programme.*



feeding, as bottles are difficult to clean and when not emptied at once they may be left unattended and get dirty before the last bit is sucked away. If breastfeeding is impossible, the cup and spoon method is an alternative to bottle feeding with less risk of contamination.

Hygienic storage practices relate both to the storage of food and the storage of eating and kitchen utensils. Perishable food is best stored for as little time as possible, covered and in a cool place, outside the reach of little children, domestic animals and insects. This also applies to left-overs that are taken at odd times. Utensils are best kept in a place and in such a way that they cannot get dirty. A cupboard is such a place or a drying rack in a sunny spot, with pots put upside down.

General cleanliness of the kitchen and the safe disposal of wastewater and human and animal faeces and of garbage (see below) are also related to food hygiene and require attention. Food hygiene is an important issue not only in the household, but also at the work site, school and health centre or hospital, and at markets and food stores. In addition, the hygiene of food service establishments and street-food vendors is a critical issue.

### *E. Domestic and environmental hygiene*

Domestic and environmental hygiene relates to household cleanliness, garbage disposal and animal management. To some extent, behaviours pertaining to this domain have already been discussed in the other domains, as the division between the domains is rather artificial and only meant to help structure the study of hygiene behaviour. The description of this domain only covers additional behaviours.

Hygienic behaviours for general household cleanliness include the wiping of surfaces, as well as the sweeping and cleaning of the floors in the house and the immediate surroundings of the house. When shoes are removed before entering the house, this may help to keep the house clean, especially in unpaved areas. Care might be taken to let children play at those places in and around the house where they run less risk of coming into contact with contaminated soil or objects. The regular cleaning of toys and play objects will also help to minimize the risk of spreading disease organisms.

Insect control is another area of household hygiene. It may include food hygiene as discussed above, and the screening of windows and use of nets to prevent mosquito bites and to control flies. The safe disposal of wastewater (see above) and solid waste will further aid the control of insects. In rural areas, garbage can often be disposed of at household level, by using pits in which the garbage is regularly covered. In more crowded areas, garbage disposal services will often be required. Households will need some safe place at home, for example a bin with a lid, if the garbage is collected every now and then through the municipal services. In many cases, the garbage will not be collected from the house, but instead people have to take their waste to collection points in their neighbourhood. The prevention of waste all over the place, blocking drainage channels, and causing health risks, involves important hygiene behaviours of both the population and the municipal services. Hygiene at public places, such as markets, public latrines, schools and offices is a special subject.

Animal management involves a last series of behaviours under this domain. As discussed in the previous chapter (Section 2.2) there is still a lot to learn about the risks that animals may pose to the health of people. Nonetheless it seems safe to say that control of animals in the household environment is an issue requiring attention. Free roaming animals in and around the house may contaminate the floor, drinking water, food and kitchen area. Corralling of animals, and the safe disposal of animal faeces are the most obvious hygiene measures.

### 3.3 Dimensions of hygiene behaviour

Hygiene behaviour is always complex. The various dimensions of any particular behaviour are listed in Box 6 below. The list is meant to be used as a reference to make the study of hygiene behaviour easier and to increase our understanding of the many aspects that constitute and influence behaviours.

**Box 6: Dimensions of behaviour**

**1. Applicability of particular behaviour**

Is the behaviour applicable?

Is the behaviour performed?

**2. Features of particular behaviour**

What behaviour?

Who (age, sex, marital status, education, occupation religion, socio-economic aspects)?

In what sequence?

When (what occasion, time of day and year)?

How much (quantity)?

How well (quality or degree)?

How long (duration)?

How strongly (intensity)?

How often (frequency)?

Where (location)?

Combined with other behaviours (before and/or after)?

**3. Determinants of particular behaviour**

Physical environment

Economic conditions

Cultural beliefs and practices

Household structure/organization

Community social structure/organization

Personal interest

**4. Motivation for particular behaviour**

Why (purpose/reasons)?

Perceived costs and benefits

Antecedents and consequences of behaviour

## THE STUDY OF HYGIENE BEHAVIOUR

Cleaning of a latrine is taken as an example. To be able to do the cleaning, one will need a brush, a cleaning cloth, a bucket of water, and preferably a cleaning product. Also, a person is needed to carry out the cleaning. Usually this will be a woman, but who exactly will do the job may depend on the number of women in the household, their respective position in the family and whether or not turns are taken (eg. mother, daughter, daughter-in-law, sister). The person must have the time, and feel the need or obligation to do the cleaning. Thus, a number of pre-conditions have to be met and preparatory behaviours carried out before the actual cleaning can start. The cleaning itself involves a series of behavioural aspects such as how it is done and what parts are done, how well and how often it is done, and how much water or cleaning product is used. After cleaning of the latrine, other hygiene behaviours may follow, such as the washing of hands.

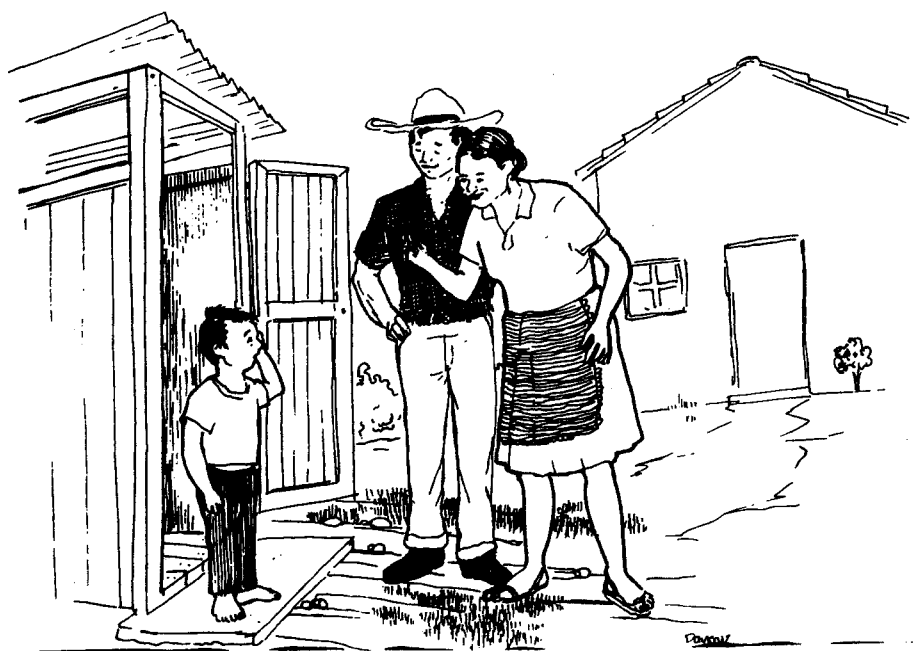
These behavioural features will be specially influenced by cultural and socio-economic determinants. For example cleaning of the latrine may be seen as a polluting activity, and therefore only reluctantly done, or poverty may dictate other priorities than cleaning.

*Kochar (1978) shows us in the following example the various aspects of hygiene behaviour, and how various behaviours may be related or integrated: "About 95 percent of people were observed to choose a place for defecation within three minutes walk of their homes. Men on average walked a little further than women. Most people go to recognized defecation grounds, and spend a minute or so walking round to find a suitable spot for squatting. They squat for about three minutes, on average, then immediately go to the pond for a wash. This ablution involves scrubbing the peri-anal skin with water while crouching in the squatting posture. Then the hands are rubbed with soil as a purification act. Termination of defilement is symbolized by taking by hand a mouthful of water and then spitting it out. Many people also prefer to take a bath as a continuation of this ritual. In any case, clothing worn during defecation is changed. Most adults change from the normal 'clean' clothes before going for defecation. The left hand only is used during ablution. Rural Bengalis scrupulously avoid the use of the left hand for eating or handling any food materials (particularly cooked food) since it is defiled. These norms are followed with high conformity, and children are often reprimanded for not following the correct procedures."*

To understand behaviour we need clear ideas not only about the features and determinants of behaviour, but also about people's motivation for a particular behaviour: 'Why do people behave the way they do?' This is especially true when we are interested in the link between hygiene and health and when we plan interventions to improve water supply and sanitation facilities and hygiene practices. For example, it makes a difference whether latrine cleaning is mainly done before the expected visits of the mother in law in order to make a favourable impression, or whether it is done as a hygienic and preventive health measure. To take another example, in Sri Lanka it was found that elderly people take hot water for drinking. However, this was not based on health considerations, but because they could not take cold water due to teeth problems. It is important to understand what purpose the behaviour has for the people concerned. Often a behaviour may serve

various purposes, which all need to be taken into account for a full understanding. In a water supply and sanitation project, women continued to use the stream for washing clothes (first purpose), because it was possible for them to socialize with other women (second purpose). Only when a series of laundry facilities and shower units were constructed, where women could gather, was the stream no longer used.

The motivation for a particular behaviour is also influenced by the perceived costs and benefits of a behaviour in terms of time and effort. For example, covering the water pot after each use may be a nuisance whereas the perceived benefits are negligible. On the other hand, a drain may be kept clean as it prevents the nuisance of mosquitoes. Carrying water from a particular water source for specific water needs is another clear example in which perceived costs and benefits are the rationale for the choice. Motivation for a particular behaviour is also influenced by what immediately precedes the behaviour (antecedents), like a mother telling her son to wash his hands, and what follows the behaviour (consequences) such as the mother commenting on her son's clean hands.



*Hygiene behaviour may often be influenced by motivation and the encouragement of people who are considered important. Drawing: IRC/UNICEF, Honduras.*



## 4. Sources of information: Observations

In Chapter 1, the study of hygiene behaviour was defined as the process of systematic learning about particular hygiene behaviours. To accomplish this, we need sources of information. Basically there are two major ways of gathering information: observation and interviewing. In this chapter we focus on observation as a method to collect data on hygiene behaviour; in Chapter 5 the focus will be on interviewing.

Throughout this chapter, and the following ones, the term 'behaviours of interest' will be used to mean those behaviours we have selected to learn about in our study. In the same way, 'topics of interest', are topics we wish to learn more about.

### 4.1 Observation as a data collection method

Observation means watching or noticing by using all our five senses: seeing, touching, tasting, hearing and smelling. One person cannot observe everything, especially not at the same time. That is why a referee of a football match has two linesmen, and even then it is not uncommon for some of the players and the audience to disagree with a decision of the referee because according to their observation a player of the opposing team was the first to break the rules of the game. Not only are our observations limited, they are also coloured by our culture, upbringing and personal experience. This is why the referee, players and regular audience will notice much more of what is going on in a football match than will somebody who just happens to watch the match without knowing the rules. This is also why in many cultures women will look differently at football than men, as football is often considered a men's game.

As it is impossible to observe everything at the same time, and as we put our own interpretations on what we observe, observation can only be used as a reliable source of information when our observations are (a) focused and (b) systematic. By 'focused' we mean that the observations are strictly directed at what we want to know, learn and understand. By 'systematic' we mean that the observations follow a fixed plan, so that things are observed in a thorough, efficient and unbiased way. Observation as a data collection method is a skill that has to be learned.

*"I spent one month each in the urban area and the two different rural areas, doing what I call focused ethnography. Although I would talk about anything with the people, I avoided observing in detail or writing notes about anything other than those activities or thoughts concerned with child care, water use, sickness and curing, food preparation and serving, bathing and defecation." (Jenkins, WP 1991).*

*In a study on the relationship between hygiene practices and severe diarrhoea in children, it was decided "to focus the observations initially on (1) handwashing after defecation and cleaning up children, and before food preparation and eating; (2) disposal of infants and toddlers' faeces; (3) water handling and storage; and (4) cleaning of utensils used for child's feeding. The observers stayed with the selected households about six hours per day for five consecutive days. Each observer was assigned one household per week, and the arrival time was staggered to enable observing various behaviours at different hours." (Baltazar, WP 1991).*

Observation is probably the most important source of information on hygiene behaviour. It has the advantage of providing first hand data. It also allows us to be 'discovery-oriented', finding out what is actually happening. Many hygiene behaviours involve ingrained routines which people are hardly aware of, so that observation often reveals much more and more specific information than other methods. Direct observation of hygiene behaviour also means that we can put the behaviour into context, and therefore understand it better (Patton, 1980).

Observation methods are not only used for directly observing people's behaviours, but also for observing signs of behaviours, and even for noting what expected behaviours don't in fact take place. Signs of particular behaviours, or so-called physical clues, such as soap and water present near the latrine, covered food, scattered garbage, or traces of faeces, often provide us with a quick and easy overview of hygiene behaviour. These physical clues might also replace direct observations of behaviours which are too sensitive to show, or which are too difficult to catch as they happen infrequently or at irregular times. Noting of behaviours that don't happen when expected can also provide us with important information. For example, if we notice that women don't collect water from the new handpump or that men tend not to use the latrine, we have learned a lot.

While observation is meant to inform us about people's hygiene behaviour, we have to be aware that people often react to the presence of an observer by behaving differently from usual. They may wish to show their best side, or behave as they expect the observer would appreciate, and therefore clean the house more thoroughly and wash hands more frequently than usual. Also, people may consider some behaviours too sensitive to show, and therefore wait until the observer has left. For example, for cultural reasons women may wish to wait until there is no risk of being observed, before they take a bath at the water source. The opposite may also occur, women may come and collect more water from the source than usual out of curiosity to see what the observer is doing. It is quite natural that people react to the presence of the observer, but if we don't take this feature into account, we may end up learning the wrong things. There are various ways to deal with reactivity, as this phenomenon is called. One way is to select locally accepted observers and to pay due attention to gender aspects. Another suggestion is to start with systematic observations only when the community has become accustomed to the observer's presence. Reactivity is given more attention in Sections 4.2, 4.3 and 6.1.



*Environmental walks, visits to water collection points, and observation of what is happening in and around houses will tell us a great deal about hygiene behaviours in their physical and social context.*

However, this type of observations may not always be so easy to conduct. Kaltenthaler (WP 1991) reports:

*“In this part of Africa visitors are seated in the front of the house in the shade. It is not considered polite to follow the mother around continuously to watch what she is doing, therefore even with many hours of observation many behaviours may not actually be observed. Especially more educated mothers tend to move out of sight to do things they don’t want the observers to see.”*

Unstructured observations are nearly always combined with or followed by conversations and unstructured interviews (see Chapter 5). There are five basic variations in observations (Figure 3), relating to the role of the observer, the openness with respect to the purpose of the study and observations taking place, and the duration and scope of the observations. Each variation requires careful consideration, both separately and together, to arrive at the best mix for our study, and the time and resources available to complete it.

## SOURCES OF INFORMATION: OBSERVATIONS

*“How a mother reacts to the presence of an observer depends on where she sees the observer in the social hierarchy. If she perceives the observer as belonging to a higher social category than herself she will make more effort to create a good impression. Our observers do not like observing in the richer households of civil servants because they feel that they are often treated with indifference by the mothers. We think that this probably means that mothers who feel no threat from our ‘low status’ observers alter their behaviour less. This is another argument for choosing relatively young, less educated observers” (Kanki et al., WP 1991).*

Observation, just like interviewing, allows us to collect qualitative and/or quantitative data. Qualitative data are primarily used to discover, explore, describe and understand hygiene behaviours, and to gain insights into patterns of behaviours and into people’s motivation, attitudes, interests and constraints related to hygiene behaviours. Thus, qualitative data provide depth and detail. Quantitative data are primarily used to provide information about the extent to which particular hygiene behaviours occur, including information about the frequency, intensity, and duration of conditions and behaviours. The highest level of information is achieved by combining qualitative and quantitative data, as will be further discussed in Chapter 6.

### 4.2 Open or unstructured observations

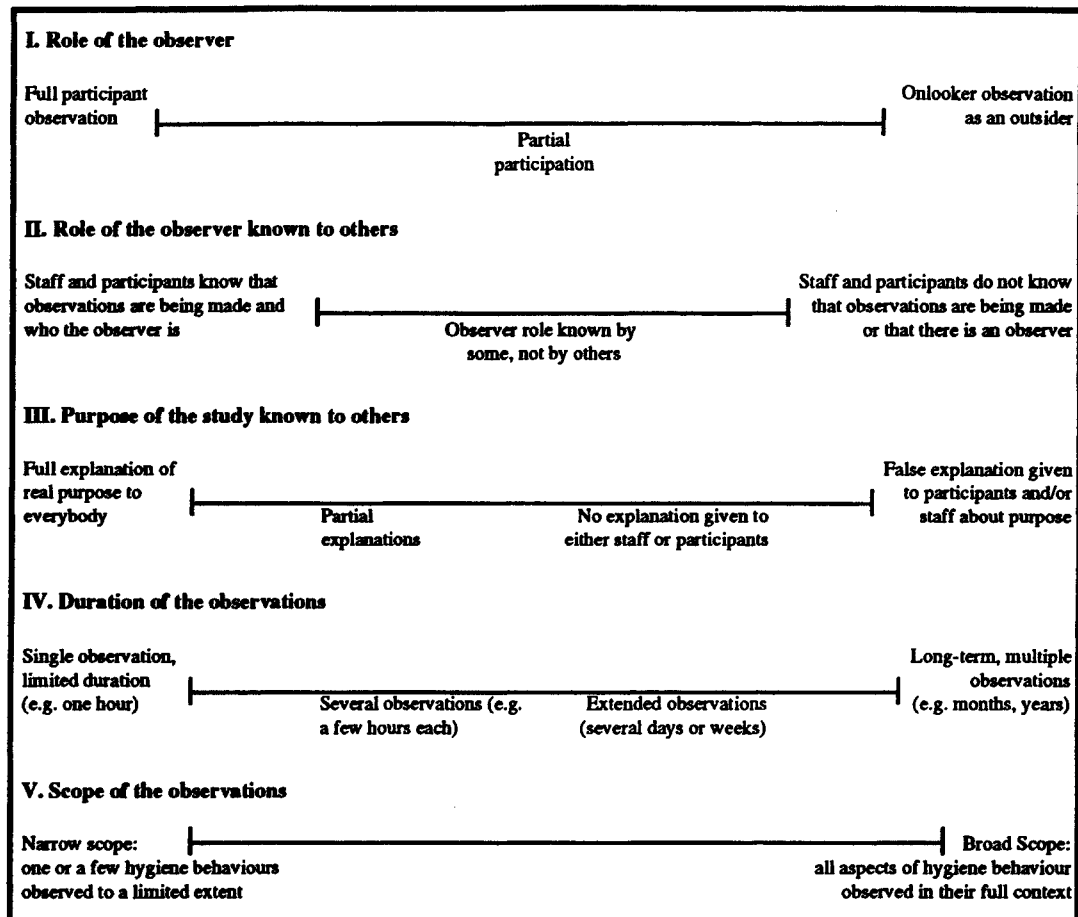
Observations are described as open or unstructured when they are not organized in a complete or detailed way. Thus, this method allows for a lot of flexibility, the only restriction being that the observations are focused and systematic (see Section 4.1). Unstructured observation often produces surprises, which need to be followed up in a later stage of the study. Unstructured observations provide qualitative data, and thus are particularly helpful to understand behaviours in their physical and social context. They also help us to understand relations between behaviours. For example, environmental walks, visits to water collection points, and observations of what is happening in and around houses, will teach us a lot about hygiene behaviours in their physical and social context.

Thus, Allen (WP 1991) observed hygiene behaviours of mothers cleaning up their infant after defecation, and a lively impression was gained of daily practices and related health risks:

*“Infants did not wear clothes and defecated or urinated on the ground, on the bed or on people’s laps. It was dealt with matter of factly: sand might be strewn over the stool, or water used to wash the bed, or clothes of the person concerned. The infant’s buttocks would be cleaned with a cloth; on one occasion the edge of a tobe. Water was usually used to wet the cloth but sometimes the woman spat onto the cloth or her fingers. Sometimes a woman would then wash her hands (with or without soap), others would simply wipe their hands on the cloth that the infant was lain on, or on their tobe. On two occasions the woman resumed chopping vegetables, and once a woman started tweaking the baby’s mouth with the fingers she had only wiped.”*

# SOURCES OF INFORMATION: OBSERVATIONS

Figure 3: Basic variations in observations. Based on Patton (1980).



## Role of the observer

The extent to which the observer is a participant in the activities being studied is the first and most important variation in unstructured observations. The extent of participation varies from full participant to strict onlooker.

In participant observation, the observer shares the life and activities of the people for a couple of weeks to several months, or even years. Through participation, the observer will experience the behaviours of interest while at the same time trying to understand those behaviours by combining this personal experience with observations and unstructured interviewing about what is happening. The purpose of such participation is to develop an insider's view of what is happening (Patton, 1980).

In onlooker observation, the observer remains an outsider, and is a spectator only. The purpose of such observation is to investigate and describe one or more behaviours fully. Whereas in participant observation data are collected through a continued combination of observations and informal interviewing, in onlooker observation the two are completely separated. Interviewing may precede and follow the observations, but does not happen at the same time.

Cheesmond et al. (1981) provide us with an example of onlooker observation:

*“For a twelve month study of the excretory behaviour of resident and migrant workers in an irrigation area, six separate observation points were selected along the canal. By parking a land rover on the raised canal banks, and by observing with binoculars from the vehicle roof, all activities in the minor canal, in the abueshreen offtakes and 450 m into the flat open fields, could be watched with minimum observer interference.*

*Each of these six observation points was visited for at least one 12-hour stretch (dawn-dusk) each month. Observations were recorded into notebooks on the spot and were transcribed later. Individuals were not identified by name, but sex, ethnic group and estimated age were recorded.*

*Direct evidence of excretion often existed - when the act was clearly visible, when faeces or wet ground were seen afterwards - but usually only circumstantial evidence was available - posture of a person, duration of holding the posture, adjustment of clothing, subsequent actions (cleaning with grass, ablution, wiping or washing left hand) or behaviour of accompanying persons. Acts of excretion were only recorded if the observer was certain that excretion was happening. In addition to the observations made from the fixed points, excretions were also witnessed during ‘canal runs’. This entailed driving slowly up and down the length of the canal noting details of who was doing what and where in order to give a ‘snap shot’ picture of the whole canal.”*

The role of the observer may change as the study proceeds. Thus, the observer may begin as a participant, and gradually become an onlooker, or the other way round. The ideal is to arrive at a degree of participation that will yield the most meaningful data about the behaviours of interest .

### ***Openness on purpose of study and observer’s role***

The next variations relate to the level of openness on the purpose of the study and the role of the observer. It is sometimes argued that if you want to know what is really happening and how people really behave, it is better not to tell everything about the purpose of the study and the observations that take place. The reason is to avoid the problem of reactivity (see Section 4.1), as people may behave quite differently when they know they are being observed and why, compared with how they behave if they are not aware.

*“Reactivity refers to changes in behaviour caused by the presence of the observer. This may be reduced by attempting to veil the real objective of the study. We tell the mother that we are coming to follow the work that she does and to look at the health and activity of the child. More important perhaps is the approach of the observer herself. Good interpersonal skills which emphasize that the activity is non-judgmental and non-threatening are very important” (Kanki et al., WP 1991).*

The more a study is carried out with the active participation of the people concerned, the less likely it is that openness on the study will become an issue. Whether it is justified

## SOURCES OF INFORMATION: OBSERVATIONS

not to inform fully the population and project staff who are participating in the study, largely depends on two major considerations. The first is an ethical and moral one: there is much to be said for the stand that it is only acceptable to do observations when the people concerned are fully informed and have given their explicit permission. Without discussing this issue in detail, it is safe to say that there must be weighty reasons for withholding any information, and if information is withheld this should not have possible negative effects on the people concerned. This will only be the case when the purpose of the study necessitates restrictions to full openness, and that is the second consideration. For some studies it is more important to consider whether any restrictions are needed or not.

