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Water, Sanitation, Health and Hygiene Studies Project
Aga Khan Health Service
Northern Areas and Chitral

ISSUE PAPER: 6

HYGIENE BEHAVIOUR IN NORTH PAKISTAN THE RESULTS OF A QUANTITATIVE AND QUALITATIVE STUDY



by:

Jeanet A. van de Korput
Muneeba
Michael A.M. Langendijk

December 1995

203.2-95HY-13601



ACKNOWLEDGEMENTS

This report is the outcome of a long process that started in 1993 with preliminary studies. In 1994-95 more specific qualitative and quantitative studies were designed, carried out and analysed. This report is one of the major outcomes of these activities.

All the field studies were carried out in rural communities and we would like to express our sincere thanks to all villagers for their cooperation and help. We are very impressed by their hospitality, patience and willingness to understand our sensitive questions. 'Ke khabber?' ('What do I know?') was usually people's first reaction to our queries. However, after some probing villagers always gave their time to talk in a detailed and open way about their practices and ideas.

For carrying out the field studies thanks goes to all the staff of the WSHHS Project, who helped in arranging and carrying out the various field studies. In addition special thanks goes to all the staff of AKHS, in particular Ms. Hasul Bibi, Ms. Dilferoze and Ms. Jahan Noor. We would also like to acknowledge the staff of AKRSP-Baltistan; Mrs. Aalya, Ms. Taqdees and Mrs. Asia who welcomed and helped us at any time. For making initial corrections to the text we thank the VSO members of AKES.

Khalil Ahmad and Haider Raza, Project microbiologists have put a lot of effort in carrying out the handwashing study. They did this in a competent and efficient manner. We would also like to acknowledge Dr. Annet of AKHS, who helped us in the process of developing an EPI-Info programme to analyse the KAP-survey results.

Throughout all the phases of the studies we received candid support from John Collett, Director of the WSHHSP. We thank him for his continuous encouragement and for the final editing of this report.

The drawings in the report are made by Muhib-Uddin, our extraordinary Project artist.

19 December 1995

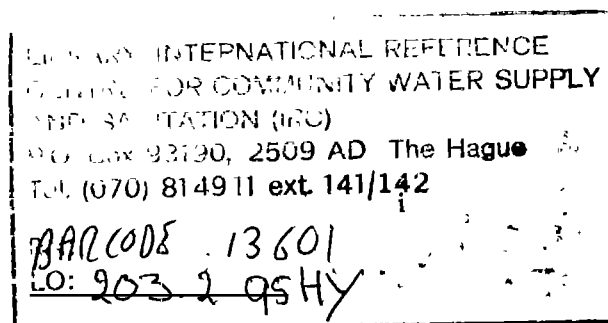




TABLE OF CONTENTS

Acknowledgement	i
Table of contents	iii
Annexures, list of figures, tables and illustrations	iv
Glossary and abbreviations	vi
INTRODUCTION	vii
CHAPTER 1 THEORETICAL FRAMEWORK AND METHODOLOGY	1
1.1 Theoretical Framework	1
1.2 Methodology of the study	5
CHAPTER 2 AWARENESS OF TRANSMISSION ROUTES FOR FAECAL AND WATER RELATED DISEASES	9
2.1 Faecal and water related diseases in North Pakistan	9
2.2 Villagers' perceptions about the causes of diarrhoea	10
2.3 Awareness of water contamination and illness and disease	12
2.4 Prevention and treatment of diarrhoea	14
2.5 Analysis of the awareness of germs and transmission routes	16
CHAPTER 3 DOMESTIC HYGIENE	17
3.1 Domestic hygiene	17
3.2 Food hygiene	19
3.3 Analysis of domestic hygiene behaviours	22
CHAPTER 4 DOMESTIC WATER MANAGEMENT	23
4.1 Water source selection and concepts of water quality	23
4.2 Water collection	25
4.3 Drinking water inside the house	29
4.4 Analysis of behaviours associated with communal and domestic drinking water management	34
CHAPTER 5 SANITATION AND HYGIENE PRACTICES	35
5.1 Disposal systems	35
5.2 'Composting'- sanitation systems	40
5.3 Analysis of sanitation related behaviours	43
CHAPTER 6 PERSONAL HYGIENE	45
6.1 Bathing	45
6.2 Clothes washing	45
6.3 Disposal of childrens' faeces and washing of soiled clothes	46
6.4 Analysis of behaviours related to personal hygiene	48
CHAPTER 7 HAND CLEANLINESS	49
7.1 A study on washing hands	49
7.2 Results of observation and KAP-survey questions on handwashing	49
7.3 Quality of handwashing	54
7.4 Analysis of handwashing behaviours	56
CHAPTER 8 TARGET BEHAVIOURS AND BEHAVIOURAL OBJECTIVES FOR WASEP	57
8.1 The selection of target behaviours	57
8.2 Formulating behavioural objectives	59
8.3 What are the next steps to develop WASEP's communication strategy?	60
LITERATURE LIST	63

LIST OF ANNEXES

ANNEX 1	Problems encountered during the observation studies	65
ANNEX 2	Spot-check format	66
ANNEX 3	Structured observation format	67
ANNEX 4	Questionnaire on water, diarrhoea and health education	69
ANNEX 5	Formats used during structured handwashing observations	70
ANNEX 6	Water sources	71
ANNEX 7	Water consumption within the household	72
	7.1 Results of the water consumption assessment	72
	7.2 Discussion of the results	73
ANNEX 8	Bacteriological contamination of hands and its reduction after handwashing with water	74

LIST OF FIGURES, TABLES AND ILLUSTRATIONS

FIGURES:

Figure 1:	Three categories of factors contributing to health and hygiene behaviour	2
Figure 2:	Matrix of health behaviours	3
Figure 3:	The main faecal-oral transmission routes	10
Figure 4:	Awareness about water as a possible cause of diarrhoea	13
Figure 5:	What is a gerasim?	14
Figure 6:	At what time of the day is water collected	25
Figure 7:	Average time spent on collecting water per round-trip	26
Figure 8:	Contamination levels of the water from storage containers inside households	30
Figure 9:	At what age the faeces of young children become harmful	46
Figure 10:	Proposed WASEP activities: barriers of contamination routes	59

TABLES

Table 1:	Causes of diarrhoea according to the villagers (KAP-survey result)	11
Table 2:	Villagers ideas about how human faeces can spread diarrhoea