*"We announced our study to each of the 32 communities being monitored, explaining we were interested in child care and children's illnesses. As highlanders are often criticised for their low levels of hygiene, we could not state exactly what we were observing, but kept it general." (Jenkins, WP 1991).*

### *Duration of the observations*

The length of time devoted to data collection through unstructured observation is another important variation. At one extreme, observations may be limited to a single one- or two-hour event; at the other, they may take months, or even years. As the purpose of our study will usually be to generate useful information for action, the time taken for data gathering through unstructured observations should not take longer than is needed to get the useful information we are looking for. Patton (1980) provides us with a nice example of how long the observations should take, by narrating the following comparison: 'In a debate between two presidential candidates, one of them being Mr Lincoln who happened to have very long legs, was asked: "Tell us Mr. Lincoln, how long do you think a man's legs should be?" Lincoln replied: "Long enough to reach the ground."' This also applies to unstructured observations: they should last long enough to answer our questions, and to satisfy our learning needs. The following example by Allen (WP 1991) shows that the duration of the observations is an important issue. If the time taken for observation had been too short, it would not have come out that people do not always behave the same. Reactivity (see Section 4.1) may have been one of the factors in the case, but more observations would be needed to ascertain that.

*"People are not necessarily consistent in their behaviour. Some women would wash their hands after defecation on some but not all occasions that were observed. Two of the women with babies behaved differently. On the first occasion that was observed a woman washed her hands with soap after cleaning the child with a wet cloth, and then continued to sit and talk to me; the second time she wiped her hands on her robe and continued chatting. The other woman used a wet hand to clean the child the first time and then washed her hands with soap; the second time she used a cloth to clean the child but washed her hands without soap. Research is needed to establish the extent of consistency, and the factors underlying the different patterns of behaviour."*

### ***Scope of the observations***

A last variation relates to the scope of the unstructured observations. The scope can be broad, encompassing all aspects of hygiene behaviour in their full context, or narrow, involving a look at only a few behaviours to a limited extent. As with the other variations, the purpose of the study, and the time and resources available will determine what is the best choice. A decision on the scope of the observations should be considered in combination with the other variations. Thus, a broad scope is usually more appropriate with participant observation than with onlooker observation.

## **4.3 Structured observations**

Observations are described as structured when an observation list is used with a fixed number of points to notice, and when this list is applied in a pre-determined number of situations, or with a pre-determined number of people. Structured observations generally provide quantitative data.

Structured observations are only useful as a data collection method when a careful selection has been made of points about which we wish to learn more. Behaviours and actions not in the observation list will not be noticed and recorded, and thus not covered by the study. And behaviours and actions that are in the observation list, but that will not provide us with the information we are looking for, will be a waste of effort and time. It follows that structured observations should never be done without first exploring what we really have to know, in what detail, and to what extent. This requires a preliminary qualitative investigation of the behaviours of interest, using unstructured observation and unstructured interview methods. For example, for a study on child feeding practices, first an idea is necessary of how food is prepared, served, and stored within households which take part in our study. Unless the behaviours of interest are understood in detail, it is not possible to formulate a good observation sheet.

*A preliminary qualitative investigation by Tempongko (WP 1991) showed that the opportunity for structured observations of food preparation would be limited, as "many families purchase food already prepared. In these depressed areas of Metro Manila, small scale fast food stores are always present and are perceived to be a cheaper alternative to preparing food at home". Therefore, it would be wrong to make food preparation a part of the household structured observations.*

### **4.3.1 Types of structured observations**

There are three main types of structured observations: continuous monitoring; spot checks; and rating checks. Each of the three types can in turn be sub-divided into two varieties, as shown in the box below. Each type of structured observation and each variety can be used separately, but usually it will be a mix of methods that best suits the purpose of our study and fits the time and resources available.



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Box 7: Types of structured observations	
1. Continuous monitoring - extended observation - time-point monitoring	} Observation of behaviour
2. Spot checks - observation of events/activities	
-----	
- observation of physical clues	} Observation of signs of behaviour
3. Rating checks - environmental ratings - individual ratings	

### *Continuous monitoring*

Continuous monitoring involves observing and recording the behaviours of interest for an extended period of time, for example several hours or a full day. It may focus on waste disposal patterns, handwashing behaviour, weaning food preparation, children's contact with soil, objects and animals, and so on. For example, to study weaning food preparation behaviour, we may wish to know how the weaning foods are prepared and whether or not they are prepared fresh each time. If not prepared fresh each time, and reheating of foods occurs, we may wish to examine how and for how long weaning foods are stored. The observer thus may spend many hours in the household obtaining this information (Bentley et al., 1990).

*"Extended observation in our study concerns a one-time five-hour household visit, utilized to examine and describe behaviours suspected to be risk factors for severe diarrhoea in children. During this visit, behaviours related to child defecation, water collection and storage, food preparation and child feeding were observed and recorded. The observations started at 8.00 a.m. since the preliminary investigation had indicated that an earlier start caused some embarrassment when some family members were still asleep. Unfortunately, due to this late start, the opportunity to observe child defecation was greatly minimized. (only in 9 out of 70 visits child defecation could be observed). Another problem was that the observed mothers tended to delay food preparation. The observers who were instructed to bring packed lunch and if possible to eat with the family, would encourage the mother to go on with the food preparation. However, the observers often found that mothers still delayed food preparation because they did not have enough food to share with their 'visitor'." (Tempongko, WP 1991).*

There are two varieties of continuous monitoring. The first variety, extended observation, is the most common and is most suitable when a series of behaviours or



*Continuous monitoring is only useful when we can reasonably expect the behaviours we want to observe to be happening.*  
 Drawing: AHRTAG/  
 Paul Cook.

infrequent behaviours have to be observed. In extended observations, the behaviours of interest are noted down in a structured format as and when they occur. Extended observations require a high level of commitment and concentration of the observer to avoid missing any important behaviours and actions of interest over the entire observation period.

The second variety of continuous monitoring is time-point observation. In this type, observations are carried out at fixed points in time, for example the first five seconds of every minute, over an extended period, such as several hours. Time-point observation reduces the risk of lapses in concentration that are common in continuous monitoring. This type is particularly useful, if we want to know the quantity of particular behaviours, both for calculating the risk of disease transmission and for the evaluation of projects by comparing the quantity of behaviours before and after the intervention. Time-point observations are not useful for observing behaviour that occurs infrequently (Peasey et al., WP 1991).

*In a study on contact with wastewater in irrigated agriculture, farmers were observed "for a maximum of three hours, or the length of the activity being observed should this be less. Every minute, starting at the minute time-point, the observer records the actions of the individual over a five-second period. The observer is equipped with a watch with a repetitive counter that sounds for five seconds every minute. The observer records the actions on a form. There are a total of 25 possible actions that can be recorded (eg. 'feet in/on wet soil' and 'hand to wastewater'), identified in the preliminary studies. As well as the actions that are recorded every minute, there are two actions that are recorded whenever they occur, and not only at the one-minute time-point (eg. 'hand to mouth')". "With a one-minute time interval between noting observations the observers had time to watch, think and note down what they had seen before the next time-point occurred and to record the occurrences of the two activities that were noted down whenever they occurred." (Peasey et al., WP 1991).*

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Continuous monitoring requires the observer to be close to the person(s) to be observed. The observer has to be skilled to relate positively to the observed person(s) and the observed person(s) need to have a positive attitude to the study and the observer. Continuous monitoring is more time consuming and complicated than the other types of structured observations, both with respect to data collection, and data analysis and interpretation.

### *Spot checks*

A spot check is a particular type of structured observation, whereby the observer records the presence or absence of a behaviour or physical characteristic of interest at the first moment of observation. For example, the number of flies in a latrine; drinking water container covered or not; dirty diapers in the living area; presence of soap or ash and water at or near the latrine; presence of a long-handled dipper at the storage pot for drinking water. In time allocation studies, spot checks often note the exact activity of all individuals within a household at a given (usually random) time.

Spot checks are usually carried out immediately upon arrival of the observer at the household, or any other place where the observations take place. This may have the advantage that the "real situation" can be observed, not disturbed by the reactions of the people to the presence of the observer. As Kaltenthaler (WP 1991) puts it:

*"Upon arrival in the compound spot checks are carried out to obtain an indication of the overall compound hygiene. The kitchen is particularly important as this is the place where water and food is stored and food is prepared. Dishes are always either in or just outside the kitchen. Although the arrival of the observer can cause the mothers to alter their behaviour, it is hoped that by doing a quick spot check of the presence of unwashed dishes, uncovered water, stored food, animals in or near the food, animal or human faeces, etc. several hygiene factors can be assessed immediately."*

Spot checks can be used for directly observing people's behaviours. However, they are of no use to observe directly behaviours of limited frequency and duration, such as handwashing, since it is unlikely that an individual will be washing his/her hands at the precise moment a spot observation is scheduled. Therefore, spot checks are more often used to collect "signs of behaviour", or so-called physical clues, as described in Section 4.1. One example is to make a round after lunch-time to see how many households have left the dishes unwashed after the meal. Another example, which has been used successfully in several intervention studies of handwashing where free soap was distributed, is to weigh the soap periodically. The decrease in its weight is then used to get an indication of handwashing with soap. But of course this sign of behaviour only gives us a good indication when we know how many people are supposed to use the soap, how much soap is used for each handwashing, and whether or not the soap is used for other purposes, such as clothes washing.

*Households were visited for about one hour for interviewing and spot check observations. The spot checks included practices related to defecation/urination of young children; water handling behaviour; food and drink preparation practices; and features of the housing. "However, one major problem was encountered during data collection: in many households the important hygiene-related behaviours did not occur. For example, in order to observe handwashing practices of the mother following defecation of a young child, the event should occur at the time of the one-hour visit". But that was hardly ever the case. Therefore, the spot check observations of behaviours were replaced by spot check observation of physical clues of behaviours (Baltazar, WP 1991).*

An alternative use of spot checks is to ask people to demonstrate the behaviour of interest, and then to observe and record whether it is done correctly. For example, people can be asked to demonstrate the correct use of a bucket pump or protected well, and they can be invited to show how they usually wash their hands. Brieger (WP 1991) provides an example combining observation of demonstrations with observation of physical clues:

*In a study to test the use of nylon monofilament cloth water filters in the control of Guinea worm disease, over 700 households were monitored each month for a six month period. "One factor facilitating use is skill in putting the filter on the water pot correctly. A rubber band had been sewn into the hem of the circular filter to make it easier to place on the pot. The local tailors had sewn in the band using two colours of thread such that a black thread would show on top and a white one on the underside of the filter. Users were taught upon receipt of their filters to place the black thread upwards always. The research assistant on the monthly visit asked each user to demonstrate filter use and then observed and recorded whether the filter had been placed on the pot correctly". In addition, the condition of the filter was observed. "The presence of dust, soot or cobwebs on a filter were indications that the cloth had not likely been used recently for filtering water. Also damaged filters, ones with loose or broken rubber bands, were unlikely to have been used, or could not have been used properly. Finally the simple observation of whether the filter was present in the household was an obvious indicator of potential use. Villagers in the study area frequently travelled between farm hamlet and main towns and occasionally forgot their filters in one place or the other, so it was possible to observe the absence of a filter where there had been one available the month before."*

### **Rating checks**

Whereas both continuous monitoring and spot checks involve recording behaviours and signs of behaviours as they occur, ratings require the observer to make a judgement on individuals and the environment. For example, 'woman washes her hands' is a pure observation of a behaviour of an individual, while 'woman's hands are clean' requires a judgement by the observer.

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<b>Example spot check observation form</b>	
FAMILY CODE:	.....
<b>OBSERVATION CODE</b>	
	0. NO
	1. YES
	2. WAS NOT OBSERVED
	9. DOES NOT APPLY
<b>HOUSE:</b>	1. Is food covered? <span style="float: right;">___</span>
	2. Is water which is stored inside the house covered? <span style="float: right;">___</span>
	3. Is the ground in the house and yard clean and free of human and animal faeces? <span style="float: right;">___</span>
	4. Is the ground in the house and yard clean and free of garbage? <span style="float: right;">___</span>
	5. Are the animals inside the house? <span style="float: right;">___</span>
	6. Are the animals tied or penned up? <span style="float: right;">___</span>
	7. Are the mother's hands visibly clean? <span style="float: right;">___</span>
	8. Are the children's (age under 5) hands and faces visibly clean? <span style="float: right;">___</span>
<b>LATRINE:</b>	9. Does the house have a latrine? <span style="float: right;">___</span>
	10. Is the latrine enclosed in an outhouse (walls)? <span style="float: right;">___</span>
	11. Is the latrine (bowl) covered? <span style="float: right;">___</span>
	12. Is the latrine clean (free of cleaning materials and faeces)? <span style="float: right;">___</span>
	13. Does the latrine show signs of use? <span style="float: right;">___</span>
	- discoloured bowl
	- worn bowl
	some odour
	- floorboards soiled with dirt
	- cleaning materials
	14. Is water for handwashing available? <span style="float: right;">___</span>
	15. Is soap or ash for handwashing available? <span style="float: right;">___</span>
<i>Source: Brown et al, 1992.</i>	

It is rather tricky to make judgements such as clean or dirty, good or bad, thorough or superficial, more or less, as it depends on personal interpretation. One observer will record a latrine with a stained pan as dirty, while another may record it as reasonably clean. Jenkins (WP 1991) noticed that observers find it very difficult to estimate the amount of garbage, and faeces of pigs, dogs, adults and children near the houses, in the village and in the food gardens. It is recommended to use ratings only if unavoidable, and when ratings are used to take ample time for training the observers to ensure that everybody is making

similar judgements. It will help when the rating is made as specific as possible; an example is the cleanliness of a latrine pan. Ratings may be as follows: (1) clean; (2) stained; (3) traces of faeces; (4) blocked with faeces.

Just like spot checks of physical characteristics, ratings also concern the observation of physical clues from which we can derive an indication about hygiene behaviour. If a mother's hands are observed five times during the morning, and they are clean each time, it is not unreasonable to infer that this mother does regularly wash her hands. We don't really know whether she washed them regularly or whether she did so before meal preparation, because the actual event was not observed, and we did not ask her, but the mere fact that her hands were clean each time they were observed, leads us to conclude that she washes her hands regularly. Another example is the following:

*"The problem of observing adult defecation practices was solved with a simple observational proxy. On each new visit the observer simply asked to go to the latrine. The mother would answer that she had one or did not have one. If a latrine was available, the observer went to use it and recorded whether it was apparently in use or not. This proved to be quite easy because unused latrines generally had overgrown paths leading to them or were very clean or locked." (Jenkins, WP 1991).*

### 4.3.2 Key decisions in structured observations

When we want to conduct structured observations, there are a number of key decisions to take. These are summarized in the box below. Usually the key decisions are interrelated, and one decision will influence the others. It will be important to check the decisions made against the time and resources available for the study, and to make adaptations if required.

**Box 8: Key decisions in structured observations**

- Should observations be location- or person-based?
- How long should the observations take?
- What is the best time of day to conduct the observations?
- How often should the observations be repeated?
- In which season(s) should the observations take place?

#### ***Location- or person-based observations***

Observations are person-based when the observer follows the person whose behaviour is under study, wherever this person goes. For example, observations are person-based when we follow the mother collecting water at the well, cleaning up her little child in the compound, preparing food in the kitchen, and bringing food to the agricultural workers in

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the field. On the other hand, observations are location-based when the observer settles down at a location, for example at a public bathing place or in a kitchen. In this case, several people might move into the location and become part of an observation. It depends on what we want to learn about behaviours, whether the choice should be for location or person-based observations. If we want to know when and how hands are washed during the day, it will be better to decide for person-based observations, but if we want to know more about water hygiene, we may wish to settle down at the water collection point, and thus decide on location-based observations. Spot checks and rating checks are always location-based.

In a study on Guinea worm control, water contact was directly observed through continuous monitoring at the water source. The behaviours of the people visiting the location were recorded on an observation sheet. To this end "a version of a stick figure was made with the letter 'O'. Five could fit on a sheet of paper. Not only would the observer be able to mark the body part that came into contact with water, but also record time, sex and purpose of visit to the pond, as seen below" (Brieger, WP 1991).

<i>Contact:</i>	[1]	[2]	[3]	[4]	[5]
	0	0	0	0	0
	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0
	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0
	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0
	0	0	0	0	0
	0 0	0 0	0 0	0 0	0 0
	0 0	0 0	0 0	0 0	0 0
	0 0	0 0	0 0	0 0	0 0
	0 0	0 0	0 0	0 0	0 0
	0 0	0 0	0 0	0 0	0 0
	0 0	0 0	0 0	0 0	0 0
	0 0	0 0	0 0	0 0	0 0
	0 0	0 0	0 0	0 0	0 0
	0 0	0 0	0 0	0 0	0 0
<i>Time in</i>	_____	_____	_____	_____	_____
<i>Time out</i>	_____	_____	_____	_____	_____
<i>Total duration</i>	_____	_____	_____	_____	_____
<i>Activity</i>	_____	_____	_____	_____	_____
<i>Sex</i>	_____	_____	_____	_____	_____
<i>Age</i>	_____	_____	_____	_____	_____

### *Duration and time of observations*

How long the observations should take and at what time of the day are the next key decisions. The first question applies to continuous monitoring only, and is a particularly difficult one. For example, if we want to study food preparation and storage behaviours, the observer might have to arrive at the household before six or seven in the morning, and leave only after the last meal in the evening. This is because food preparation and storage behaviours may depend on the type of meal (eg. breakfast or main meal) and the time of

the day (eg. during the morning the woman might have so many duties to attend to that she takes less hygienic measures than in the afternoon). Such an extensive period of observation is costly in time and money, so the first task will be to try and minimize the required number of hours of observation. The preliminary qualitative study should provide us with information to take the right decision.

Choosing the appropriate time of the day during which to conduct structured observations is also an important issue. Three considerations will have to be taken into account. The first relates to the behaviours of interest. If all water for household consumption is collected before eleven in the morning, it does not make sense to plan observations of water collection during the afternoon. The second consideration relates to the preference of the people. People might prefer visits at certain times of the day, and if there is no timing conflict with observation of the behaviour of interest, there is no reason not to take these preferences into account. The preliminary qualitative study should provide us with the right information to take a decision with respect to these first two considerations. A third consideration relates to the availability of the observer. Sometimes it is difficult to arrange for an overnight study in the village, or the observer may have to be back home before dark. This may be the case especially with female observers, and careful attention is needed to create acceptable solutions for the observer, the people, and the study.

*“Qualitative observation was needed not only to prepare for the structured observation, but also to complement it. In this case the observers were not free to sit by the pond all day, so it was necessary to determine the periods of maximum use prior to formal data gathering. This was obtained during short informal visits at the ponds and informal interviews with women in the community. Consequently the structured observation was scheduled from dawn to about 8.00 a.m. and again from about 4.30 p.m. until dark. During the intervening hours occasional visits were often conducted. The bulk of activity at dusk and dawn consisted of collecting water by women and children for domestic use. During the remaining time, men would often come to the pond to collect water for a bath, which they would have in a small cluster of bushes about 6 metres from the pond, or to wash their clothes.” (Brieger, WP 1991).*

### ***Frequency of observations***

How many times the same observations should be repeated is a next question. There is no rule-of-thumb of how many times a particular event or physical clue should be observed before we know we have captured the right or ‘true’ picture. If we have observed water use on Monday, how do we know it will be the same on Tuesday, Friday or Sunday, and the next Monday?

One of the major considerations for deciding the number of observations required is the variability of the behaviour. Variability refers to how consistent people are with respect to the behaviour of interest. For example, does the person wash her hands each time after she defecates, or only half the time? When behaviours are consistent (i.e. less



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variable), fewer observations or less observation time is needed to characterize that person's behaviour. Thus, if a woman always washes her hands (or never washes her hands) then only one observation is needed to characterize her hand-washing behaviour accurately. However, people are rarely so consistent.

There are other important sources of variation that also must be taken into account. There will be variability in the behaviour patterns of people living in the same household, so it may be necessary to make observations on more than one person to characterize the behaviours of that family. More importantly, different households may have quite different behaviours. Careful sampling of households may be needed to cover the full range of behaviours in the community (see also Section 6.5). Also, many hygiene behaviours will vary with time, be it during the day, daily, weekly or otherwise. Again, the preliminary qualitative study should provide us with the information on the variability in behaviours of interest, to take a decision on the frequency of observations. For example, if water collection patterns do not seem to differ much over the week and between the various households, the number of observations for a water quantity study can be less than when there is a high variability. With continuous monitoring, the previous decision on the duration of the observations will have to be taken into account, as the total time required can easily get out of hand if we decide on both a long duration and a high frequency. In that case, priorities have to be set to strike the balance.

*“Variability of behaviours needs to be understood. Some behaviours vary from day to day whether there is an observer present or not. Some behaviours vary through the day. Observing only in the early morning may produce results with a particular bias. For example, the observational study may show a higher proportion of mothers throwing stools outside the compound rather than into the latrine when observing in the early morning. This is because latrines often serve as bathrooms and are heavily occupied in the early morning, thus stools have to be thrown elsewhere. One approach to the problem of variability lies in observing at least some households for longer periods to assess diurnal variability of behaviour and in making repeat visits to look at day to day changes. This will provide an estimate of the variability of different behaviours. However, there may be so much variability in some behaviours that they cannot be used in statistical analysis.” (Kanki et al., WP 1991).*

The number of observations required will also be influenced by the possible reactivity (see Section 4.1) of the people under observation. We have already mentioned that reactivity will be less when the people to be observed are familiar with the observer. This will be the case when the observer is from the same community as the participating people, or when the observer takes sufficient time to get close to the people by staying in the community for at least a few weeks before starting with structured observations. People may still behave differently when they are actually observed, but this appears to be reduced by repeated observations, as the observed grow accustomed to the presence of the observer. Through pre-testing it may be possible to identify a point in time where reactivity decreases significantly. For example, if two visits are needed before people feel

at ease and start acting as if the observer is not present, these two visits should be added to the total number of observations required.

The purpose of the study, and the time and resources available, will also influence the decision on the number of observations required. A further consideration relates to the complexity of analysis of repeated observations. Data collected during a one-time only observation are much easier to analyze than data collected during repeated observations, as will be further discussed in Chapter 6.

### *Seasonality of observations*

In study areas with changing seasons it will be necessary to consider the influence of the climate and the people's workload on their hygiene practices. In the dry season when water is scarce, it might be more difficult to adhere to frequent bathing and washing, while in the wet season, women may be primarily occupied with agricultural work. When the total time available for the study does not allow one to cover the various seasons - as will often be the case - this should at least be made perfectly clear. In a before-and-after study (see Chapter 7), this would imply that the after study should be carried out during the same season as the before study, to prevent distorted results.

*Seasonality is a particular source of variability that needs to be taken into account in observation studies. We had to change the timing of visits during the cold season since mothers get up later (remote roads in the dark early morning could also be dangerous for female observers going out alone). We moved the start time back from about 6.00 to 6.15 am for three months of the study. We will not cover the month of Ramadan when Muslims fast and eat only in the night. Normal patterns of sleeping and eating change completely in this month and could not be compared with the rest of the year (Kanki et al., WP 1991).*

## 5. Sources of information: Interviews

Interviews are the second major source of information on hygiene behaviour. This chapter provides a brief overview of the various interview methods. In discussing the different interview methods, the terms 'interviewer' and 'interviewee' or 'respondent' will be used frequently. An interviewer is defined as a person who seeks to learn something on the subject of interest by asking questions. The terms interviewee or respondent are synonymous and refer to the person who provides the requested information.

### 5.1 Interviewing as a data collection method

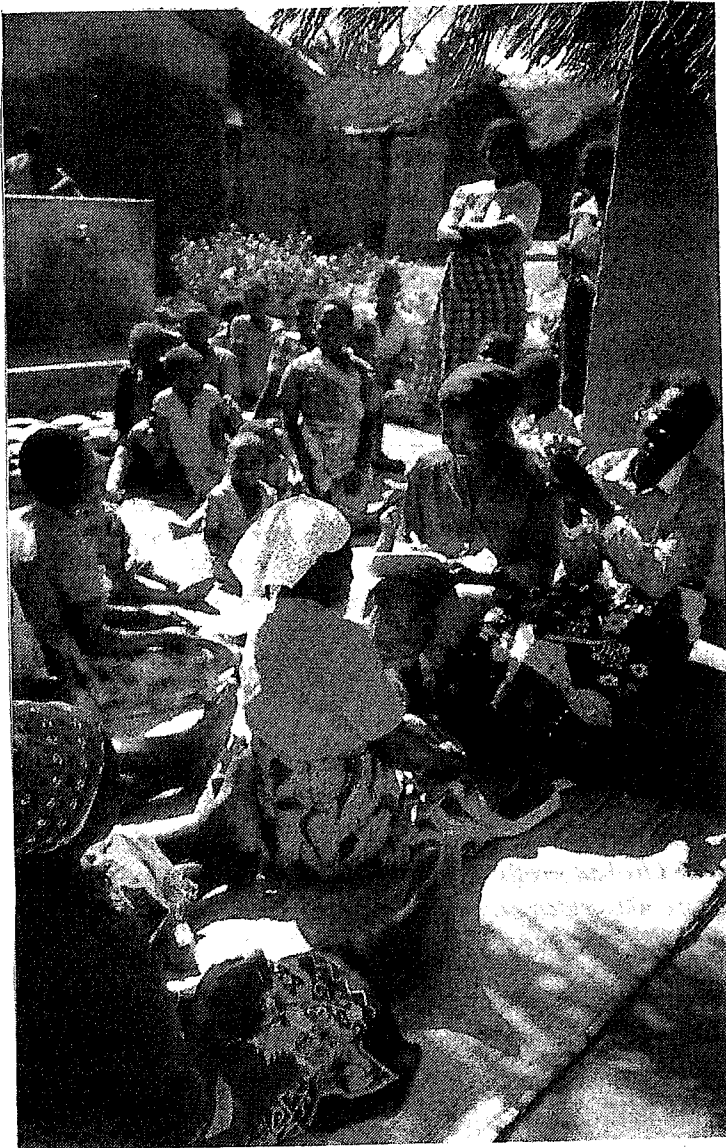
An interview is a meeting of two or more persons face to face. The purpose is to find out what is in the mind of the person(s) being interviewed. We interview people to learn about those things we cannot directly observe. We cannot observe behaviours that took place in the past. We cannot observe behaviours where we cannot be present. We cannot observe feelings, thoughts, beliefs and intentions, and we cannot observe people's perceptions. We have to ask people questions about those things (Patton, 1980).

*Hall et al. (1991) asked about people's views on the role of dogs, pigs and chickens that were frequently seen foraging around the adult defecation sites and on the ash leaps where children defecate. "Almost all interviewees acknowledged that village animals play an important role in the disposal of human faeces in and around the village. However, people had mixed views. Some felt that the animals' role was positive in that they kept the village and the defecation sites virtually free from human faeces. Others felt that the consumption of human faeces by animals presented health hazards to the community. When these people were asked to specify what these dangers might be, most (19) said that they feared dogs that had been consuming faeces might come into the house and contaminate utensils and uncovered food or even drink from uncovered water containers. Some (17) noted that animals that had consumed faeces might contaminate unprotected springs by leaving traces of faeces when they drank. A few (3) claimed that animals returning from the defecation sites spread disease into the home by standing at the doorway and breathing into the house. This view is in keeping with the widespread belief that diseases are transmitted by bad smells. Two people suggested that animals presented a danger because flies which settled on a animal's mouth (that had recently eaten faeces) might then move into the home where they could contaminate food."*

Interviewing may seem easy, but it requires quite some skill to collect meaningful information. Interviews may range from very open discussions on a topic of interest to the presentation of strong statements in order to provoke people's views. Photos, pictures,

maps, objects, demonstrations, etc., may be used to go deeply into a subject. Often it is useful to be with the people from whom we wish to learn in the location where the relevant behaviours occur. We can walk around together with interviewees to examine the various wells, springs, water-taps and other sources of household water use. We can sit in kitchens (if culturally allowed), visit courtyards, schools, health centres, markets. On-site interviewing can often bring out unexpected information.

No matter how well we use the interview methods, we will never obtain information about how people really behave in everyday life. Rather, we get information about people's perceptions of how they behave. It is a common truth that we cannot always remember correctly and fully what we have done and that we do not always do what we intend or say we will do. Sometimes we are even not aware of what we do, or how often we do it.



*Group interviews can be very participatory and produce a lot of valuable information and understanding in a short period of time. Photo: IRC/Boesveld.*

## SOURCES OF INFORMATION: INTERVIEWS

*The differences between what we actually do, and what we remember or say we are doing was subject of a study by Stanton et al. (1987a). In this study, data from a 24-hour recall and a knowledge-attitude-practice questionnaire were compared with data obtained by direct observation of practices related to water storage, handwashing and defecation. The results confirmed that, at least for practices related to sanitation and hygiene, the responses to the two questionnaires do not correlate with observed household practices. Main reasons were over-reporting of 'correct' behaviour, and a poor recall of what had happened during the last 24 hours.*

In every culture there are notions of what is "correct" or "ideal" behaviour, for example washing hands before eating. Whether we do it or not, we usually know how we should behave. Therefore, a person may tell the interviewer that he does wash his hands before eating, whereas in fact he only does it occasionally, because he is too busy, or negligent, or water or soap is lacking. The important point here is that he knows what he should do and what he may even wish to do, but other factors influence what he actually does.

*"Both structured interviews and systematic observations were completed for the entire sample of 158 cases, half of which served as the experimental group (with health education intervention) and the other half served as the control group (without health education intervention). Results of the interviews indicate that in the experimental group 90.5% in village B and 94.6% in village K acknowledged the need for washing hands with soap after processing of dung cakes. This is contradicted by the observation data, in which 28.6% of B and 13.5% of K followed this practice" (El Katsha, WP 1991).*

While interviewing is meant to find out what is in the mind of the person(s) being interviewed, we have to be aware of the so-called 'interviewer effect', in which the respondent reacts to and is influenced by the personality and views of the interviewer. People may wish to make a favourable impression and report to the interviewer ideal behaviour rather than actual behaviour, or they want to please the interviewer by providing information they expect the interviewer wants to hear. Also, people may find it difficult to respond freely, because they do not wish to reveal personal information to an interviewer who is from the opposite sex, or too young, or too much an outsider, etc. The problem of the interviewer effect is comparable to the problem of reactivity in observations, as discussed in the previous chapter.

*In a study to measure food hygiene behaviour of kitchen and cafeteria staff in two large hospitals, interviews were held with these staff to learn about their hygiene practices associated with handling of raw and cooked foods. A major problem with these interviews in an institutional setting was that "respondents themselves are aware of the possible consequences of improper food hygiene behaviour and must therefore not give responses that will expose their inadequacies. For this reason, we got responses in the affirmative for desirable behaviours quite contrary to what was later observed" (Ekanem et al., WP 1991).*

Interviews can be held with individuals and with groups. Groups may be existing groups acting together (eg. credit associations, women's clubs, water committees, neighbourhood or community groups) or groups made up from individuals for the purpose of the study (eg. teachers, visitors at a water point, mothers with children < 5). The difference between individual and group interviews is not only the number of people participating in a single interview session. Group interviews require more planning and are more difficult to guide because of the interactions between the various participants. Sometimes group interviews may be preferable because they can produce a lot of valuable information and understanding in just a couple of hours. Also, people are often willing to share feelings, emotions, and concerns in groups which they are reluctant to do in more private settings (the opposite may also occur as sometimes an individual may not wish to express his/her views in a more public setting). Information gathered in group interviews is also sometimes more accurate than that obtained in individual interviews because people may be reluctant to give inaccurate answers when they can be contradicted by other participants. Also, others in the group may add to what one is saying, thus raising the level of information (Casley et al., 1988). Another advantage of group interviews is that they may allow for greater people's participation in the various phases of the study.

In selecting individuals or groups for interviewing, we should be gender conscious. Men and women often have different roles and responsibilities as well as different knowledge, views and experience with regard to hygiene behaviour. Because of these differences between men and women, the relevance is stressed of women interviewing women, and if necessary, separately from men so they can express themselves more freely (Simpson-Hébert, 1983). Also among men and among women in the household there may be a difference in responsibilities, tasks and authority according to age and family status (e.g. mother in law, daughter-in-law, first wife/younger wife, girls, children) (Bah, 1988). There may also be differences in socio-economic and cultural background of men and women from different households to be taken into account (Wijk, 1985).

Just as with the observation methods, interview methods also can be distinguished between open or unstructured interviews and structured interviews.

## **5.2 Open or unstructured interviews**

Interviews are open or unstructured, when the persons being interviewed respond in their own words to express their own personal views. The purpose of unstructured interviews is to learn about people's views on the behaviours of interest, to learn their terminology and judgements and to capture their perceptions and experiences. There are various types of unstructured interviews, as summarized in Box 9.

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### Box 9: Types of unstructured interviews

- Informal, conversational interviews
  - with individuals
  - with groups
- Key informant interviews
- Topic-focused interviews
  - with individuals
  - with groups
- Semi-structured interviews
  - with individuals
  - with groups

### ***Informal, conversational interviews***

Informal conversations are spontaneous talks with individuals and groups of people on the subject of our study. This type of interviewing allows maximum flexibility to discuss any topic related to our study.

*“An important issue was how sensitive it would be to discuss human excreta practices. So we decided on a try-out during our preliminary field visits. One of the female team members informally contacted community women and discussed village life including defecation practices. A male team member did the same with community men. When no apparent restrictions were encountered in discussing the subject, neither with individuals nor in groups, mixed discussions with both sexes were also tried out. It proved to be quite acceptable for men to discuss this subject with women, and vice versa. During a group discussion on how parents helped their children clean up after defecation, one of the women started to laugh and demonstrated how many of them would rather use their big toe than their hands for wiping babies’ bottoms: an important practice to know when developing a meaningful hygiene education programme” (Boot, WP 1991).*

During an informal conversation, the interviewer merely introduces a topic of interest and then follows the reactions of the people interviewed. One topic may be discussed at full length, whereas other topics may be left untouched, to be picked up later, when new opportunities occur for other informal conversations with the same or other people. Topics already covered before may also be picked up again for further exploration. In this way, each conversation will build on the previous ones, learning more each time, until additional conversations no longer produce new or deeper insights.

Informal conversations are particularly useful in combination with open or unstructured observations, as they allow us to discuss on the spot what we notice, thus increasing our understanding of the lives of people and their hygiene behaviour. For example, talks with women who are collecting water at the standpost may provide a lot of additional information about water hygiene perceptions and practices.

*“Another interesting observation was the knotted palm frond placed near several ponds. Interviews revealed that these were traditional warning signs to remind community members not to do ‘dirty’ things, like defecation or refuse disposal, in or near the pond” (Brieger, WP 1991).*

An informal conversation may look easy, just like a chat, but in fact is quite difficult, and requires a lot of skill. The interviewer must be able to interact easily with people in a variety of settings, generate rapid insights, formulate questions quickly and smoothly, and guard against asking questions that will produce an interviewer effect (see Section 5.1). Skills will also be needed to pull together and analyze the data obtained from informal conversations. We will return to this point in Section 6.1.

### ***Key informant interviews***

A key informant is a person who is specially knowledgeable, at least in some subjects or topics of interest, and with whom the interviewer develops an ongoing relationship of information exchange and discussion (Pelto, WP 1991). The difference between a general informant and a key informant is that general informants primarily give information about themselves, whereas key informants provide information about others or specific situations, events and conditions in the study area (Casley et al., 1988). Thus, a key informant is a kind of expert on some cultural, political or health aspects of the community beyond his or her own personal beliefs and behaviours. Both men and women, formal and informal leaders, professionals and ‘ordinary’ people can be key informants. General characteristics of good key informants are that their views and knowledge represent those of a larger group, and that they like to communicate and exchange information with the interviewer (Pelto, WP 1991).

Key informant interviews often occur on a very informal, impromptu basis. The interviewing is based on mutual trust between the interviewer and the key informant, and



*Key-informant interviews often occur on a very informal impromptu basis. Drawing: CHETNA, India.*



## SOURCES OF INFORMATION: INTERVIEWS

this trust can only be built up through a series of contacts. The first meeting is often an occasion to get to know each other, and the subsequent meetings are used for more detailed discussions on the subjects or topics of interest. In the earlier interviews, the emphasis will be more on exploring and learning, for example of local terms and ideas in relation to hygiene and health; daily water and sanitation practices; household and community social structures; economic conditions and local politics; important events. In later interviews, emphasis will shift to gain a deeper understanding, by verifying earlier information, by correcting original misinterpretations, and by filling information gaps. At this later stage, discussions with key informants are also useful to get their views on the findings and results that emerge from the study.

*“While interviews on hygiene are especially suspect, they were deemed necessary to obtain a better understanding of the observed behaviours. Interviews with eleven key informants were held before and throughout the observations. In open-ended and exploratory interviews, informants were led to talk about food storage, dish washing, and on their perception of ‘dirty food’. These interviews provided a good understanding of normative behaviour and cultural values regarding food handling and storage, crucial information for any educational messages. Interviews also conveyed the extent of intra-community variability and of the need for representative samples of households” (Saenz de Tejada, WP 1991).*

For key informant interviewing, the interviewer must be able to communicate in a way that stands halfway between interviewing and informal conversation. The interviewer does not have a list of questions, as with topic-focused interviewing (see below), but topics are introduced by the interviewer and the informant alike, and explored in detail. Key informant interviewing is especially useful in combination with unstructured observation. Key informants can help to explain behaviours and signs of behaviours (physical clues), and thus help the observer to understand what is happening and why. In discussions, comparisons can be made between actual behaviours and ideal behaviours. Key informants also can act as sources of information about what the observer was not able to observe for him/herself.

### ***Focus group discussions***

This section is largely based on Morgan (1988). A focus group discussion is an open discussion amongst a small group of people on a specific subject. In the discussion, the emphasis is on a free exchange of views and experiences. The discussion may be recorded on tape. The interviewer’s role is to act as a facilitator, stimulating the participants to keep discussing the subject, until no new points emerge. Focus group discussions require skilled facilitators. A list of issues to be covered should be prepared beforehand, to guide the discussion.

Focus group discussions have the advantage of generating a large amount of information in a relatively short time, and because of the group interaction, more in-depth information is often generated than through topic-focused interviews (see below). Focus groups are

especially useful when it comes to investigating what participants think, and why participants think as they do. Because of these characteristics, a focus group discussion is a powerful method to explore subjects of interest and to gain a deeper understanding of attitudes, perceptions, beliefs and wishes of the group participants.

*"In a discussion group we asked what a clean mother is. We were told that mothers all aspired to be clean, and that:*

*'When you enter the compound of a clean woman you find that*

- the courtyard, the house and the kitchen area has been well swept;*
- the plates, bowls and cups have been carefully washed;*
- the children are clean and bathed;*
- the mother is herself clean in clean clothes'.*

*But when we asked more specifically about child stools we were told that child stools smell bad and should be treated such that they can no longer be smelt or seen. Not once was the presence of invisible microbes mentioned. The discussion group told us that mothers do not regard children's stools as dangerous to health" (Kanki et al., WP 1991).*

A focus group discussion will be most successful when it resembles a lively conversation among friends or neighbours. The technique is unsuitable when participants do not know enough about a subject, or if the subject is highly controversial, or if the participants do not feel comfortable to voice their views on a particular subject in a group. The simplest test of whether focus groups are appropriate is to ask how actively and easily participants would discuss the subject of interest.

Usually 6 to 12 persons participate in a focus group discussion. As originally developed by the advertising industry, members are chosen who do not know one another. However, in rural communities this is not always possible. As the participants will never be completely representative of a total population (see Chapter 6) it is best to invite as participants those persons that are interested and able to provide meaningful information. For a fruitful exchange, it is important that the group is more or less homogeneous. This is not to imply that they should be homogeneous in their views and attitudes, because that would create a flat, unproductive discussion. Rather, they should share a common background so that they feel comfortable to talk freely with each other. A common background usually relates to the same sex, age, socio-economic or socio-cultural group, but has to be carefully defined in each specific case. For example, if the subject of discussion is school hygiene and sanitation, the common background may be 'parent', rather than sex, age or class. If culture prevents a free exchange between men and women, the choice may be for separate focus groups, one with fathers, and one with mothers.

A typical focus group discussion takes one to two hours to conduct, but transcript typing is slow, and analysis time consuming (see Section 6.1). Hence, careful consideration should be given to the number of focus groups. The purpose of the study, and the time and resources available, will determine the number of groups to conduct. If the moderator can clearly anticipate what will be said next in a group, then enough groups have been held; this usually takes three to four groups. However, this number is to be multiplied by the

## SOURCES OF INFORMATION: INTERVIEWS

number of types of group. If it is important to have separate groups for women and men, we have to continue with women's groups until we can anticipate what will be said, and the same for the men's groups.

### **Example question guide on malaria for a focus group discussion**

1. People in this community have talked to me a bit about malaria. Could you tell me how you know someone has malaria?
2. Are there differences between children's and adults' sickness?
3. If someone has malaria, what do you do? (probe for differences according to different sets of symptoms and according to age of person).
4. Are there other words for malaria?
5. Is malaria more common at some times of the year than others - why might this be so?
6. What causes malaria? (probe for a complete list of causes, and understanding of transmission).
7. IF mosquitoes are mentioned: do all mosquitos cause malaria? Where do they breed? Bite? When?
8. Is there anything you can do to avoid getting malaria?

**Note:** The facilitator would not word the questions as formally as they are listed. The general order of questions, however, would be followed.  
Source: Dawson et al., 1992.

### ***Topic-focused interviews***

For a topic-focused interview a guide or checklist is prepared with subjects and topics to be covered during the interview. The guide provides a framework for the interviewer to formulate questions and to explore the topics on the list. Usually there is no fixed order for the topics to be discussed, and the interviewer will follow the natural flow of the discussion, taking up what the interviewee comes out with, and probing for more in-depth information on the topics in the list as they arise. If other topics of interest do come up during the interview, these may be further explored as well, as long as they are important for the purpose of our study. Topic-focused interviews are often fruitfully combined with unstructured observations.

*“For the observations and in-depth interviews with mothers, twelve families were chosen who were visited three times for 1-3 hours each visit. The families were not randomly chosen as it was felt to be important to include families from the various tribes, all areas of the villages, as well as families of different income levels and social situations. Questions were asked about daily life, food preparations, health of children, breastfeeding. Observations were made concerning food preparation, household and personal hygiene, and the presence of animals. In-depth interviews were held with each mother to gain insight into mothers’ attitudes towards the causes and treatment of diarrhoea as well as breastfeeding, personal and domestic hygiene. Particular emphasis was placed on gaining insight into mothers’ knowledge of the ways in which diarrhoeal diseases might be spread. Several issues arose from this preliminary phase which were useful in planning the sampling phase. Many hygiene behaviours thought to be potentially involved in the spread of faecal contamination within the home were identified” (Kaltenthaler, WP 1991).*

The advantage of a topic-focused interview is that the guide will help to ensure that all required information will be collected, whereas at the same time flexibility is kept to explore a topic fully. If the same guide is used for interviewing a number of persons, the data generated will be more comparable, since all interviews will cover the same topics. A topic-focused interview requires a skilled interviewer, but as the guide provides a clear framework for discussion, it may be easier to conduct than a focus group, a key informant interview, or an informal conversation.

*Interview schedules were administered to 16 school teachers from 8 primary schools. One of the aims was ‘to establish the teachers’ attitudes towards Health Education, and whether there were any constraints’. All except 2 of the respondents found the subject interesting to teach. As far as they were concerned health-related problems were those which were met by people in their daily lives. This made it relevant for them teaching it. The subject was also seen to be quite useful in that children had to be made aware of their health problems and how to handle them. Various constraints were encountered. Three of the respondents expressed their concern over the shortage of water and sanitation facilities and attributed the ineffectiveness of schistosomiasis-related lessons to this. They also noted that besides this, the parents were doing very little in encouraging their children to use available facilities. One respondent pointed out that some children did not take instructions. This view was supported by three other respondents who gave various reasons for this kind of behaviour. One reason was that of religious faiths. This was evident in school treatment programmes for schistosomiasis where children of certain faiths refused to take tablets. The other problem, according to the teachers, was financial. Children would rarely visit clinics as this was financially prohibiting (Gwatirisa, WP 1991).*

Topic-focused interviews can be used for interviews with individuals and with groups. Topic-focused interviews with individuals are usually held with general informants, as distinct from key informants (see above). A topic-focused group interview can be conducted in smaller and larger groups, but especially in larger groups it is best if two interviewers share the tasks of guiding the discussion, formulating new questions, probing

## SOURCES OF INFORMATION: INTERVIEWS

for more in-depth answers, and recording the generated information. Topic-focused group interviews are especially useful at the start of a study, to gain general interest, opinions and cooperation of the people, and at the end of the study, to discuss jointly the preliminary results, and implications for action.

*During a study on child health, a series of group discussions were organized with mothers from the study area. At the start, women were invited to help describe and characterize each section of the town, and later the mothers helped to test the draft household questionnaire. When the results of the questionnaires came in, and interesting findings emerged, the study team again went back to the groups of mothers to discuss the implications of these findings and to jointly develop an intervention programme to reduce the incidence of diarrhoea (Kanki et al., WP 1991).*

### ***Semi-structured interviews***

Semi-structured interviews are interviews guided by a list of questions which are asked in the exact wording and order as they have been written down. Preparation of a semi-structured interview requires that first a qualitative investigation is done, to gain a deeper understanding of what questions should be asked from whom, how and in what order.

Although the wording of the questions is determined beforehand, the answers are still open-ended, and the respondent is free to give his or her own words, thoughts and insights in answering the questions. For this reason, a semi-structured interview is sometimes called a 'standardized open-ended interview'. The technique is particularly useful when time is limited and it is desirable to have the same information from a number of people. As the answers are open-ended, the emphasis in this type of interview is still on gaining in-depth understanding, but as the questions are standardized, the answers from the various respondents will be comparable enough to combine them into frequencies of responses.

Compared to the other qualitative interview methods, a semi-structured interview is less dependent on the interviewer's communication skills and knowledge of the subject of study. Thus, semi-structured interviews can be carried out by less qualified persons, although they also will need some specific training for adequate job performance (see Chapter 7). When more than one interviewer is involved in interviewing, the list of questions will help to minimize the variation among the various interviewers. A possible weakness might be that less qualified interviewers easily fail to pursue in-depth answers from the persons interviewed, or that they forget to write down the answers as correctly and completely as possible. In those cases it is better to resort to other interview methods.

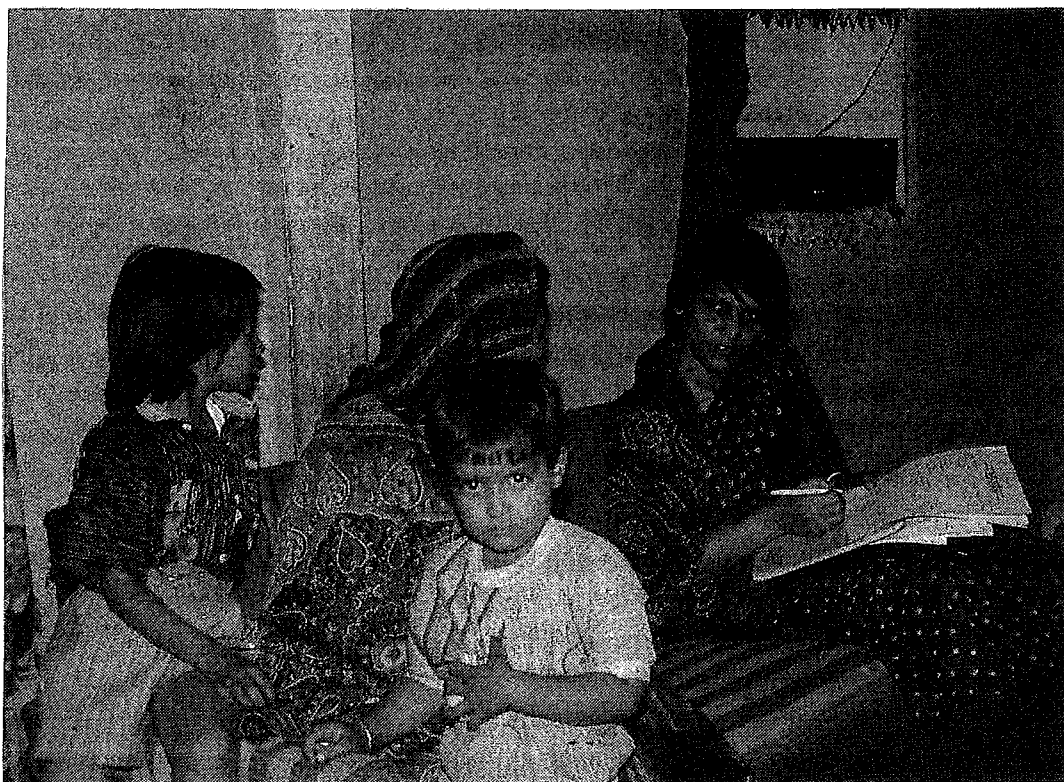
As the list of questions is fixed, it is also known what is not going to be asked, and thus, what information will not be obtained. It is important to realize this beforehand, so as to prevent a lack of relevant information at the end of the study. However, the opposite is also true; since all questions in the list will be asked of all persons interviewed, we may end up with a time consuming exercise and with too much data that we cannot possibly sort out and analyze into useful information within the time limits of the study. A judicious choice should be made about which questions to include and which questions to leave out.

A pre-test will be needed to ascertain that the right questions are asked to provide the required information, and that the responses can be handled to produce timely results. This testing of the list is also necessary to be sure that none of the questions present any confusion or difficulties for the interviewer or the interviewees.

### 5.3 Structured interviews

Structured interviews have closed instead of open-ended questions, but otherwise resemble semi-structured interviews. In closed questions, the answers are limited to a predetermined set of choices. The advantage of this method is that it allows for easy coding and analysis of the answers. Also, structured interviews are easier carried out by less experienced interviewers, as no probing for full answers is required. With the same number of questions, structured interviews take less time to complete than semi-structured interviews because the answers are usually limited to a few words only.

Structured interviews, are designed to generate factual and quantitative data. Structured interviews are particularly useful to study the composition and characteristics of the population, and people's general views and attitudes on issues of interest, for example hygiene behaviour, disease and disease transmission, priorities and constraints. Only simple matter-of-fact questions and questions that can be answered through pre-defined responses are suitable for being included in the structured interview.



*A mother interviewed at home, using a questionnaire. Photo: IRC/Boot.*

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As with semi-structured interviews, the choice of questions should be based on a qualitative investigation, to be sure that the questions are relevant both for the people and the study. Also the design of the questions and answers is a matter of crucial importance. If we ask the wrong questions, or questions that create confusion or embarrassment, or if we formulate wrong or confusing answers, we cannot expect useful results. Therefore, the wording of the questions, the construction of the sentences, the sequence of the questions, and the choice and wording of the answers need careful attention. A pre-test is always required to check whether the questionnaire poses any problems to the interviewer or the interviewee, or creates any difficulty with respect to coding of the answers, data analysis, and usefulness of the results.

Kochar (WP 1991) points out a frequent problem in the study of hygiene behaviour (as well as in other studies): "It is assumed that a long list of questions is all that is required, and anybody who can read the questions can go and collect the information without much ado." However, "it is wrong to start with questions and jump into data collection". A questionnaire has to be based on a preliminary qualitative study and must be carefully designed and implemented. Although the implementation of questionnaires requires less trained interviewers than for any of the other methods discussed, this is not to imply that they don't need regular guidance, support and supervision to ensure uniformity and quality of data.

*"I have found that periodic participation in field work, interactions with field workers, and discussion on the field experiences and problems is very rewarding. I encourage field workers to bring problems and vexing situations for discussion and clarification." . . . "One telling example is of two field workers working in the same village, who brought totally different response patterns with regard to a particular community on one question. I noted this during one of my fortnightly review meetings. It turned out that the question was considered by the field workers to be an obvious one not requiring interrogation. One field worker assumed the response and filled the answer as he deemed fit. In the other case the question was presented but the responses were vague. The pet answer was: 'What to say sir, you know it', forcing the interviewer to put responses as he deemed fit. The two interviewers incidentally had a totally opposite view on the matter and hence the contrasting records" (Kochar, WP 1991).*

The problem of the interviewer effect may arise in a structured interview, although through its structured nature this effect is usually more controlled than for the other interview methods. Well-known examples are that people provide inaccurate information on their income, land ownership, income and expenditure patterns for fear of misuse of the information. Often, a careful consideration of what information is really needed will help to solve this problem. After a preliminary investigation for a study on water, sanitation and hygiene in Bangladesh, it was decided that it was only necessary to have an indication of the relative socio-economic position of the households in the project area. For this purpose no questions had to be asked at all, as it was sufficient just to observe whether a household was living in one or more rooms (Abdullah et al., 1989). For the same reason in Sri Lanka

it proved to be sufficient only to observe whether the cooking fire was at ground level or elevated. In other cases, the interviewer effect may be less easy to solve. Kochar (WP 1991) relates one of his experiences as follows:

*“In Bengal I wanted to find out whom the households consulted in case of sickness in the family. The data which the interviewers returned showed that very few households used folk healers, rituals and magical medicine. This was contrary to what I knew first hand. It turned out that since we were in a ‘medical’ project all the interviewers were referred to by the villagers as ‘doctors’. So when we asked our questions the people promptly reported that it was the ‘doctors’ they consult. They never thought that we would be interested in ‘village medicine’. In a redesigned study we found that more than 90% of the sample households had used ritual/folk medicine.”*

A great number of studies have struggled with the problem that interviewing cannot provide accurate information about how people really behave in everyday life. This applies especially to information related to water use for personal hygiene and the exclusive use of hygienic latrines. Direct observation of behaviour or the observation of physical clues are the first choices to solve this problem, but not always applicable to the extent desired. Therefore, various studies have tried to address this problem in a way that best suits their purpose. Thus, Kirimbai et al. (1983), Sophal et al. (1986) and Hall et al. (1991) decided that it was difficult to confirm purely through observation the extent to which people wash their hands (especially after defecation), and therefore asked the interviewees the following question: “When do you wash your hands?”. This question was asked not to get an impression of actual behaviour, but of people’s views about when one should wash hands. In all cases this worked satisfactorily. Alternative ways to ask about handwashing practices are questions such as: “When do you think it is important to wash hands?” and “Why do you wash hands”. Note that the question was not framed in the form “Do you wash your hands after defecation?” to which the ‘desirable’ answer is obvious. Such leading questions should be avoided in interviews.

*Another example comes from Abdullah et al. (1989): “Interestingly, the straightforward question on people’s opinion when one should wash hands showed that nearly everybody indicated that this should be done after defecation and before eating, but that only a minority pointed at the importance of washing hands before food preparation and after cleaning a child’s bottom after defecation. This question about when one should wash hands was followed by a question about whether people really do what they know they should. Two thirds of the respondents answered they did, whereas the others indicated they often were too busy, or just forgot. Although these answers did not give a precise overview of when and how often hands are washed, they did provide the project with a clear idea that handwashing after helping children and before food preparation needs more attention, as does the general problem of how handwashing can be made a consistent and routine activity.”*



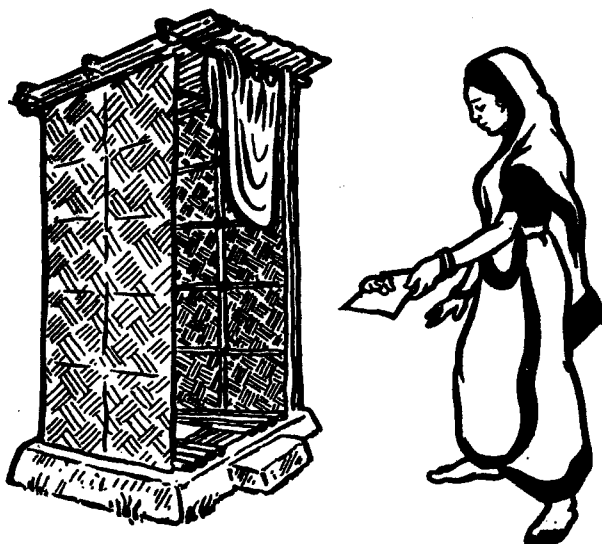
## SOURCES OF INFORMATION: INTERVIEWS

A study in Bangladesh tried to gain an overview of latrine use and practices related to the disposal of excreta of babies and little children by asking comparative questions about who is more likely to use a latrine and by showing an illustration about excreta disposal to generate reactions.

*“From the preliminary discussions with project staff and men and women in the communities it was learned that the construction of hygienic latrines did not always imply the use of these latrines by everyone in the family. Sometimes latrines were only constructed for the sake of complying with the condition for getting a handpump. It was also indicated that for cultural reasons women and men were not always able to use the same latrines. Others told us that only women would use the new latrines, to prevent the pits from filling up too quickly.*

*We tried to cover these issues in the questionnaire survey, by asking comparative questions about which family members are more likely to use the latrine or would do so more often, and for what reasons. Although the pre-testing and the implementation of the questionnaire did not reveal any particular problems, analysis of the collected data did not provide us with meaningful or conclusive answers. We concluded that the use of latrines needed further investigation, using different research methods.*

*More successful was our attempt to get an idea about practices related to the disposal of the excreta of babies and little children. One of the mini-posters developed by the project (see illustration) was used as an entry point to a discussion of the topic. While preparing the questionnaire, the research team was rather sceptical whether this less conventional tool could work, but when testing showed that community men and women reacted favourably, the initial reluctance was easily overcome. The interviewers liked the break in the question - answer sequence and the men and women in the communities felt invited to explain more freely and fully how they disposed of their children's faeces” (Boot, WP 1991).*



Drawing: Government of Bangladesh.

## 5.4 Formulation of questions

This section is largely based on Patton (1980). For any interview we have to decide what questions to ask, how to sequence the questions and how to word the actual questions.

### *What questions to ask*

There are basically six kinds of questions that can be asked of people in a study of hygiene behaviour:

- Experience/behaviour questions:** These are questions about what a person does or has done. These questions are aimed at eliciting descriptions of experiences, behaviours, actions and activities that would have been observable had the observer been present. An example question is: "If I followed you to the water source, what would I see you doing?"
- Opinion/Value questions:** These questions are aimed at understanding people's goals, intentions, desires, and values. Example questions are: "What do you believe?" "What do you think about ..?" "What would you like to see happen?" "What is your opinion of ..?"
- Feeling questions:** These are questions aimed at understanding the emotional responses of people to their experiences and thoughts. An example question is: "Do you feel satisfied with the new latrine?"
- Knowledge questions:** These questions are asked to find out what factual information the respondent has. Example questions are: "Do you know how children get sick with diarrhoea?" "Why do you wash hands?"
- Sensory questions:** These are questions about what is seen, heard, touched, tasted, and smelled. Example questions are: "When you go to the river, what do you see?" "What did he actually say?" "How does the water from the handpump taste?"
- Background/demographic questions:** Answers to these questions help the interviewer locate the respondent in relation to other people. Age, education, occupation, residence/mobility questions, and the like are standard background questions.

### *The sequencing of questions*

There are no fixed rules as to the order of the questions. In unstructured interviews it is important to be as flexible as possible. In the semi-structured and structured interviews the order of the questions has to be predetermined and the following suggestions may be useful to keep in mind.

It may be best to start with questions about non-controversial present behaviours, activities and experiences. Once some experience or activity has been described it is

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appropriate to ask about interpretations, opinions, and feelings about the behaviours and actions described, and to ask knowledge and skill questions. Questions about the present tend to be easier to answer than questions about the past. It is usually better to begin by asking questions about the present, then, using the present as a baseline, to ask questions about the same activity or attitude in the past. Questions about the future involve a lot of speculation and are typically less reliable than questions about the present or past. Background and demographic questions are usually boring, and it is best to keep them to a minimum while spacing them throughout the interview. Some background information may be necessary at the beginning to make sense out of the rest of the interview, but such questions should be tied to descriptive information about present experience and activities. Otherwise save background and demographic questions to the end.

### *The wording of questions*

Asking questions is an art. The way questions are asked will largely determine how interviewees will respond. Questions should be, at a minimum neutral, singular and clear. In unstructured interviews the questions should also be truly open-ended.

- ❑ **Open-ended questions:** For a question to be truly open-ended, the question has to be asked in such a way that respondents can answer the question in their own terms. Examples are: “How do you feel about ..?” “What is your opinion of ..?” “What do you think of ..?” In comparison: “How satisfied are you with ..?” is not truly an open question as the direction of the answer is already given in the question. These latter type of questions may be more suitable for structured interviews. Also, to be truly open-ended a question cannot be phrased as a dichotomy, as that will suggest a “yes/no” answer only. For example: “Are you satisfied with ..?” invites the interviewee to answer with “Yes” or “No”.
- ❑ **Neutral questions:** Neutral questions give the interviewee the possibility to answer freely. Neutral questions are the opposite of leading questions, which give the interviewee hints about what would be a desirable or appropriate kind of answer. Leading questions ‘lead’ the respondent in a certain direction. For example: “Do you use a latrine?” will easily provide the answer “Yes”, irrespective what people actually do. Instead, “Where do you go to relieve yourself?” is a neutral question.
- ❑ **Singular questions:** Singular questions are questions that contain only one idea. Singular questions are important to prevent confusing answers. For example: “Do you wash and bath at the water source?” may give an answer related to bathing, to washing, or to both, but we cannot be sure.
- ❑ **Clear questions:** To get clear answers we should ask clear questions in the first place. Clear questions are phrased in the words and ways that are common with the interviewee. For example there may be special words for specific hygiene practices, and there may be special ways to refer to and discuss sensitive subjects.

An interview will run better, and provide more and better information when the following suggestions are taken into account:

- ❑ **Minimize ‘yes/no’ answers to questions:** This is especially important in unstructured interviews, but also applies to structured interviews. For example: “Are you satisfied with the new latrine?” or “Have you changed your bathing practices as result of the new water supply?” are questions that invite the respondent to reply with “Yes” or “No”, without giving further information. Better is “What is your experience with the use of the new latrine?”
- ❑ **Minimize ‘why’ questions:** Too many ‘why’ questions can be very boring, and provide partial answers only. Take for example: “Why did you construct the latrine?”. Probably there have been various reasons, and it might be difficult for the interviewee to pick the most relevant one. By thinking carefully what questions we are really interested in, we can formulate more precise questions such as: “What made you construct a latrine?” “What people played a role in your decision to construct a latrine?”
- ❑ **Include ‘presupposition’ questions:** Presupposition questions are questions in which it is assumed, or presupposed that the interviewee has something to say. This not only increases the likelihood that the interviewee will indeed have something to say, but it also will make sensitive issues more easy to discuss. Thus, “What do you know about ..?” is often better than “Do you know anything about ..?” or “What kinds of problems do you have with ..?” is often better than “Do you have any problems with ..?”
- ❑ **Include ‘simulation’ questions:** In simulation questions the interviewee is asked to place him/herself in the position of somebody else. This is often a good way to increase our understanding of common behaviours, and ideas about what are good behaviours. Examples are: “Suppose a person is sick with diarrhoea, where do you think he will go?” or “Suppose I was a new person in the village, what would you tell me about the use of the well?”
- ❑ **Make the interview a two-way flow of communication:** We should avoid the interview becoming an interrogation. This goes beyond the phrasing of specific questions, and can only be achieved when the purpose of the interview and how the information will be used are made clear to the interviewee at the start. Training interviewers how to introduce themselves, and how to ask questions in a way that gets the point across and is non-judgmental as well as culturally acceptable, is very important to make the interview a rewarding activity. For example, in many cultures an interviewer cannot go up to an old person and just ask a question, as going straight to the point might be interpreted as being rude. First the right atmosphere has to be created, and then the questions have to be phrased in a respectful way.

## 6. *General methodological issues*

In carrying out hygiene behaviour studies, various methodological issues have to be considered in relation to the design and implementation of studies and the use of the study results.

### 6.1 **Maximizing learning opportunities and benefits**

#### *Involvement of relevant people*

In Chapter 1 the study of hygiene behaviour was defined as a process of systematic learning. This raises the questions: “Learning for whom?” and “Learning by whom?”. These questions will have to be answered to maximize learning opportunities and benefits from any study.

A first group of people to be actively involved in the study are those we expect to use the information that will be generated. Information users may include: community groups, health and hygiene educators, public health staff, water and sanitation project staff, teachers, government staff and officials at different levels, policy makers, and others.

Often a distinction can be made between direct users and general users of the study results. Direct users are the people for whom the study is undertaken, and who are expected to do something with the results. General users are categories of people for whom the results of the study are expected to be interesting for their own work and/or lives. For example, health education staff and men, women and children from participating communities may be the direct users of a baseline study in preparation of a hygiene education programme, whereas all health staff involved in hygiene and nutrition and all population groups with children under five may be the general users of a food hygiene study.

Expected information users are more likely to work with the results of the study when the study is adapted to their actual information needs, and, especially for the direct users, when they take part in the important decisions and different stages of the study. People whose lives and work will be directly affected by the results of the study should be fully involved. It is a common truth that people are more likely to act on findings, conclusions and recommendations, when they are drawn into the learning process and feel committed to the results.

To ensure timely involvement of the expected information users, a first step in any study is to identify these relevant people, and to arrive at a common understanding of what issues the study should cover. Patton (1978) describes a little exercise to get a study focused on its future use, by asking the identified information users to complete the sentence: “I would like to know ..... about .....” up to ten times. If this exercise is done in



*A successful and useful hygiene behaviour study needs to include women.  
Drawing: International Women's Tribune Centre/ Anne S. Walker.*

a meeting, and everybody has completed his/her sentences individually, small groups are formed to discuss each other's sentences and to integrate them all into one set. After this, the same procedure is repeated in the plenary.

After data collection and analysis it is also important to have the identified information users together, to discuss the preliminary findings and their implications for use. Only then should the conclusions and recommendations be finalized, as this process will make the results more practical and use-oriented.

A second group of people to be actively involved in the study is those who are important providers of information, but who are not at the same time the main expected information users. Examples are participating population groups when the central government wants to increase its insights in the general use and maintenance of improved water supply and sanitation facilities to learn from past experience for future planning and implementation, or when epidemiologists want to learn about the links between animal management and diarrhoea to provide health staff with more information about hygiene and health. In those cases it will be important to share with the people who provide information the relevant details about the study, the preliminary findings and the final results. Involvement of the information providers in the preliminary findings has the additional advantage that they can help to analyze and interpret the collected data.

Over the last ten years there has been a growing emphasis on people's involvement in studies. Sometimes this is called 'participatory research' and defined as: A systematic

learning process in which participation is sought in initial decision-making, planning, implementation, summary and analysis, and in the use of results (Feuerstein, 1986). Participatory research has been especially focused on making data gathering a more participatory process by a specific mix of observation and interview methods. A few examples are provided in the next section (6.2), after a more general discussion on the combined use of various methods of data collection and analysis.

### *Choosing and combining methods*

Chapters 4 and 5 cover a series of observation and interview methods available for the study of hygiene behaviour. Each method has its own strengths and weaknesses. For each study, we need to find the methods that will provide us with the greatest learning opportunities. The box below presents an overview of the factors to be taken into account when deciding on which methods to choose for data collection.

**Box 10: Criteria for the selection of data collection methods**

Choice of methods depends on:

- the purpose of the study
- the phase of the study
- the things we want to learn
- the skills of the observers and interviewers
- the time and resources available

Table 4 provides an indication of the suitability of the various data collection methods in relation to the most important choice factors. Usually the choice will be for a judicious mix of observation and interview methods, including collection of both qualitative and quantitative data. In deciding on the methods that best suit our purpose and means, we should be aware of what the various methods have to offer. Reading through Chapters 4 and 5 may help with this choice.

*Kanki et al. (WP 1991) wanted to study the various "elements of behaviour: (a) 'the ideal' or the set of beliefs about hygiene behaviour which originate from our life experience and culture; (b) 'the image' or what we want to present to others; and (c) 'the actual' or the things we actually do". For each of these, they chose (a) focus group discussions, (b) household questionnaires and (c) direct observations respectively as data collection methods.*

The obvious reason for choosing multiple methods is that no single method can provide sufficient information on the subjects of our study. Thus, various methods are needed to complement each other, and to make sure that the information is as accurate and reliable as possible. Also, conflicting information can be sorted out by combining methods.

Table 4: Selection of data collection methods

Choice factors		Methods of data collection									
		<i>Unstructured observations</i>	<i>Continuous monitoring</i>	<i>Spot check observations</i>	<i>Rating check observation</i>	<i>Conversational interviews</i>	<i>Key informant interviews</i>	<i>Focus group discussions</i>	<i>Topic focused interviews</i>	<i>Semi-structured interviews</i>	<i>Structured interviews</i>
Purpose of study	Exploration, description, understanding	•				•	•	•	•	•	
	Measurement		•	•	•				•	•	•
Phase of study	Preliminary phase	•				•	•	•			
	Main phase	•	•	•	•	•	•		•	•	•
	Wrapping-up phase	•				•	•	•	•		
Subjects/ Topics of interest	Actual behaviour	•	•	•							
	Indications of behaviour	•		•	•	•	•	•	•	•	•
	Perceptions, opinions, beliefs, experience, facts, motivation					•	•	•	•	•	•
Skills of observers and interviewers required	Highly skilled	•						•			
	Medium skilled				•	•	•		•	•	
	Moderately skilled		•	•							•
Time and resources	Most suitable in case of constraints	•		•		•		•	•		
	Least suitable in case of constraints		•								



*“Through walks around the entire community it was possible to count the number of latrines, an easy task since there were only two standing latrine structures in the entire town of 8,000. Observation also revealed that the rocky outcroppings on the northern side of town were covered with faeces. At the communal refuse piles on the southern edge of town, children were directly observed while defecating. A more quantitative technique included analysis of a measured volume of the contents of the refuse piles, which showed that faeces made up 5% of these heaps. Of equal importance, it was observed that much of the faeces was wrapped in paper or polythene bags, implying that defecation behaviour occurred elsewhere before final deposit on the refuse heap.*

*Interview was needed to qualify the behaviours observed and implied from the above, since observational techniques would not be acceptable to adults who desire privacy while defecating. Through a survey it was possible to determine the frequency, time of day and preferred place of defecation for men, women and children. Patterns that varied by sex, age and time of day were found. The responses to a survey also explained the findings of ‘packages’ of faeces in the refuse heap. During interviews people mentioned the dislike of moving far from home to defecate at night and the problem of sick or elderly people being unable to leave the house. Thus, survey and observation were necessary to get a fuller picture of the nature of the behaviour under study” (Brieger, WP 1991. Based on studies by Qyalonghen et al. and Hadgu).*

*Through structured interviews it was learned that 70% of the respondents indicated to wash hands after defecation. Additional informal conversations revealed that some do not feel the need for handwashing after defecation, as they “cleaned themselves by rubbing over grass thus avoiding any chance of hand contact with their faeces” (Hall et al., 1991).*

Methods to collect quantitative data can only be fruitfully applied when preceded by a preliminary qualitative study phase. The qualitative phase allows us to explore relevant subjects, topics and questions and to gain an in-depth understanding of the behaviours, and of their scale and context. The information collected during this phase will help us to decide what to observe and how to observe it, and what to ask and how to ask it.

*Jenkins (WP 1991) concludes on the basis of her study that the qualitative phase “was absolutely essential in providing the basic information” upon which the structured observations component could be developed. The qualitative phase also took much less time (one month in each of the three locations) than the structured observations, “. . . which spanned over a year’s time. Specifically, living in the communities allowed for an assessment of the sensitivity associated with particular hygiene, sanitation and child care practices and the range of variation likely to be encountered. Unstructured observations and interviews provided a measure against which we could assess the direction of behavioural alteration due to the presence of observers as well as much additional information on beliefs and practices related to sickness and curing. Finally, the qualitative phase provided a more complete understanding of the economic and social reasons for the behaviours observed, a level of understanding which could not be recovered from structured observational data or survey questionnaires, and provided the interpretative basis upon which realistic recommendations could be based.”*

In this process of using a qualitative investigation as the basis for a quantitative phase, it is important to find out about local words, meanings and definitions. Then we can be sure that all parties involved in the study talk about the same things, and have the same understanding about them. If not, the quantitative data may provide us with wrong or misleading information. The following examples may illustrate this.

*One finding from the qualitative study which affected the design of the structured observations ". . . was that it was difficult to observe handwashing as such. Women's hands were found to be in contact with water several times a day: when they carry it, when they wash clothes, when they make tortillas and cook, when they wash vegetables, and when they wash dishes. But handwashing to eliminate contaminating dirtiness was seen less frequently. Therefore, in the structured observations instrument a category of 'indirect' handwashing was established to allow (...) recording all these contacts of mothers' hands with water without the explicit purpose of washing them" (Hurtado, WP 1991).*

*Zeitlyn (WP 1991) also points to the need to clearly define behaviours, and she also questions how to define handwashing: "In the village where we did our fieldwork one individual might use several handwashing methods in a single day; she might, for example, rub the left hand with mud and rinse it with water after defecation, pour water over the right hand before eating, rub hands, arms, legs and feet with water before prayer and wash hands along with other parts of the body with soap in the course of a daily bath." Zeitlyn provides two other examples in addition. One is the local definition of 'drinking water'. Is it only water for drinking or does it also include water for cooking, preparing tea, washing fruit etc.? The other example is the definition of a cleaning agent. Is only soap included in the definition, or also mud, ash and local substances?*

Often, several methods can be profitably merged into one activity. We have already noted that unstructured observations and unstructured interviewing go very well together, and usually reinforce each other. Also structured observations and structured interviews can be easily combined. For example, a household questionnaire can be combined with a household observation list on water and sanitation facilities and practices. Other methods that are more distinct, or more close to each other, may also be combined. An example of the first is structured interviewing supplemented by unstructured observations while an example of the last is a combination of semi-structured and structured interviews. A few examples are related below.

*(a) "Observations were carried out when the households were visited to interview the mothers or caretakers. Direct observation of the various items in the checklist was done during and immediately after the interview. The interview and observation procedures lasted for about one hour." (Baltazar, WP 1991).*

*(b) Structured observations are supplemented by a short narrative written at the end of the visit, to capture qualitative information that enriches the information obtained through the structured observations (Saenz de Tejada, WP 1991).*

*(c) A survey questionnaire was combined with a request for the interviewee to demonstrate handwashing observed by the interviewer (Hurtado, WP 1991).*

### *Recording and analysis*

Observation and interviewing produce data that need to be recorded. Highly unstructured or qualitative information, like that usually collected at the start of a study, is best recorded in a narrative form. As the information gets more structured, this can be replaced by short descriptions on specific behaviours, actions, issues and settings. In writing down notes it is important to be detailed and concrete, and to distinguish between descriptions and interpretations. A description is: 'The woman uses a long-handled dipper to draw water for drinking from the covered container'. An interpretation is: 'The woman draws water in a hygienic way'. Words like 'hygienic', 'poor', 'dirty', 'superficial', 'many' etc. are interpretations, because they include reflections, comparisons and judgements.

Notes from unstructured observations and interviews usually contain four types of information (Patton, 1980):

- Descriptive, concrete and detailed data in their actual settings from observations and interviews;
- Direct quotations, or as near as possible recall of direct quotations, from what people said during the formal or informal interviews;
- Feelings, reflections, reactions and experiences of the interviewer/observer;
- Preliminary insights, comparisons and interpretations of the information collected by the interviewer/observer.

It is important to indicate clearly in the notes whether something recorded is a description, quotation, feeling or interpretation. Especially crucial is to distinguish between a feeling or interpretation of an interviewee which should fall under descriptions and direct quotations, and an interviewer's/observer's feeling or interpretation. The latter is part of a preliminary analysis.

Analysis of qualitative data requires much skill, and cannot be completed without additional 'gut-feeling'. First the notes have to be grouped together under key points or topics. If cards have been used to record the data, the data can be easily re-organized. If a notebook is used, the records may be duplicated and the copy cut up to re-group the data under the key points. An alternative is to write key-point codes in the margin of the notes. The codes will thus enable you to read quickly all the information about a particular key point. Microcomputers may be considered for qualitative data recording and analysis, but expert guidance and support should be secured before embarking on such an adventure.

Data from structured observations and interviews are to some extent easier to record and analyze, provided the data collection forms have been properly designed and tested. Two types of analyses can be conducted: descriptive; and comparative. A descriptive analysis concerns summary counts, percentages and simple associations between variables. For example, the percentage of people who wash their hands after defecation in a village that has received a handwashing intervention is descriptive. A comparative analysis involves comparison between sets of variables. For example, the percentage of people who wash their hands after defecation in an intervention group may be compared with the percentage in a "control" group – that is, a comparable group which did not receive the

intervention (Esrey, WP 1991). Comparative analysis is complicated with a number of pitfalls and therefore requires support from a skilled statistician.

Quantitative analysis includes combining the quantitative information with the collected qualitative information, as only by comparing and contrasting results from different methods can we build up a full picture of the complex reality of hygiene behaviours.

## **6.2 Supportive tools and techniques**

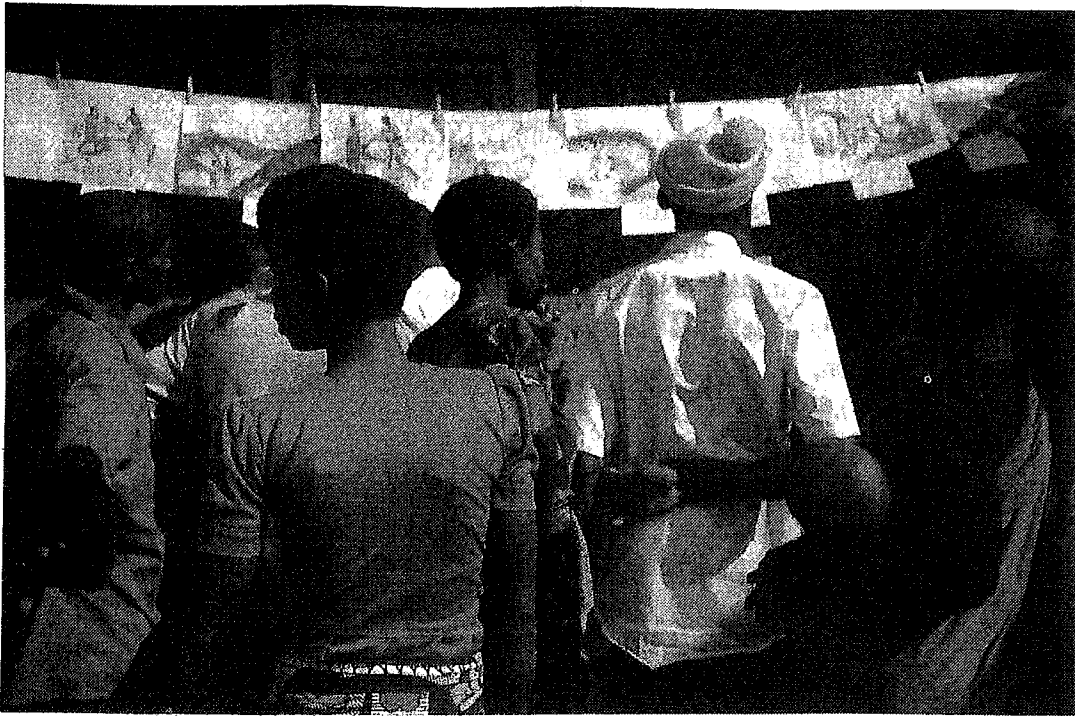
Specific combinations of observation and interviewing may be used to make the collection and interpretation of data more participatory, and to facilitate a fuller understanding of behaviours and determinants of behaviours in their social, cultural, economic and physical context. A few examples are given below, mainly based on information and experience available from PROWESS/UNDP and IIED. (See Srinivasan, 1990; Narayan-Parker, 1989; Chambers, 1990; Scoones et al., 1989; Mascarenhas et al., 1991 and Theis et al. 1991). The strengths of these activities are that they generate learning from, with and by the people involved, and that the step from learning to action is more natural and easier to take. Use of these participatory activities follows the same principles as previously discussed for focus group interviews (see Section 5.2). They also require skilled facilitators, because the success largely depends on a fruitful interaction among participants.

### ***Mapping and modelling***

This activity concerns the drawing of a map or the building of a model by the participants to gather relevant information about a community and its hygiene-related issues. Especially at the start of a study, people may create a map or model of their own community, visualizing important information with respect to different population groups and population densities; public places such as a school, community building, health unit, and market; public and private latrines; public and private water points; drains; river; road; refuse heaps; and the like. During map building and afterwards, discussions can reveal important information about the lives and living conditions of the community members, their health and hygiene situation, and opportunities and constraints for improvement (Srinivasan, 1990 and Mascarenhas et al., 1991).

### ***Voting***

Voting is an easy tool to familiarize communities with procedures for collecting and analysing data by using a pocket chart or some pots. In its simplest form, a pocket chart consists of a row of pockets, usually four to six, with a picture above each. The pictures represent choices, such as different sources of domestic water supply. Participants put their voting slip (or a seed or something else) in the pocket of their choice – for example the rainwater pocket as a preferred source for drinking water. To ensure confidentiality, the voting may be carried on out of sight. When everybody has voted, the pockets/pots are emptied, the votes counted, and the findings discussed (Srinivasan, 1990).



*Community men and women discuss the votes in a pocket chart. Photo: IRC/Boesveld.*

### ***Story telling/Role playing/Flexi-flans***

These activities are tools to express ideas, feelings, experiences, perceptions, hopes, concerns, problems and constraints with respect to water, sanitation, hygiene and health. These activities can also be used to discuss private beliefs and feelings without being threatening. Flexi-flans are a supportive tool to story telling and role playing. They consist of paper cut-outs of human figures, animals, vegetation and objects which can be placed on a flannel-covered board by the participants to illustrate a point of view or to relate an incident or a story (Srinivasan, 1990).

### ***Pictures and drawings***

Pictures or drawings are easy tools to express oneself, to generate discussion and exchange of views and experience, and to provide interpretations to subjects of interest. Single pictures or sets of pictures can be used, both with individuals and groups. Before using these tools they should be carefully pre-tested to be sure that they are clear, easily understood and culturally acceptable.

One example is a set of 10 to 15 pictures that are given to a group of people to create their own story about a subject of interest. The pictures show a number of actions and situations that relate to community life and hygiene behaviour. This activity works best when the pictures are not serialized (do not follow a specific order), and wide open to various interpretations (Srinivasan, 1990).

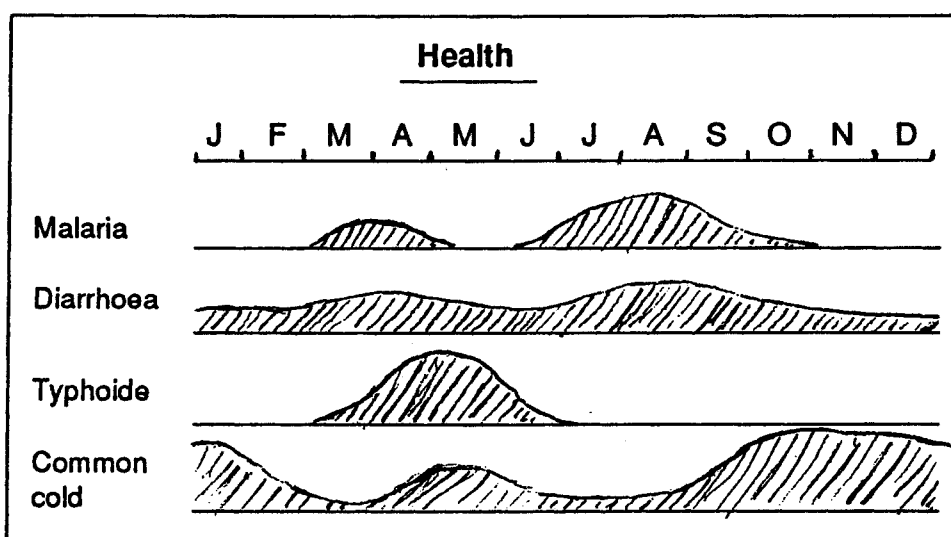
A second example is a set of 9 to 15 cards showing different behaviours, or signs of behaviours. The group is asked to sort out the cards into three piles according to their interpretation of what is good, bad or in-between from the viewpoint of health, sanitation or water supply (Srinivasan, 1990).

A third example is a so-called 'story with a gap' with the use of two pictures: one showing a 'before' scene, for example one without an improved water supply, and the other showing an 'after' scene, in our example a scene with an improved supply. The group is invited to discuss the subject by comparing the two pictures. Although this tool is developed to discuss the planning process from an undesired to a desired situation, it can also be used to discuss health and hygiene issues (Srinivasan, 1990).

A last example is a set of three or more cards showing various ways of doing something, for example handwashing or child feeding and asking the participants to discuss the various methods displayed (Srinivasan, 1990). Even more simple is just to show one picture and invite people to comment on the behaviour depicted, and to ask how they do it or would like to do it, if resources allow (see for example the end of Section 5.3).

### *Seasonal calendars*

In this activity the participants draw in the dust or with chalk, or make piles of stones, seeds or powders to represent relative quantities and patterns over the year, for example of rainfall, floods, availability of water and water sources, agricultural and non-agricultural labour, food consumption, several types of illness, and so on. The calendars are used to discuss constraints (eg. too heavy workload during the agricultural season to attend to hygiene), and relations between different sets of information, for example lack of water and high incidence of diarrhoea in the same season (Mascarenhas et al., 1991).



### *Diagramming*

Participatory diagramming is another supportive tool in generating joint learning and action. Pie diagrams, bar charts, flow diagrams etc. can be made by the participants using their collective knowledge and experience. The diagrams can be made by drawing on the ground or on a piece of paper, and by using sticks, seeds, fruits, stones and other materials (Mascarenhas et al., 1991).

### *Wealth ranking*

If we want to identify groups or clusters of households according to relative wealth or well-being, for example to construct a sample (see Section 6.5), the wealth ranking activity may be useful. The names of all households are recorded on slips of paper and the participants are asked to group them into piles according to wealth. The wealthiest are put at one end, the poorest at the other, and as many piles as desired are made in between. This activity can be done individually (and in that case it should be repeated a few times) or in a group. An easier alternative is to invite the people to indicate on the community map (see above) where various groups of people are living (Mascarenhas et al., 1991).

### *Self-reporting*

People may be invited to keep a diary on a subject of interest, or to record specific data on a form for a specified period of time. This tool can be very useful in giving detailed insights, provided people have a clear idea of what they are expected to accomplish and they feel motivated to do so.

## **6.3 Measuring water consumption**

### *Reasons and limitations*

Behaviour which is characteristic of good hygiene often involves the use of water. Some important hygiene improvements, however, such as washing hands, may use such a small proportion of the total household consumption that they do not make a detectable difference. Previous studies indicate that a notable increase in overall household water consumption is most likely when water is provided within 100 metres (or a few minutes' round trip) from the home (Cairncross, 1987). In those cases where water availability has been drastically improved, an increase in water consumption may be taken as an indication of hygiene improvements.

Measuring water consumption is harder than it seems. The simple solution is to measure only the water carried home, as most important uses of water for handwashing, and food hygiene are more likely to occur at home. However, this has its limitations. One problem is that water is also used at the source, for instance for bathing and washing clothes. Another shortcoming in using water consumption as an indicator is that water

carried home may be used for other purposes than hygiene, such as watering plants and animals. A further complication is that precious water may be re-used for various hygiene purposes. It also should be kept in mind that measuring water consumption is time consuming. Observation and interviewing of specific hygiene behaviours may well provide better information for hygiene proposes than estimates of water consumption (VanDerslice, 1992).

### ***Initial investigation***

There are three general measures of water consumption: water collection time; amount of water collected; and amount used for specific purposes. (See Sandiford et al., 1990). Water consumption is best measured by a skilful combination of structured observation and interviewing, *after* an initial qualitative investigation. First we have to find out things like: who the main water collectors are (often women and children); where the water is collected and at what times; how, where and for what purposes the water is used (and re-used); whether water consumption varies widely from day to day and between various types of households; and what are the best times and locations for observation.

### ***Structured observation***

Structured observation at the water source is feasible where few households (say less than 30) use each source, and where each household uses only one. Structured observation at the household takes account of the use of multiple water sources, but it may not be possible to observe more than one or two households at a time. Since a sample of at least 100 household-days is needed to make comparisons, it may be a lengthy business.

Structured observation for measuring water consumption typically involves counting the number of strokes of a handpump, or the number of containers used to carry water per day per household. To calculate total water consumption from these numbers, an estimate is needed of the average volume of water per stroke or per container. An alternative to observation may be a system of self-recording by the persons who carry the water, which often will be women and children. When a piped supply is used, water meters can be installed.

*The quantities of handpump water used by each household in the intervention area were measured at three different times of year during 1987, when the handpumps had been operating long enough for new patterns of water use to become established. Water collection was observed at each working Tara pump after every household using it had been identified. The collection of handpump water was recorded from 5:30 A.M. to 9:30 P.M. over two consecutive days. Women from the user group of a neighbouring handpump were engaged to collect these data. Two women were assigned, on a rotating basis, to each pump for the first day, and another two monitored that pump for the second day. Project staff visited the observers three times per day to supervise their performance.*



## GENERAL METHODOLOGICAL ISSUES

*Each observer was provided with family photographs of the handpump's user group, two pots of different colours for each household, and some stone chips. For each stroke pumped by a household member, a stone chip was put into one of that household's two pots. One was for strokes pumped by adults and the other for strokes pumped by children (counted as half-strokes). A multiplying factor based on the discharge rate of each pump (available from fortnightly monitoring of all Tara pumps) was used to determine the household consumption of handpump water, in litres, over the two days. This figure was divided by two and by the numbers of persons in the household to give an average daily per capita consumption rate in litres per capita per day (l.c.d.) (Aziz et al., 1990).*

Where households use many different types of water containers, it will be difficult to make an accurate estimate of the volume of each container. The most accurate method is to weigh each container empty and full. A conventional bathroom scale can be used for this purpose. Filling each container from a measuring jug is another convenient way of measuring its volume, but is only possible when observation is done at the source, before the water is collected. An alternative is to measure the containers with a tape and calculate the volume from a table or by a computer program, but this is only valid for standard shapes (cylinder, bucket or box shapes), and thin-walled containers. If water consumption between groups is to be compared, the same fieldworker(s) should be used for both, as some observers tend to record more generous estimates than others.

### *Structured interviewing*

Structured interviewing is used to complement or partly replace structured observation. For example, total water consumption can be measured by observation, and a questionnaire administered (preferably twice a day) to ascertain how much has recently been used for each purpose. If a suitably-designed questionnaire form is used, the responses can be added up during the interview and checked against the observed amounts carried home and currently in the household's storage vessel. Any major discrepancy can be used to prompt further questioning; it often turns out that some water has been used twice, or a major use (such as a bath) has been left out.

The information collected on each household in a water consumption study should also include the number of resident household members, and the level of service or the length of the water collection journey – ideally, to both the old source and the new one. The measure is time, including time spent in the queue. A direct measurement by the field worker will be more precise than an estimate by the person who collects the water (not to mention by household members who do not collect the water). An additional advantage is that it ensures that the field workers actually visit the sources, which often leads to interesting discoveries. If the source is far away, the length of the journey is likely to be similar for a group of houses, so that it need not be measured separately for each.

"Water use data were collected in conjunction with water collection data. The team members involved in the study who supervised the water collection team, asked questions and measured quantities of water used for different purposes from 12 households over a period of two days." The data collection form as shown in Table 5 was used to record the information. "For each household being observed for water use, observers made three visits: in the morning, late afternoon, and very early the following morning to obtain information about water use in the evening and night". ... "Water use observation proved to be the most disliked activity among team members because of the precision demanded in measuring and estimating quantities of water used for different purpose" (Narayan-Parker, 1988).

Table 5: Example of a water use survey form (Cairncross et al, 1980)

20	Household	Village .....	Source observed .....
19	Water stored last night (A)		
18	Drinking unboiled		
17	Cooking and tea		
16	Washing food and utensils		
15	Personal washing		
14	Washing clothes		
13	Garden watering		
12	Animals		
11	Brewing and industry		
10	Other (specify below)		
9	TOTAL		
8	Water collected in morning (B)		
7	Water stored in morning (C)		
6	CHECK: A + B - C = TOTAL		
5	Drinking unboiled		
4	Cooking and tea		
3	Washing food and utensils		
2	Personal washing		
1	Washing clothes		
	Garden watering		
	Animals		
	Brewing and industry		
	Other (specify below)		
	TOTAL	EVENING VISIT	
	Water collected during day (D)		
	Water stored in evening (E)		
	CHECK: C + D - E = TOTAL		
	Clothes washed at source?		
	Personal washing at source?	Date .....	

***Presentation of findings***

Water consumption data are best expressed in litres per capita per day. The figure can be calculated for each household if comparisons are to be made between different groups, such as those with and without a new water supply, or households at different distances from the source. However, the overall average consumption is not the average of these household figures, but the total consumption divided by the total population of all the households observed. Some adaptation of the water consumption figures may be necessary to adjust for activities which are not related to hygiene, but require large amounts (such as watering gardens), or which are sometimes carried out at the source, sometimes at home. This also helps to set the total water consumption figures in perspective.

**6.4 The use of microbiology**

Under specific conditions, especially when we want to learn about the links between hygiene behaviour and health, or when we want to decide on priority interventions in a hygiene education programme, microbiological methods can be usefully applied as a part of our study. These methods are used to get an indication of the level of faecal contamination of surfaces, water, food and hands. Their main strength is the ability to give an objective measure, to help select which hygiene behaviours are most important in faecal-oral disease transmission. (Note: microbiological methods do not measure disease, they only indicate the level of faecal contamination of a substance or object.)

If you are considering the use of microbiological methods for testing levels of faecal contamination, it is best to contact the local public health laboratory or hospital to learn what methods and media they have used and with what experience. If no one in the study team has been trained in applying microbiological methods, professional support should be assured before starting. A lot of practical problems will also have to be considered, the most important ones being availability of the required laboratory equipment, media, and technicians. Since microbiological samples must reach the laboratory within an hour or two of collection, efficient transport (or a mobile laboratory) is essential.

***Indicators of faecal contamination***

The most important and widely used indicators of faecal contamination are bacteria. There are species of bacteria which are always present in large numbers in faeces, usually the faeces of all warm-blooded animals. They do not normally multiply or survive for many days in the environment, but they should be at least as persistent as those organisms which cause disease. Detection should also be cheap and easy. Various species meet these requirements, but those most commonly used are the faecal coliforms.

Faecal coliforms nearly always indicate the presence of faecal pollution. Usually, a very high proportion of faecal coliforms are actually the gut organism *Escherichia coli* (*E. coli*). It is often judged impractical or unnecessary to undertake the further testing required to confirm the presence of *E. coli*, although *E. coli* is a more accurate indicator. Some

laboratories are used to test for “total coliforms”, but these include many bacteria which are not faecal, so that the number of total coliforms is not a reliable indicator of the level of faecal pollution.

Indicators of faecal contamination may be most useful when combined with other methods, particularly observation. When qualitative information is gathered, microbiology can help to quantify particular areas or behaviours in terms of faecal contamination. Its main strength is the ability to identify which hygiene behaviours are most important in faecal-oral transmission and cross-contamination. However, it provides only an indication of contamination, and should only be used as a relative measure to compare one behaviour, or set of behaviours, with others.

### ***Water quality analysis***

Most countries have some experience with the use of microbiological methods for testing the bacteriological water quality. The World Health Organization’s recommended indicator bacteria for water quality analysis are faecal coliforms. The membrane filtration method is the most common medium for water testing.

Water quality analyses are used to get an idea about faecal contamination of the water as such, but also to make comparisons. For example:

- quality of water stored at the household compared with the quality of the water at the source;
- quality of water stored in different types of vessel;
- quality of stored drinking water compared with quality of stored domestic water (e.g. for anal cleansing, cooking, bathing);
- quality of water from different water sources.

The results of these comparisons might be particularly useful as physical clues (see also Sections 5.1 and 5.3) for hygiene behaviours in relation to water protection and water handling.

*A study in Guatemala showed that, although 97% of the water samples collected from the piped distribution system were free of coliforms, only 65% of the samples from home containers had acceptable levels (Torun, 1982). Enge (1983) reports that in Botswana 85% of the tested standpipe water was fit for drinking. However, “water in household containers was also tested and found to be heavily contaminated. Water is usually stored in open buckets on the floor of the house and is generally scooped out of the bucket with a mug or calabash. The mug is often just left on the floor when it is not used, people drink out of it and sometimes dogs lick at it”. An experiment was carried out in one village where 30 plastic containers with small openings were distributed free of charge. The first results showed that piped water stored in a plastic container was not easily contaminated.*

### *Food*

Domestic contamination of stored water must be seen in the context of other routes of faecal-oral disease transmission in the home. Babies' milk and weaning foods often contain thousands more faecal bacteria than water (Barrell et al., 1979). This is partly because faecal bacteria, including some disease organisms, can multiply very rapidly in foods, while they cannot normally do so in water.

The level of faecal contamination of food may be easily influenced by the type of food, the time since cooking, and the way the food is stored. For example, bacteria cannot normally survive so well in foods which have been fermented. Factors such as this should be taken into account if we want to compare types of food or food-related behaviours. Food microbiology is a complex subject, and it is not advisable to undertake a microbiological study of faecal contamination of foods without the active participation of an experienced food microbiologist.

### *Surfaces and objects*

In the domains of personal, domestic and food hygiene it might be useful to test worktops, eating utensils, babies' bottles, compound soil, etc. for faecal contamination, and relate the results to particular hygiene behaviours.

Various methods and media can be used to test faecal contamination of surfaces and objects. One method is to use cotton swabs which are dipped in Ringer's Solution (or butter) to make them wet and to have them plated on MacConkey Agar No. 3. There are various other methods available that do not require the use of cotton swabs, but allow for direct contact of the surface or object to the selected medium. More research will be needed to develop more simple techniques for testing of surfaces and objects for faecal contamination.

Studies of soil contamination have usually used the eggs of *Ascaris lumbricoides* (roundworms) as a faecal indicator. These can persist in the environment for much longer than bacteria – up to a year. Schultz et al. (1992) describe such a study, but they note that here, too, further research is needed to establish their usefulness.

### *Hands/Fingertips*

The testing of faecal contamination of hands or fingertips might be particularly interesting in view of the importance of hands in the faecal-oral transmission of diseases. The test developed to measure fingertip contamination is relatively new and requires further research to assess its usefulness as an indicator.

*“Handwashing behaviour is difficult to measure. Indirect indicators such as weighing the amount of soap used over a given time period can be very unspecific as soap may be used for a number of other activities. For example in northeast Thailand soap is generally only used for bathing. Therefore it was attempted to develop a microbiological indicator of handwashing practice” (Pinfold, WP 1991).*

In selecting an indicator bacteria for fingertip microbiological tests, the following should be taken into account:

- *E. coli* are very short-lived on the dry skin (most of them die within 10 minutes) and probably should only be used to compare activities or behaviours conducted immediately before testing. Usually the results include a lot of negative samples. For *E. coli* it is suggested to use MacConkey Agar no. 3 as medium.
- Faecal coliforms are more commonly found on fingertips as some survive longer than *E. coli*. Faecal coliforms are a less specific indicator of faeces than *E. coli*.
- Faecal streptococci survive much longer on the skin (50% of faecal streptococci survive the first 30 minutes) than the two mentioned above, and therefore are a better indicator of overall contamination. This indicator bacteria can also be used to test handwashing in before/after studies (see Chapter 7). For faecal streptococci, K.F. Streptococcus Agar or Slanetz and Bartley Agar are suggested as media. Both contain sodium azide. Although sodium azide is toxic it seems that it does not pose a health risk in such low concentrations.

*“Membrane filtration equipment was used on site rather than transporting the fingertip-rinse samples to the laboratory; this greatly increased the number of samples taken in one day. Media used for fingertip-rinses contained 1/4 strength Ringer’s Solution supplemented with 0.1% (v/v) Tween 20. Sterile containers contained enough solution to cover the fingertips when a hand was inserted and the person was told to rub the thumb back and forth across the fingertips for approximately 5 seconds. All samples were divided equally between two membrane filters (0.45 mm pore size), one was placed on pads saturated with Membrane Lauryl Sulphate Broth (SLS; Oxoid MM 615) for the enumeration of faecal coliforms, and the other placed on KF Streptococcus Agar (Oxoid CM701) for the enumeration of faecal streptococci. All non-sterile equipment was sterilized with acetone before each use, and forceps sterilized over a flame. Periodic checks were made to test the thoroughness of this procedure by sampling the sterile fingertip media. All plates were placed in plastic bags to avoid drying and stored in a dark box. At the end of the day samples were incubated at 44.5 °C: faecal coliforms for 24 h and faecal streptococci for 48 h. The numbers of bacteria were determined following the membrane filtration technique (Pinfold, 1990a/b). This method has since been simplified “Fingertips are now sampled directly on the KF Streptococcus Agar plates and enumeration is determined by the number of fingerprints positive for faecal streptococci (range 0-10). This method not only makes sampling much quicker but also reduces the problem of administering sterile techniques in the field” (Pinfold, WP 1991).*

## **Handwashing**

Apart from the use of the fingertip method for an indication of the effectiveness of handwashing for the removal of faecal bacteria, experiments have also been carried out by testing water contamination after washing hands. The following example illustrates this:

*Kaltenthaler et al. (1988) used the 'bowl technique' following the traditional Zimbabwean handwashing process. First "... each person was given a sterile aluminium bowl filled with 450 ml. of sterile distilled water and asked to wash their hands in their usual manner. This was repeated with another bowl filled with 450 ml. sterile distilled water. It was hoped that the first handwashing would indicate the number of bacteria removed from the hands, and the second handwashing would be an indicator of the number of bacteria left on the hands. The water samples were transported back to the laboratory and tested within six hours using the membrane filtration technique for the isolation of faecal streptococci or faecal coliforms."*

### 6.5 Sampling issues

Sampling issues arise when we decide from whom and from where to collect data for our study. Before discussing these issues, a few terms should be explained. *Sampling* means collecting data from a selected part of the total population. The *total population* is defined as all the units from which the sample is drawn. These *units* can be individuals, households, groups, events, locations, or things. The *sample* consists of those units from the total population which are selected for data collection. We usually wish the sample to be representative of the total population. A sample is *representative* when we learn from the sample the same as we would learn from the total population. As Feuerstein (1986) puts it: "... we only need to take one spoonful, if we want to know how a pot of food tastes". The purpose of sampling is to reduce the cost in time, energy and money involved in data collection and analysis. At the same time, sampling may help to produce more accurate information, as the less data we have to collect and analyze, the fewer mistakes we are likely to make.

If we want to draw a sample and our sample is to represent the total population, the first step is to define what the total population is. For example, we may define the total population as 'all mothers between 15 and 40 years of age in the project area', or 'all households along the river', or 'all water points and water bodies within a radius of 5 km', or 'all restaurants and food sellers in districts A and B'. The next steps are to decide on a sampling procedure and to determine the required sample size. These decisions will always be influenced by the purpose of the study and the time and resources available.

#### *Sampling procedures*

There are four basic sampling procedures: simple random; systematic; stratified; and cluster. They are briefly discussed below, followed by one form of non-random sampling: systematic matching. For more sophisticated sampling, the assistance of a statistician will be required.

In a *simple random sample* every unit of the population has an equal chance of being selected. A common method to obtain such a sample is by means of a table of random numbers, which can be found in most statistics books. The procedure is briefly explained by using an example. Let us assume the total population is 'all 250 households in

community Y'. Then, each unit (household) in the population is assigned a number, in our case numbers 001 to 250. Once this is done, the table of random numbers is taken (see example figure below) and a starting point selected by dropping a pen on the table and starting where the point falls. Let us say the pen landed on number 161 (because the numbers that need to be selected consist of three digits, only the first three digits in the table of random numbers are read). The unit (household) which corresponds with number 161 will be the first one selected in the sample. From number 161 we may move up or down the columns to select the next numbers. If we move down, the next units (households) would be 023, 011, 006, etc. This should be continued until the required number of units to be included in the sample have been selected (Dixon et al., 1987).

*Example figure: Using a table of random numbers (from: Dixon et al., 1987).*

28071	03528	89714
48210	48761	> 02365
83417	20219	82900
20531	43657	45100
94654	97801	> 01153
52839	42986	28100
74591	> 16100	91478
38921	56913	32675
40759	84027	52831
45980	70523	47985
52182	68194	62783
12890	59208	> 00691
08523	74312	13542

A simple random sample is sometimes confused with a haphazard sample. To continue the above example, if in community Y we just interview 25 households where somebody is at home at the very moment of our visit, we do achieve a 10% sample, but this may be far from random, because all families out working in the field did not have an equal chance of being included. Rather this is a case of haphazard sampling, and the information obtained may not give an accurate impression of the whole village. Samples should never be haphazard, unless there is no need for representativeness. In that special case, the results of the study will only apply to the units in the sample, and not to the total population. Especially in baseline and evaluation studies this is a point to keep in mind.

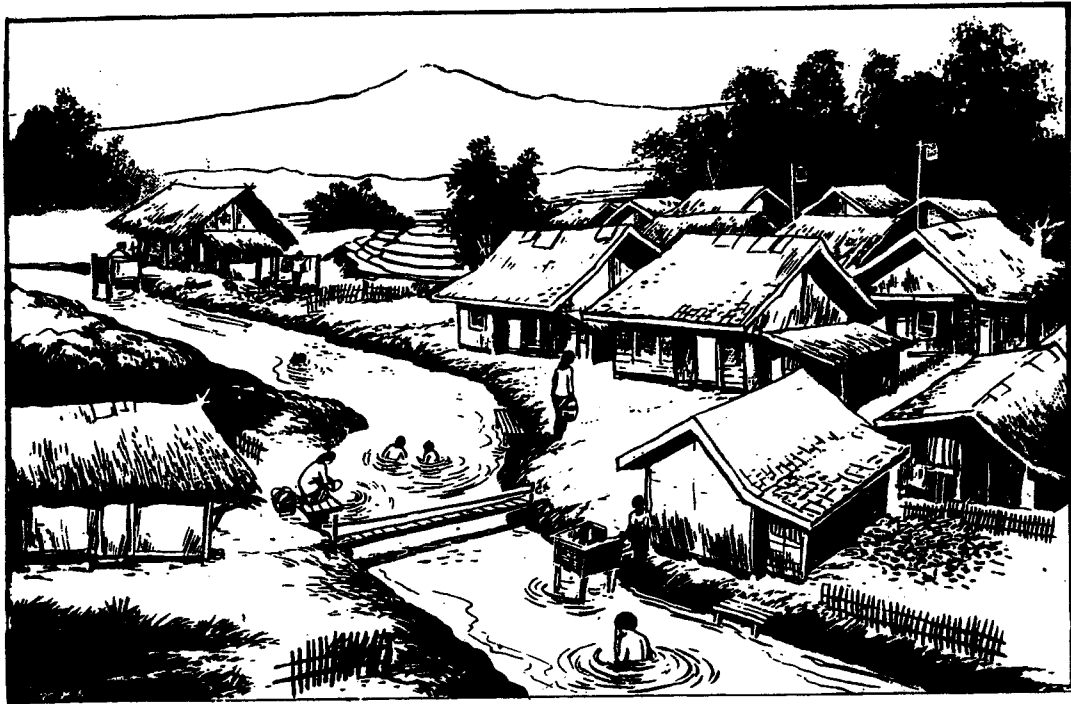
To draw a simple random sample we need a list of all units in the total population, or a map or aerial photograph. When these tools are lacking, a list or map may be made on the spot with the participation of the people. Care should be taken that no units are missed out of neglect, or for political, socio-economic or cultural reasons.



*“(1) With a sharp pencil I numbered every house in the area on the aerial photograph. The total number of houses in Aremo was 741. (2) I selected 100 numbers between 1 and 741 from a table of random numbers. (3) I located each of these numbers on the photograph and circled the house. (4) Using the photograph as a map, the interviewers and I located the 100 houses.....” (Mitchell, 1973. In: Pelto et al., 1978).*

A *systematic sample* is often easier to draw and therefore more frequently used than a simple random sample. To draw a systematic sample, one only needs to know the total number of units in the population, and the number of units to be selected in the sample. By dividing the total number by the sample number, the interval is found at which to select the units in the sample. To dwell upon our example of a total population of 250 households and a sample of 10% or 25 households, the interval will be 10 ( $250:25=10$ ) and thus every tenth household will be selected in the sample. To determine which household to take as a starting point, a random selection has to be made from the households in the first interval, in our case from the first ten households. Assume that the household randomly selected is number 6. Then the following households in the sample will be numbers 16, 26, 36 and so on.

In a *stratified sample*, before drawing a sample the total population is first divided into groups, based on one or more criteria. For example, people may be divided first into men and women; villages into those with and without piped water; households into those



*Which houses and people should be included in the study? A careful sample may be needed.  
Drawing: Dinas Kesehatan Prop. Jabar dengan, CARE Jawa Barat, Indonesia/ Trya Yudhantara.*

with and without access to a latrine. Within each resulting group, the required number of units for the sample is selected. The number of units per group may be the same in all groups, or reflect the proportion of the total population in each group. Thus, three villages with and three villages without piped water may be selected, irrespective of how many villages do and do not have piped water. Alternatively, 80 households without and 40 households with access to a latrine may be selected if there are twice as many households without as there are with access to a latrine.

The advantage of stratified sampling is that we are more directly focused on the information we need to obtain, and that we can more easily determine the sample size (see below). A stratified random sample is often the best choice for a behavioural study, because it will usually give more precise and useful information about the various groups of people that are relevant to us.

In *cluster sampling*, clusters are sampled instead of units. Clusters (for example neighbourhoods, villages, schools, or women's clubs) generally consist of a number of units in close physical proximity (for example households, students, adult women). From a list of all potential clusters, a sample of clusters is drawn, usually by simple, systematic or stratified random sampling. The advantages of cluster sampling are:

- there is no need to make a listing of all units prior to sampling, only a listing of clusters and their approximate sizes;
- since units are usually in close physical proximity within the cluster, it is usually more efficient and less costly to carry out the field work.

If necessary, units can then be sampled from within each cluster.

Technically, the correct level of data analysis under cluster sampling is the cluster rather than the unit which is actually observed. The extent to which behaviours within clusters are similar relative to behaviours between clusters largely determines both the number of clusters and the number of units per cluster needed to provide an adequate sample. Overall, the best 'rule of thumb' is to keep the number of clusters large and the average cluster size small (Bentley et al., 1990).

One form of non-random sampling is *systematic matching*. In systematic matching only a small number of people are selected and matched with an equal number of people who are very similar with respect to relevant population characteristics and socio-economic conditions except for the one thing we want to learn about. For example, we might decide to select a small number of women, and match them with 'comparable' men, if we want to learn about the differences between sanitation behaviours of women and men. Likewise, if we are interested in quantities of water use between households with and without a piped supply we might select a small number of households from a community with a piped supply, and match them with households from a community without a piped supply. Of course matching has to be done very carefully, because if we match unequal pairs, we cannot make a reliable comparison. Systematic matching is often used in epidemiological studies seeking to establish the links between behaviours and health. It might also be useful for comparing behaviours of households that participated in a

hygiene education programme, and households that did not. Systematic matching and the subsequent analysis of collected data usually requires the help of a statistician.

### *Levels of sampling*

Sampling methods can be applied at various levels. The most common levels are: country, town/village, household/site, and individual level. In behavioural studies, the first level - selection of countries - usually does not apply, as this kind of study generally takes place at or below project/programme level within one country. Sometimes the first level is the selection of study areas within the country. Then the same principles apply as for the second level.

The second level relates to the selection of towns and or villages in the project or programme area. If a project covers more than one town or village a sample may need to be taken. This sample will seldom be a simple random or systematic sample. Rather, a number of selection criteria will be formulated in relation to the purpose of the study, and based on these criteria a stratified or cluster sample will be taken. This requires that a total list of towns/villages and information concerning the criteria are readily available. If not, a decision may be taken just to look for the required number of towns/villages with the right characteristics (Bentley et al., 1990). We will come back to this issue when we discuss study designs in Chapter 7.

*“Together with representatives of the Ministry of Health and the Programme Officer of UNICEF it was decided to select eight villages in two districts for the hygiene education baseline survey. It was agreed that the selection of villages should reflect the different characteristics with respect to:*

- *water sources (well, river, pond, canal);*
- *distance to a main road;*
- *future ratio population/pump.*

*A prerequisite would be that no project activities had been started as yet in the villages to be selected.” (Sophal et al., 1986).*

Selecting sites for observation or households for interview is the third level, and the one most commonly associated with sampling procedures. Choosing a person within the site or within the household is the fourth level, and this level is often not given enough attention. The result may be that, for example, only senior men are interviewed as representatives of the households – wrongly excluding women. For these last two levels, all types of sampling procedure may be applied according to the purpose of the study and the resources available.

Biases may be introduced at any level. This may happen if we cannot clearly define, and therefore select from, the total population, or because some towns, villages, sites, households, or individuals that we would like to include cannot be selected due to difficult accessibility or special events (such as elections, a wedding or funeral, etc.), or because people or authorities refuse cooperation. Of course these biases have a bearing on the representativeness of the results of our study.

*“Selection of villages proved to be difficult as the villages were not easy to classify, especially not with respect to water sources and distance to a main road, and a considerable number of villages was already affected by the programme. Of the selected villages, two happened to be inaccessible due to floods caused by heavy rains and therefore were replaced by two others. However, one of these villages had to be struck off the list as it did not fit the selected criteria. In view of these problems, the results of this study cannot be simply extrapolated to the whole project area” (Sophal et al., 1986).*

### **Sample size**

When a sampling procedure and one or more levels of selection have been identified, a decision can be taken with regard to the sample size(s). How large the sample should be is not an easy decision. Basically it will depend on:

- a. the number of units in the total population. For example, if the total population is a community with 593 households, a 10% sample with 60 households may give us sufficient information for a fairly accurate impression of the whole population. But if our total population consists of six improved water points, then a 10% sample will not do. How can we feel confident that the only water point selected will accurately represent all six? In that case, it is better to make a purposeful selection, or to sample all six.
- b. the variation in the units in the total population. Thus, if we want to carry out a household questionnaire in a community with a very heterogeneous population with respect to cultural and socio-economic characteristics, we will need a larger sample to feel confident that the sample represents the total population, than in a community where everyone has a very similar background.

If we wish to come close to a ‘truly’ representative sample size, we have to apply statistical calculations and for this the help of a statistician will be indispensable. A basic rule about sample size states that about thirty units are required as a minimum in order to provide a pool large enough for even the simplest analyses (Dixon et al., 1987). In general, if the total population size is known it is reasonable to draw a 10-20% sample, taking into account the purpose of the study, the total population size, the variation in the population units, and the sampling procedure applied. It should be remembered that a large sample size can in no way compensate for bad sampling procedures.

*“A common question in the design of any quantitative study is ‘How many people should I sample?’.” As data collection and analysis “. . . can be so labour and time intensive, the balance of what is feasible logistically and what is necessary for drawing statistically valid conclusions is crucial to consider. If we study too many people/households then the staff time and resources become unwieldy; too few and we are faced with the difficulties of making meaningful conclusions from scarce data” (Huttly, WP 1991).*

### *Warning*

One warning is called for at this point. Careful decisions on the sampling procedures and required sample size are of course important issues, but it is even more important that we take every precaution to get high quality data and results. Observation sheets and questionnaires should be well designed and carried out and the data collected correctly noted down, processed and analyzed. This requires a well-considered study set-up and a thorough training and supervision of the observers and interviewers. (see also Chapter 7). If the data collected and analyzed cannot be trusted, the results of the study will not truly apply to the sample, and so cannot be at all representative of the total population. For example, if almost everyone in our sample claims to use a latrine when in fact they do not even own one, and we do not check the accuracy of their responses, then we will gain a completely false impression of the sanitation practices of the population, however large and carefully selected our sample may be.

## 7. Study design and organization

### General design

In Section 3.1 we noted that the study of hygiene behaviour is particularly useful for:

- evaluation of water supply and sanitation projects;
- design and evaluation of hygiene education;
- programme development and monitoring;
- learning about links between hygiene and health.

To carry out such a study of hygiene behaviour the series of steps summarized in Figure 4 have to be taken.

All hygiene behaviour studies will include identification, description, measurement and understanding of specific hygiene behaviours, but the emphasis put on these various components will vary with the purpose and objectives of the study. When our purpose is to evaluate a water supply and sanitation project, we wish to learn whether we have achieved what we set out to do. The hygiene behaviour study will therefore focus on how well, by whom, and to what extent, new and improved facilities are used, and why. A hygiene behaviour study for the design of a hygiene education programme will be concerned with the identification and understanding of risky behaviours, and of those which may be selected for modification or change through hygiene education support. In a hygiene education evaluation we want to learn whether behaviours have been modified or changed in the desired direction, and by whom and why. A hygiene behaviour study for programme development is usually a more general and descriptive study for greater understanding of people's behaviour, whereas for monitoring purposes we focus on a few specific behaviours or physical clues as key indicators to keep track of progress.

*"The indicators were arrived at only after clearly identifying and prioritizing the behaviours to be addressed by the new hygiene education strategy." "It was decided that the indicators must be simple, easily visible and limited in number (to ten) in order to minimize the work involved in compilation and presentation and so they could be collected routinely, every six months without becoming burdensome." At the same time, the indicators should be non-intrusive into private lives, directed to action, and open to change. Thus, indicators such as: number of latrines kept clean, and number of rainwater jars covered, were selected. The information collected "was going to be used by the village development committees to find local solutions to obstacles to behaviour change, and by the Sanitation Centre to see if their efforts region-wide were yielding results." (Simpson-Hébert, WP 1991).*

## STUDY DESIGN AND ORGANIZATION

The purpose and objectives of the study will also determine how the study is best designed. Basically there are two types of design: without and with comparisons. For studies carried out within the framework of a project or programme, it is normally preferable to stick to as simple a design as possible. For example, it is not usually worthwhile to design the study with comparisons.

Studies with comparisons include the following types:

- a before-and-after intervention study, such as a comparison between hygiene behaviour before a water supply improvement is implemented and after it has been completed;
- a with-and-without intervention study, in which an area where a project has been implemented is compared with a similar area without a project (This study design is sometimes called an intervention/control comparison);
- a combination of a before/after and with/without study.

*Figure 4: Steps in the study of hygiene behaviour.*

<p><b>step 0:</b> Decide on the need for a study (see Section 3.1).</p> <p><b>step 1:</b> Determine overall objectives and type of study needed (see Section 3.1 and Chapter 7).</p> <p><b>step 2:</b> Establish a study team. (See Chapters 1 and 7.)</p> <p><b>step 3:</b> Investigate who are expected information users. Determine jointly what results are needed and when. Decide how the future information users will be participating in the next steps (see Section 6.1).</p> <p><b>step 4:</b> Set specific objectives for the study. Make sure these are in line with the outcomes of <b>step 1</b> and <b>step 3</b>. Determine time and resources needed/available (see Chapter 7).</p> <p><b>step 5:</b> Prepare for a preliminary qualitative study. Decide on: where, what, with whom, how. Carry out a pre-test (see Chapters 4, 5 and 6). If necessary select and train observers/ interviewers. Arrange for logistics. Set time frame (see Chapter 7).</p> <p><b>step 6:</b> Implement and analyze preliminary study. Compare preliminary findings with the specific objectives set in <b>step 4</b>.</p> <p><b>step 7:</b> Decide on and prepare for main study phase. Decide on: where, what, with whom, how. Carry out a pre-test (see Chapters 4, 5 and 6). Arrange for logistics. If necessary select and train observers/interviewers. Balance between time needed and time available (see Chapter 7).</p> <p><b>step 8:</b> Implement main study phase and make analysis and interpretation of the data collected (see Section 6.1).</p> <p><b>step 9:</b> Discuss findings with people involved in the study including information users and information providers. Finalize findings and recommendations and present them in an easily accessible form (see Chapter 7).</p> <p><b>step 10:</b> Use and disseminate results of the study. Check their use at predetermined time intervals. (See Chapter 7).</p>
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Studies with comparisons require substantial inputs from an experienced researcher, such as a social scientist or epidemiologist (see Loevinsohn, 1990). Simpler studies without comparisons are generally easier to carry out. They produce quick and practical results, which are less liable to be misleading. They are also less costly and time-consuming and less dependent on outside expert support. The following is an example of the objectives and results of a simple study of hygiene behaviour, without comparisons:

*The study will have one main and one secondary objective. The main objective will be:*

*(a) To gather in-depth information on water, sanitation and hygiene practices which will enable the development of an appropriate health education programme and sanitation practices.*

*The secondary objective will be:*

*(b) To gather area-specific baseline information which will be of use to the programme staff and which might later be used in an evaluation of the programme as a whole.*

*The possible results of such a study might be summarized thus:*

**Handwashing.** *The washing of hands before eating and after defecation is almost universal. Over 90% of households have bar soap, but it is normally reserved for bathing and laundry and rarely used for washing hands. In a sample of mothers asked to demonstrate handwashing, 95% used water only.*

**Excreta disposal.** *Nearly half the families in the area (46%) have a latrine; most of these were built in the last three years. However, children below the age of seven do not usually use these, and children's stools can be seen on the ground in the yards of most households. They are not perceived as harmful and are only removed when the yard is swept, once or twice a week.*

*Findings such as these could lead to proposals for a hygiene education programme focusing on:*

- \* the use of soap (or a substitute) for handwashing;*
- \* consolidation of the recent rise of latrine ownership;*
- \* the health hazard posed by children's stools;*
- \* the use of latrines by children;*
- \* regular sweeping of yards.*

## **Choice of key behaviours and methods**

After we have decided what purpose the study should serve, and what our objectives are, the next step is to select which behaviours to study. As is clear from Chapter 3, a careful selection will be needed as there are many behaviours and behavioural aspects that could be included.

First we should consider which behavioural domains should be covered. Not only the purpose of our study, but also the objectives of our project will guide us in this decision. Thus, for an evaluation of a water supply project we may wish to focus on domains B: Use



and protection of water sources, and C: Water and personal hygiene. Alternatively, for the planning of a hygiene education programme as part of a sanitation project we may decide to concentrate on domains A: Disposal of human faeces, and D: Food hygiene (see Section 3.2). Running through the five domains of Table 2, and ticking behaviours that appear to be priorities at first sight may guide the preliminary selection process.

With a first list of priority behaviours, we are ready for the initial qualitative study to identify key behaviours and the relevant dimensions of these behaviours. The list in Box 6 (Section 3.3) may be used as a reference to study the dimensions. We will want to know who is performing the behaviours, or who is expected to perform them but doesn't. The determinants of behaviour will require special attention. Thus it is important to look at the roles, responsibilities and actions of men, women and children within their socio-economic and cultural context. In this preliminary study phase, we keep an open mind on behaviours and dimensions of behaviours which have not been initially selected as priorities for study, but which prove to be important to meet our objectives.

Information collected during the initial qualitative study will allow for a further choice of key behaviours to be included in the main study phase. Apart from the objectives of our study, the time and resources available will influence this choice. Our guiding principle should always be to study as little as will give valuable and timely results that can be put to use for their intended purpose.

If our aim is to evaluate a water and sanitation project, then our priority behaviours of interest will relate to the use of the water and sanitation facilities that have been constructed under the project. The reasons for their use or non-use will also be investigated, as this information will help future project planning. If our aim is to develop a hygiene education programme, we will be especially interested to learn about risky or hazardous behaviours that need to be changed and how this change may be facilitated, taking into account socio-economic and cultural determinants.

In deciding on key behaviours for study we can profit from the work of others. For example, a recent WHO meeting (May 1992) decided that for the control of diarrhoeal diseases it was important to focus on a limited set of behaviours, rather than to try to include all possible faecal-oral transmission routes. The series of behaviours thus selected are:

- safe disposal of human excreta of infants and small children and people with diarrhoea;
- handwashing before handling food and eating/feeding, and after going to the toilet and cleaning babies and toddlers;
- maintaining water free from faecal material both at the source and at home;
- feeding infants and small children recently cooked food.

Also, the system of Hazard Analysis Critical Control Point was developed by WHO (1988) in the context of food hygiene, and the system may well be used for the other domains as well. In this system, the hazards defined as unacceptable are first determined. These may, for instance, include contamination of water, food or hands. Next, the critical control points are identified, such as using safe water for food preparation, cooking food

thoroughly, and washing hands before touching food. Then, control measures are selected and implemented, for example by spot checks, continuous monitoring, or the use of microbiology. Table 6 is an example checklist for evaluating hazardous food preparation and storage practices.

*Table 6: Example of a checklist for evaluating hazardous food preparation and storage practices (WHO 1988).*

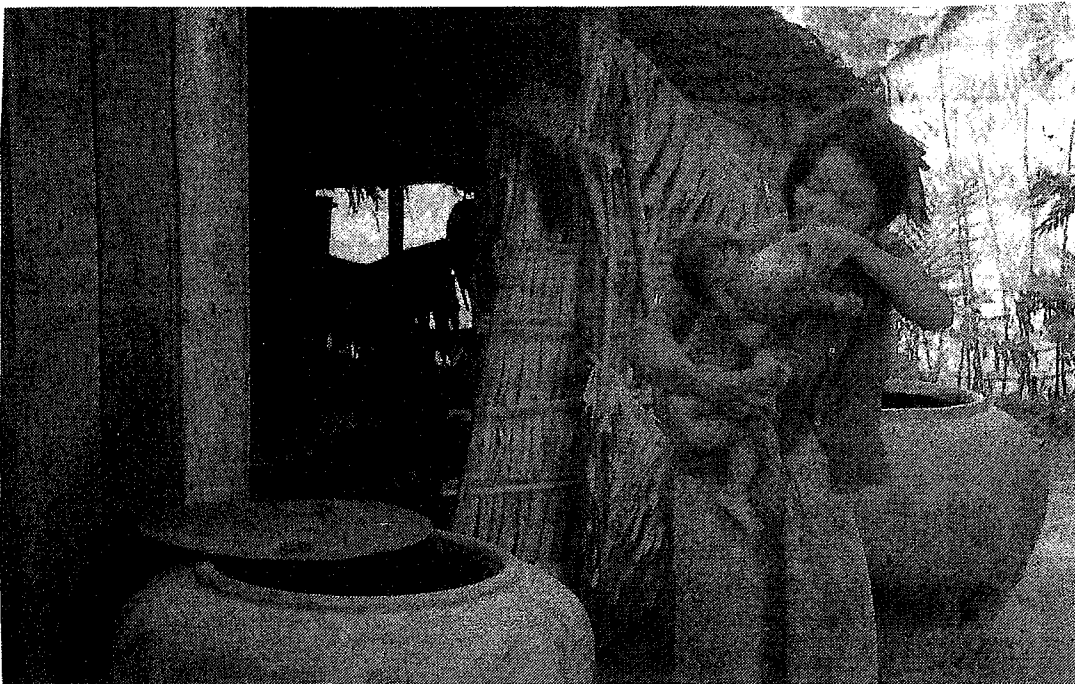
<i>Hazardous practices (indicators)</i>	<i>Yes (a)</i>	<i>No (b)</i>	<i>Operations not performed at time of visit (c)</i>
Foods cooked to < 70°C			
Cooked foods reheated to < 70°C			
Refrigerated cooked foods in large volumes			
Cooked foods left at room or ambient temperature > 5 hrs. (e.g. left between meals or overnight)			
Cooked foods < 60°C to be held hot at > 10°C to be held cold			
Use of dirty cutting board			
Food preparation activities after diapering babies without washing hands			
Eating of raw, non- or weakly acidified meat, poultry, fish or shellfish			
Consumption of raw milk or milk products derived from raw milk			
Other hazardous practice(s) (describe)			

- a) "Yes" means that the hazardous practice is performed.  
 b) "No" means that the hazardous practice is not performed.  
 c) If practice is not performed at the time of the visit, eliminate it from evaluation for that household/establishment..
- Note: More "No" answers after the education programme would indicate that improvements had been achieved.*

## STUDY DESIGN AND ORGANIZATION

Especially when the aim of our study is to monitor behaviours or to evaluate changes in behaviour, it is the initial investigation which will help to determine the behaviours to be studied. Pinfold et al. (1991b) provide us with an example:

*The initial study was carried out to help identify the sort of hygiene practices that would be appropriate for an intervention study. Fingertips were more likely to be contaminated when sampled after activities associated with child care, food and water. Stored water and water used for washing dishes and cooking-related activities was usually contaminated. Dirty utensils from cooking and eating were often left to soak, thereby providing the necessary ingredients for the growth of faecal bacteria. Storage of prepared food was found to be another risky practice, but considered to be more difficult to change. Therefore, two main activities were selected for a hygiene education intervention: (a) washing dishes immediately after use, and (b) handwashing before cooking and eating, and after going to the latrine or cleaning a baby. To monitor and evaluate the intervention, the presence of soaking dishes in the households was used as a quick and simple indicator. An indication of handwashing practice provided a greater challenge, and a microbiological method involving fingertip-rinses was selected. As the study showed both a decrease in the presence of soaking dishes and in finger contamination after the intervention, it may be considered to only use the presence of soaking dishes for a continued indication of the success of the intervention, as this indicator is much cheaper and quicker than the fingertip-rinse.*



*To help in the study of hygiene practices related to small children, mothers in this study were asked to demonstrate how they give water to their little ones. Photo: IRC/Boot.*

Once we have decided which are the behaviours of interest we want to study, we can select how to study them. In Section 6.1, we concluded that the goal should be to use methods that will provide us with the greatest learning opportunities. The selection process is guided by the general criteria presented in Box 10. However, in the main study phase when it comes to the practical decision how to study a specific behaviour, we may include a further criterion, the 'minimal option', being the method that is easiest and quickest but still producing satisfactory and useful results. Guiding questions will be:

- can we learn enough about the behaviour by asking people about it?
- can we learn enough about the behaviour by looking for signs of behaviour?

Deciding on the minimal option may be best illustrated by using handwashing as an example. All methods can be used to study handwashing. Easiest and quickest is to ask people about their handwashing practices, but will this reported behaviour provide us with sufficient information? The discussion in Section 5.3 shows that this is questionable, but nonetheless it may be selected if there are other considerations and constraints. The next minimal option is to do spot checks and to look for signs of handwashing, such as whether water and soap are around at a convenient place. Again, this may not always provide a good indication of handwashing. An alternative is to invite people to demonstrate how they usually wash hands (see Section 4.3.1). However, if the information thus collected will not be enough, we will have to embark on more difficult and time-consuming methods (or select a different behaviour of interest as an alternative). Continuous monitoring and the use of microbiology then come into focus. Whatever method we decide to take in the end, a thorough pre-test will be needed to make sure we will collect the information we need within the limits of time and resources available.

## **Human resources**

Sometimes one person, but usually at least two, will take responsibility for the design, implementation and coordination of a hygiene behaviour study, forming a study team. They may come from various organizations and professional backgrounds, such as project staff, staff from ministries, universities, training institutes, and NGOs (Non-Governmental Organizations), and should preferably have a social or health educational background. The team should be selected on their communication and participation skills, their ability to create trust and motivation, and their interest in the study. It will help the study team to produce timely and useful results if they have support from an experienced sociologist or anthropologist to get the study started, to keep it on track, and to aid the analysis. Future users of the results and members of the community/ies to be studied should be brought into the process as early as possible in the study design. Their suggestions can make a great deal of difference to the success of the study.

For unstructured observations and interviews the team may need additional observers/interviewers. These men and women should again be selected on their communication, observation and participation skills, and preferably have a comparable background with

the population covered by the study. For the specific requirements of a qualitative study, the study team and the additional observers/interviewers can benefit from further training in the use of observation and interview methods. Learning to be systematic and focused, learning to observe, to listen and to probe, and learning to report and record fully and correctly are all very important. Such training should be in the hands of an experienced researcher who is at the same time a skilled trainer.

A number of female and male field workers may also be needed for structured observations and interviews. They should have the same cultural background and speak the same language as the population covered by the study, and should be locally accepted and respected. Quite a range of people can be good observers and interviewers, including interested men and women from the local community, village health workers, extension workers, NGO volunteers, teachers, school children, school leavers, and university graduates. They invariably need adequate preparatory training and close supervision. Data collection and recording will be better when one of the study team members is around to supervise, to offer instant help and support, and for reporting back at the end of the day.

Training of field workers may take anything from two days to two weeks, depending on the data to be collected and recorded. The training should include a general introduction to the water, sanitation and hygiene education project and an explanation of the aims of the study and the data to be collected, followed by extensive training in the use of the structured observation forms, questionnaires or any other data collection tools to be used. In addition, sufficient time should be devoted to how to introduce oneself, how to observe, how to communicate, and how to record data. Role playing followed by a practice run in the field are important ways to qualify the field workers for their work.

Whatever fieldwork methods are used, it is always invaluable for all the field workers to meet at the end of each day, or at least at regular intervals, to compare experiences, problems encountered, and unexpected findings. These meetings should be attended by a member of the study team, because issues are likely to be raised on which the field workers need guidance.

### **Time and resource requirements**

It is often assumed that the study of hygiene behaviour is a time-consuming affair. But this is not necessarily so, especially if the study is for project purposes. The preliminary phase may take from a couple of days to a couple of weeks per community, in the case of a so-called "rapid" study. More in-depth preliminary studies will take four to six weeks per community. How much time the main phase will take can be calculated with the help of the table at the end of this chapter. Often, the time needed for data analysis, interpretation, report writing and sharing of findings, conclusions and recommendations is underestimated. As a rule of thumb it is safe to say that these parts of the study easily consume 50% of the total time, implying that when data collection has been completed we are only half way through the process.

In order to complete the study in a set period of time, it is necessary to make a reasonable selection of what to study, in what depth and with what precision. The real art is to minimize data collection and to maximize the use of the data collected.

Apart from personnel and time, there are other resources to be considered. A study requires money, transport facilities, materials such as paper, duplication facilities, and preferably a microcomputer and printer. Money and transport facilities are common constraints and therefore should be taken into account from the very beginning. The main costs usually relate to payment of staff and field workers, field allowances, training, workshops, and payment for transport and materials. An overview of resources required in relation to selected methods is best obtained by using a table such as the one below:

*Table 7: Example of a table which might be used to estimate resources required for field work*

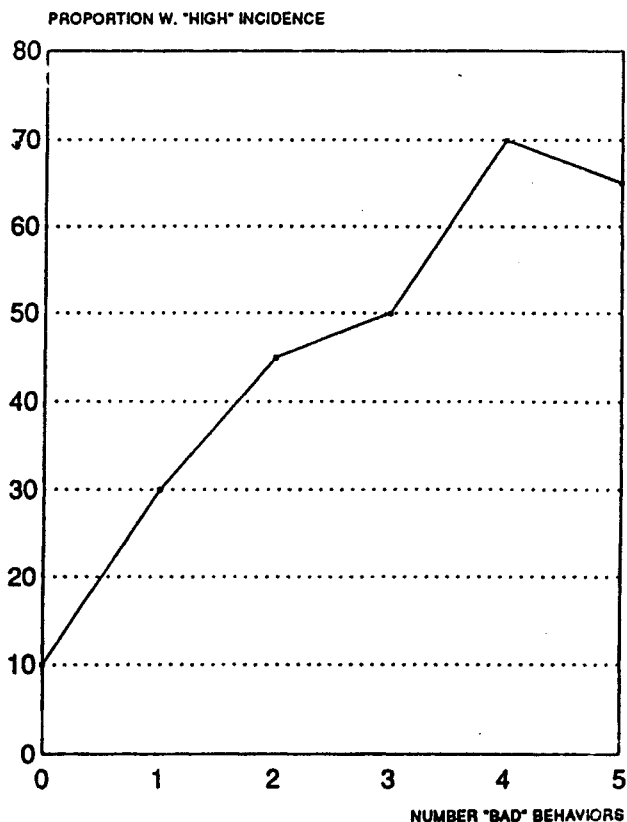
<i>method</i>	<i>number of observations/ interviews</i>	<i>time needed</i>	<i>personnel needed</i>	<i>training needed</i>	<i>transport needed</i>	<i>money needed</i>
initial unstructured observation	.....	.....	.....	.....	.....	.....
focus groups	.....	.....	.....	.....	.....	.....
household survey	.....	.....	.....	.....	.....	.....
continuous monitoring	.....	.....	.....	.....	.....	.....
follow-up interviews	.....	.....	.....	.....	.....	.....
.....	.....	.....	.....	.....	.....	.....

## **Data presentation and dissemination**

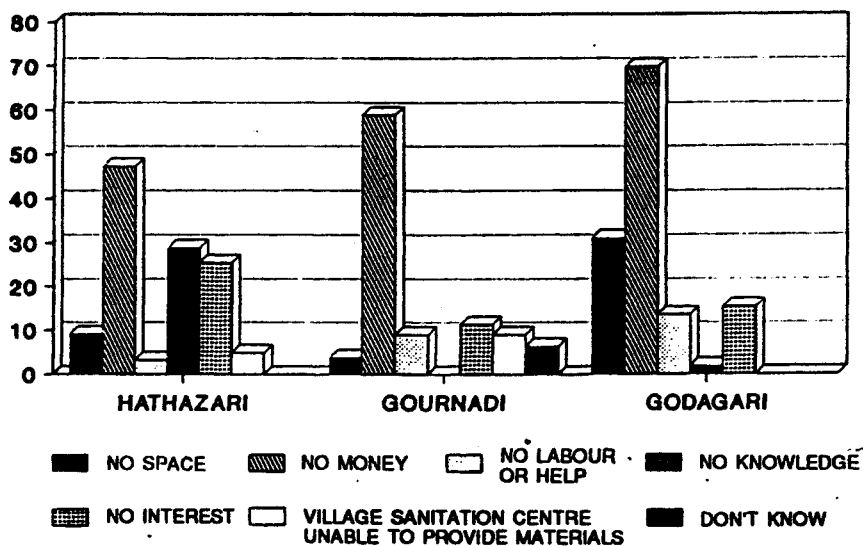
Graphs, figures and drawings or pictures will make the results of a study more appealing and generate more attention and reaction. A few examples follow. Remember though that, however beautiful the presentation of findings, the whole effort will be wasted if they are not shared and used for their identified purpose. Active involvement from the beginning of the people who are expected to use the results of the study will create the right environment (see Section 6.1). Other opportunities to share and stimulate the use of the results can be created through meetings and workshops on the outcomes of the study and their implications for future work, and by distributing the summary findings more widely. A further measure to enhance their use is to build in check points at predetermined intervals.

## STUDY DESIGN AND ORGANIZATION

*Example: Graphs and figures to visualize the results of a study*

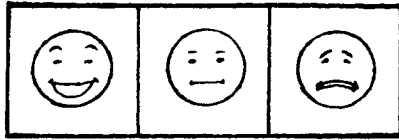


Line graph showing relation between incidence of diarrhoea and number of "bad" behaviours (Source: Hurtado, WP 1992).



Bar graph showing reasons of families for not yet constructing latrine (Source: Boot, 1991).

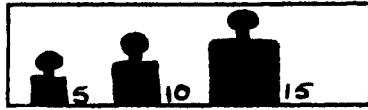
*Example continued*



- degree of satisfaction, for example with the use of the new latrines



- number of children, for example with and without scabies

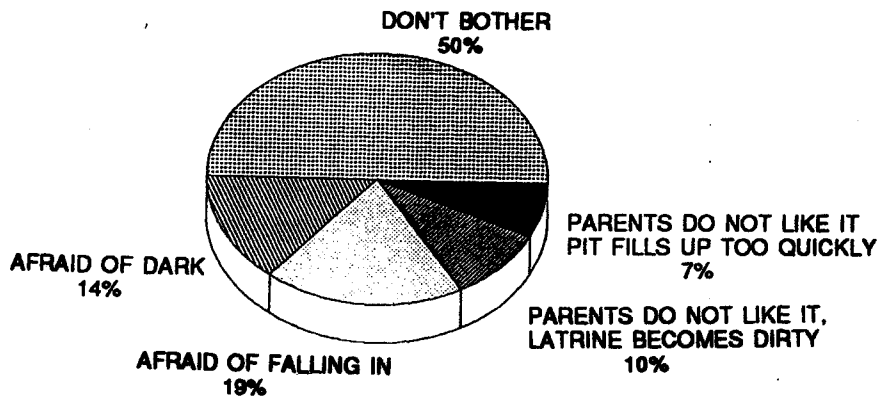


- number of households using the improved well



- something present or absent for example fence around water point

Pictogrammes in which drawings or other signs are used to visualize important information (Source: Boot/IRC).



Pie chart illustrating reasons why children do not use latrine (Source: Boot, 1991).



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## *Annex 1: List of Workshop Participants*

Dr. Ann Allen	University of Wales College of Medicine, UK.
Dr. Masee Bateman	WASH, USA.
Dr. Margaret Bentley	Johns Hopkins University, USA.
Dr. Ursula Blumenthal	London School of Hygiene and Tropical Medicine, UK.
Ms. Marieke Boot	IRC International Water and Sanitation Centre, The Netherlands.
Mr. Bill Brieger	University College Hospital, Nigeria.
Dr. Sandy Cairncross	London School of Hygiene and Tropical Medicine, UK.
Dr. Carlos Caroso	Federal University of Bahia, Brazil.
Dr. E.E. Ekanem	University of Lagos, Nigeria.
Dr. Samiha El-Katsha	The American University of Cairo, Egypt.
Dr. Olfat El Sebaie	Alexandria University, Egypt.
Dr. Steven Esrey	McGill University, Canada.
Ms. Wilma Gormley	WASH, USA.
Dr. Pauline Gwatrira	Blair Research Institute, Zimbabwe.
Dr. Patricia Haggerty	Food and Agriculture Organization of the UN, Italy.
Dr. Fitzroy Henry	Harvard Institute for International Development, USA.
Dr. Bilqis A. Hoque	International Centre for Diarrhoeal Disease Research, Bangladesh.
Dr. Elena Hurtado	INCAP, Guatemala.
Ms. Sharon Huttly	London School of Hygiene and Tropical Medicine, UK.
Dr. Carol Jenkins	Papua New Guinea Institute of Medical Research, Papua New Guinea.
Ms. Eva Kaltenthaler	Nyangabgwe Hospital, Botswana.
Ms. Bernadette Kanki	Centre Muraz, Burkina Faso.
Dr. Carl Kendall	Johns Hopkins University, USA.
Ms. Betty Kirkwood	London School of Hygiene and Tropical Medicine, UK.
Prof. Vijay Kochar	University of Hyderabad, India.
Dr. Claudio Lanata	Nutrition Research Institute, Peru.
Dr. José Martines	WHO, Switzerland.
Ms. S. Mtero	Blair Research Institute, Zimbabwe.
Dr. Melissa Parker	London School of Hygiene and Tropical Medicine, UK.
Ms. Anne Peasey	London School of Hygiene and Tropical Medicine, UK.
Dr. Duncan Pedersen	International Development Research Centre, Canada.
Prof. Pertti Pelto	University of Connecticut, USA.
Dr. Helen Pickering	UK.
Dr. John Pinfold	Khon Kaen University, Thailand.
Ms. Wendy Quarry	Canadian High Commission, Pakistan.
Dr. Sandra Saenz de Tejada	INCAP, Guatemala.
Dr. Mayling Simpson-Hébert	WHO, Switzerland.
Prof. Sandra Tempongko	University of the Philippines, Philippines.
Mr. Jim VanDerslice	University of North Carolina, USA.
Prof. Gilbert White	University of Colorado, USA.
Prof. Carl Widstrand	Linköping University, Sweden.
Dr. May Yacoob	WASH, USA.
Dr. Sushila Zeitlyn	British High Commission, Bangladesh.



## Annex 2: List of Workshop Papers

(The institutions mentioned refer to the author's place of work)

- Allen, Ann K. *Studying stigmatised behaviour - defecation*. University of Wales College of Medicine, United Kingdom.
- Baltazar, Jane C. *Measurement of hygiene behaviour*. Manila, Philippines.
- Bateman, O. Masee. *Health and hygiene behavior: hygiene behavior in epidemiologic perspective*. WASH, United States of America.
- Boot, Marieke. *The study of hygiene behaviour in water supply and sanitation programmes: Notes from the field*. IRC International Water and Sanitation Centre, The Hague, The Netherlands.
- Brieger, William, R. *Measuring hygiene behaviour in rural Nigeria*. University of Ibadan, Nigeria.
- Ekanem, E.E. and Akitoye, C.O. *Measurement of Food Hygiene Behaviour*. University of Lagos, Nigeria.
- El-Katsha, Samiha. *Women, Water and Sanitation: Measuring Change in Hygiene Behaviour*. The American University of Cairo, Egypt.
- El Sebaie, Olfat. *Measurement of hygiene behaviour*. Alexandria University, Egypt.
- Esrey, Steven A. *Analyzing hygiene or washing dirty data*. McGill University, Canada.
- Gwatirisa, Pauline. *Madziwa schistosomiasis control project: a community-based approach. An evaluation of the impact of water and sanitation facilities on the prevalence of Schistosomiasis in Madziwa and Bushu Communal Lands*. Blair Research Institute, Harare, Zimbabwe.
- Gwatirisa, Pauline. *Problems of measuring hygiene behavior in the evaluation of water and sanitation programmes*. Blair Research Institute, Harare, Zimbabwe.
- Haggerty, Patricia. *Community-based hygiene education to reduce diarrhoeal disease in rural Zaire: measurement of hygiene behaviour before and after the intervention*. Rome, Italy.
- Hoque, Bilqis A. and Sack, R. Bradley. *Monitoring Water Use in Rural Bangladesh*. International Center for Diarrhoeal Disease Research, Dhaka, Bangladesh.
- Hubley, John. *Evaluating Hygiene Education - What do we measure?* Leeds Polytechnic, United Kingdom.
- Hurtado, Elena. *Measurement of Water-related behaviors including hygiene behaviors*. INCAP, Guatemala.
- Huttly, Sharon. *Raising some issues on sample size and sampling procedures in observational studies of hygiene behaviour*. London School of Hygiene and Tropical Medicine, London, United Kingdom.
- Jenkins, Carol. *Methodological issues in the measurement of hygiene and sanitation-related behaviour: Lessons from Papua New Guinea*. Papua New Guinea Institute of Medical Research, Goroka, Papua New Guinea.
- Kaltenthaler, Eva. *Contribution to Workshop on Measurement of Hygiene Behaviour*. Nyangabgwe Hospital, Francistown, Botswana.
- Kanki, Bernadette; Curtis, Valerie; Mertens, Thierry; Cousens, Simon and Traoré, Etienne. *Measuring hygiene behaviours: experiences of a comprehensive approach in Burkina Faso*. Bobo Dioulasso, Burkina Faso.

- Kendall, Carl and Gittlesohn, Joel. *A discussion of the reliability of measures of hygiene behaviors: the case of the health behavior intervention project, Lima, Peru*. Johns Hopkins University, United States of America.
- Kochar, Vijay. *Getting the socio-behavioural research done*. University of Hyderabad, India.
- Lanata, Claudio F. *Problems in measuring hygiene practices and compliance during a hygiene intervention study*. Instituto de Investigación Nutricional, Lima, Peru.
- MacCormack, Carol. *Evaluation methodologies and anthropological studies in Sierra Leone, The Gambia and Jamaica*. Bryn Mawr College. Pennsylvania, United States of America.
- Martines, José. *Promotion of personal and domestic hygiene. Intervention-related research priorities*. Diarrhoeal Diseases Control Programme. WHO, Switzerland.
- Mtero, Shungu. *Hygiene behaviour - past and present experiences*. Blair Research Institute, Harare, Zimbabwe.
- Peasey, A. and Blumenthal, U. *Use of time-point direct observation in the measurement of hygiene behaviour associated with irrigation with wastewater*. London School of Hygiene and Tropical Medicine, London, United Kingdom.
- Pedersen, Duncan. *Qualitative and Quantitative: two styles of viewing the world or two categories of reality?* IDRC, Canada.
- Pelto, Pertti, J. *The qualitative quantitative mix in research on hygienic practices*. University of Connecticut, United States of America.
- Pickering, Helen. *Anthropological methods used in the Gambian MRC Aids Research Programme*. London, United Kingdom.
- Pinfold, John V. *Measurement of hygiene behaviour*. Leeds University, United Kingdom.
- Quarry, Wendy. *Hygiene education. Does it change behavior?* Islamabad, Pakistan.
- Saenz de Tejada, Sandra. *Assessing food hygiene: a pilot study in Guatemala*. INCAP, Guatemala.
- Simpson-Hébert, Mayling. *Some indicators of hygiene improvement based on experience from Thailand*. WHO, Switzerland.
- Tempongko Sandra B. *Extended Observation: Its Uses and Limitations in Studies of Hygiene Behaviour*. Manila, Philippines.
- VanDerslice, James. *Estimating hygiene-related water consumption*. University of North Carolina. United States of America.
- Widstrand, Carl. *Some measurement problems in hygiene behaviour*. Linköping University. Sweden.
- Zeitlyn, Sushila. *Measuring hygiene behaviour: the importance of definition and meaning*. Bangladesh.
- Zeitlin, Marian F. *Data management and analysis issues in the use of summary measures of longitudinal data to detect associations between hygiene behaviors and diarrhoeal disease*.

## Annex 3: Further Reading

*For those who want to know more about key issues as discussed in this book we recommend the following titles:*

### I. Health and Hygiene

Benenson, Abram S. (1990). *Control of communicable diseases in man: an official report of the American Public Health Association*. 15th ed. Washington, DC, USA, American Public Health Association.

Cairncross, Sandy and Feachem, Richard G. (1983). *Environmental health engineering in the tropics: an introductory text*. Chichester, UK, John Wiley.

Listorti, James A. (1990). *Environmental health components for water supply, sanitation, and urban projects*. (Technical paper; no. 121). Washington, DC, USA, World Bank.

McJunkin, F. Eugene (1983). *Water and human health*. 2nd ed. Washington, DC, USA, US Agency for International Development.

Werner, David (1978). *Where there is no doctor: a village health care handbook*. Palo Alto, CA, USA, Hesperian Foundation.

### II. Health Impact and its measurement

Briscoe, John; Feachem, Richard G. and Rahaman, Mujibur M. (1985). *Measuring the impact of water supply and sanitation facilities on diarrhoea morbidity: prospects for case-control methods*. Geneva, Switzerland, World Health Organization.

Briscoe, John; Feachem, Richard G. and Rahaman, M. Mujibur (1986). *Evaluating health impact: water supply, sanitation, and hygiene education*. Ottawa, Ont., Canada, International Development Research Centre.

Esrey, Steven A. et al. (1990). *Health benefits from improvements in water supply and sanitation: survey and analysis of the literature on selected diseases*. (WASH technical report; no. 66). Arlington, VA, USA, Water and Sanitation for Health Project.

### III. Evaluation

Boot, Marieke (1987). *Evaluating water supply and sanitation projects: training course. Vol. I: Guide for course moderators. Vol. II: Training course*. (Training series; no. 2). The Hague, Netherlands, IRC International Water and Sanitation Centre.

Cairncross, Sandy et al. (1980). *Evaluation for village water supply planning*. (Technical paper series; no. 15), The Hague, Netherlands, IRC International Water and Sanitation Centre.

Feuerstein, Marie-Therese (1986). *Partners in evaluation: evaluating development and community programmes with participants*. London, UK, Macmillan Publishers.

Narayan-Parker, Deepa (1990). *Participatory evaluation: tools for managing change in water and sanitation*. (Tools for community participation). New York, NY, USA, United Nations Development Programme, Promotion of the Role of Women in Water and Environmental Sanitation Services.

Patton, Michael Quinn (1978). *Utilization - focused evaluation*. Beverly Hills, CA, USA, Sage Publications.

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#### **IV. Observation and Interview Methods**

Bentley, Margaret E. et al. (1990). *Guidelines for the use of structured observations in health behavior intervention studies* (Working title of forthcoming publication).

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Casley, Dennis J. and Kumar, Krishna (1988). *The collection, analysis and use of monitoring and evaluation data*. Baltimore, MD, USA, Johns Hopkins University Press.

Dawson, Susan and Manderson, Lenore (1992). *The focus group manual*. (Methods for social research in tropical diseases; no. 1). Geneva, Switzerland, World Health Organization.

Khan, Me and Manderson, Lenore (1992). Focus groups in tropical diseases research. In: *Health policy and planning*, vol. 7, no. 1, p. 56-66.

Kumar, Krishna (1987). *Conducting group interviews in developing countries*. Washington, DC, USA, US Agency for International Development.

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Morgan, David L. (1988). *Focus groups as qualitative research*. (Qualitative research methods; vol. 16). Newbury Park, CA, USA, Sage Publications.

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Rowntree, Derek (1981). *Statistics without tears: a primer for non-mathematicians*. London, UK, Penguin Books.

Scrimshaw, Susan C.M. and Hurtado, Elena (1987). *Rapid assessment procedures for nutrition and primary health care: anthropological approaches to improving programme effectiveness*. (Reference Series; vol. II). Los Angeles, CA, USA, UCLA Latin American Center Publications.

#### **V. Participatory Methods**

Mascarenhas, James et al. (1991). *Participatory rural appraisal: proceedings of the February 1991 Bangalore PRA trainers' workshop*. (RRA notes; no. 13). London, UK, International Institute for Environment and Development.

PROWESS and Netwas (1991). *Workshop on participatory methods for monitoring and evaluation of water supply and sanitation activities. November 11-16, 1990, Kibwezi, Kenya*. Nairobi, Kenya, AMREF Network for Water and Sanitation.

Srinivasan, Lyra (1990). *Tools for community participation: a manual for training trainers in participatory techniques*. (PROWESS/UNDP technical series: involving women in water and sanitation: lessons, strategies, tools). New York, NY, USA, United Nations Development Programme. Promotion of the Role of Women in Water and Environmental Sanitation Services.

Theis, Joachim and Grady, Heather (1991). *Participatory rapid rural appraisal for community development: a training manual based on experiences in the Middle East and North Africa*. London, UK, International Institute for Environmental Development.

## **VI. Hygiene Education**

Boot, Marieke T. (1991). *Just stir gently: the way to mix hygiene education with water supply and sanitation*. (Technical paper series; no. 29). The Hague, Netherlands, IRC International Water and Sanitation Centre.

Brown, Lori DiPrete and Hurtado, Elena (1992). *Development of a behaviour-based monitoring system for the health education component of the rural water and health project, Care-Guatemala*. (WASH Field Report; no. 364). Arlington, VA, USA, Water and Sanitation for Health Project.

Burgers, Lizette; Boot, Marieke and Wijk-Sijbesma, Christine van (1988). *Hygiene education in water supply and sanitation programmes: literature review with selected and annotated bibliography*. (Technical paper series; no. 27). The Hague, Netherlands, IRC International Water and Sanitation Centre.

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Loevinsohn, Benjamin P. (1990). Health education interventions in developing countries : a methodological review of published articles. In: *International Journal of Epidemiology*, vol. 19, no. 4, p. 788-794.

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## Annex 4: Glossary

attitude	the feeling and/or point of view which a person or group has relating to people, events, opinions
average	the sum of a group of measurements divided by the total number of measurements
bacteria	one-celled micro-organisms, some of which are harmless and some of which cause disease
baseline information	information which provides a basis for planning programme development and evaluating progress
behaviour	the way people act in general, especially in relation to the situation they are in or the people they are with
cercariae	schistosome larvae which live in water and enter humans through the skin during water contact
chlorination	a water treatment process in which bacteria are destroyed by the addition of the chemical chlorine
cluster	a small group that is part of a population that is being studied
coliform bacteria	bacteria that inhabit the intestines of humans and animals and occur in faeces, but that are also found naturally in soils and water
community	territorial settlement, such as a village or neighbourhood
contagious	communicable by contact (synonymous with infectious)
contamination	the presence of chemical or infectious impurities, such as bacteria that may be harmful to health
custom	something that the people in a community or society always do in particular circumstances because it is regarded as the right thing to do; something that someone usually does in a particular situation or at a particular time of day
coverage	the extent to which something is 'covered'; the extent to which those who need something are actually receiving it
criterion	a standard by which something may be judged or evaluated (plural – criteria)
demography	number of births, deaths, marriages, and diseases in a community over a period of time
diarrhoea	abnormally frequent evacuation of watery stools
<i>E(scherichia) coli</i>	a type of coliform bacteria of exclusively faecal origin. <i>E. coli</i> survives longer than most bacteria from human faeces which might cause illness. Its presence in water or on surfaces is used as indicator of faecal contamination
endemic	any disease of man maintained at a fairly constant low level in the community over a period of years
enteric	pertaining to the small intestine
enteric pathogens	disease organisms in the small intestines
environment	all the circumstances, people, things and events around them that influence their life; the particular surroundings in which they live

epidemic	temporary outbreak of a disease beyond normal levels
excreta	liquid and solid human body wastes
faecal	having to do with solid human or animal wastes discharged through the bowels
faecal-oral cycle	the process by which faecal material gets into the mouth
faeces	solid human and animal wastes discharged through the bowels
faecal coliform	bacteria that inhabit the intestines of humans and animals, including <i>E. coli</i> . Faecal coliforms are differentiated from other coliform bacteria by specific biochemical reactions. They produce a visible colony of the appropriate colour and appearance when incubated on a faecal coliform medium at a temperature of 44.5°C
faecal streptococci	type of streptococci which normally are found in the intestines of humans and animals. They are used as an indicator of faecal contamination
food hygiene	synonymous with food safety
food safety	all conditions and measures that are necessary during the production, processing, storage, distribution, and preparation of food to ensure that it is safe, sound, wholesome, and fit for human consumption
geography	the way that features such as rivers, mountains, towns, streets, etc are arranged in an area
germ	a one-celled micro-organism, usually refers to a pathogen
Hawthorn effect	the effect of being watched or unusual attention being paid
hygiene	the practice of keeping oneself and one's surroundings clean, especially in order to prevent illness or the spread of diseases.
hygiene education	the creation of learning experiences to facilitate the sustained adoption of behaviours which help to prevent water and sanitation-related diseases
hygiene behaviour	a wide range of actions associated with the prevention of water and sanitation- related diseases
impact	effect
incidence	number of new cases of a specified disease during a defined period of time, usually expressed in cases/100,000
indicator	something that acts as a sign, and that provides information about what you want to know. For example water and soap near the latrine may be an indicator (sign) for hand washing after defecation
indicator organisms	organisms whose presence in water is used to assess the degree of faecal contamination; <i>E. coli</i> is the most commonly used indicator organism
infection	a successful invasion by a pathogen
infectious	communicable or able to cause infection through direct and indirect contact. (synonymous with contagious)
interview	a meeting of two or more persons face to face
interviewee	person who provides the requested information in an interview (synonymous with respondent)
interviewer	a person who seeks to learn something on the subject of interest by asking questions

interviewer effect	the influence of the personality and views of the interviewer on the answers of the interviewee
kafir	small water reservoir, pond fed by surface water run-off
KAP survey	a survey which measures Knowledge, Attitudes and Practices in an individual or group in relation to a specific purpose
key informant	a person who is specially knowledgeable, at least in some subjects or topics you are interested in, and who is willing to share this knowledge with you
morbidity	rate of sickness in the community
mortality	death rate in the community
norm	a way of behaving that is considered normal and usual and that people expect from you; an official standard or level of achievement that you are expected to reach
observation	action or process of carefully watching someone or something, especially in order to learn or understand something about them
observer	someone who spends time watching an activity or event in order to see what happens, but without actually taking part
oral	through the mouth
participatory research	a systematic learning process in which participation is sought in initial decision-making, planning, implementation, summary and analysis, and in the use of results
pathogen	a disease-causing micro-organism
percentage	the number of people with a particular characteristic in a group, divided by the total number in the group and multiplied by 100
perishable food	food that goes bad quite quickly
prevalence	number of persons sick with a specified disease at a particular moment in time, usually expressed in cases/100,000 (By comparison, incidence measures new cases)
pollution	process of making water, air, people, etc. dirty, impure, or dangerous
purity	state of ritual cleanliness
qualitative data	data not measurable in numerical terms
quantitative data	data measurable in numerical terms
questionnaire	a standard form with a list of questions on which the answers of the interviewee are recorded
reactivity	behaviour or changes in behaviour caused by the presence of the observer
reliability	the extent to which something can be relied on and trusted to be of consistent quality when used repeatedly
respondent	person who provides the requested information in an interview (synonymous with interviewee)
senior female	adult woman in the household with responsibilities for the family she belongs to (synonymous with "female head of household", but also other adult women in the household are senior female when they bear responsibilities for the family)



<b>senior male</b>	<b>adult man in the household with responsibilities for the family he belongs to (synonymous with “male head of household”, but also other adult males in the household are senior male when they bear responsibilities for the family)</b>
<b>study</b>	<b>the process of systematic learning about a particular subject</b>
<b>validity</b>	<b>the extent to which something is reliable and actually measures or makes a correct statement about that which it claims to</b>
<b>variables</b>	<b>the varying characteristics of something that is being looked at or measured</b>
<b>vector-borne disease</b>	<b>disease transmitted to man directly or indirectly by animals, notably insects</b>

## *Annex 5: Basic principles for safe infant and young children's food preparation*

*Adapted from Golden rules for safe food preparation, in Health surveillance and management procedures for food-handling personnel: report of a WHO consultation. Geneva, World Health Organization, 1989 (Draft).*

- Cook infant food thoroughly.** Many raw foods, notably poultry, raw milk and vegetables, are very often contaminated with disease-causing organisms. Thorough cooking will kill these organisms. For this purpose, all parts of the food must become steaming hot, which means they must reach a minimum temperature of 70°C.
- Avoid storing infant food.** Prepare infant and young children's food freshly, and give it to the infants immediately after preparation and when it is cool enough to eat. Foods prepared for infants and young children should preferably not be stored at all. If this proves to be impossible, food could be stored only for the next meal, but in this case it has to be kept cool, at temperatures below 10°C, or hot, at temperatures near or above 60°C. Stored infant food should be reheated thoroughly. Again, this means that all parts of the food must reach at least 70°C.
- Avoid contact between raw foodstuffs and cooked foods.** Cooked food can become contaminated through even the slightest contact with raw food. This cross-contamination can be direct, as, for example, when raw food comes into contact with cooked food. It can also be indirect and subtle: for example, through hands, flies, utensils or unclean surfaces. Thus, hands should be washed after handling high risk foods, e.g. poultry. Similarly, utensils used for raw foods should be carefully washed before they are used again for cooked food. The addition of any new ingredients to cooked food may reintroduce pathogenic germs. In this case, infant and young children's food needs to be thoroughly cooked again.
- Wash fruits and raw vegetables.** Fruits and vegetables, particularly if they are given to infants in raw form, must be washed carefully with safe water. If possible, vegetables and fruits should be peeled. In situations when these are likely to be heavily contaminated, for example when untreated waste water is used for irrigation or untreated nightsoil is used for soil fertilization, fruits and vegetables which cannot be peeled should be cooked before they are given to infants.
- Use safe water.** Safe water is just as important for preparing infant and young children's food as for drinking. Water used in the preparation of such food should be boiled, unless the food to which the water is added has subsequently to be cooked (e.g. rice, potatoes). Remember that ice made of unsafe water may also contain pathogenic organisms.
- Wash hands repeatedly.** Wash hands thoroughly before you start preparing or serving food and after every interruption - especially if you have changed the baby or have been to the toilet. It should also be remembered that household animals often harbour dangerous germs that can pass from hands to food.

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- ❑ **Avoid feeding infants with a bottle.** Use spoons and cups to give drinks and liquid foods to infants and young children. It is usually difficult to get bottles and teats completely clean. Spoons, cups, dishes and utensils used for preparing and feeding infants should be washed right after use. This will facilitate their thorough cleaning.
  - ❑ **Protect foods from insects, rodents and other animals.** Animals frequently carry pathogenic micro-organisms and are potential sources of contamination of food.
  - ❑ **Store non-perishable foodstuffs in a safe place.** Keep pesticides, disinfecting agents or other toxic chemicals in labelled containers and separate from foodstuffs. To protect against rodents and insects, non-perishable foodstuffs should be stored in closed containers. Containers which have previously held toxic chemicals should not be used for storing foodstuffs.
  - ❑ **Keep all food preparation premises meticulously clean.** Surfaces used for food preparation must be kept absolutely clean in order to avoid food contamination. Every scrap of food or even crumbs are potential reservoirs of germs and can attract insects and animals. Garbage should be kept in safe, covered places and be disposed of quickly.

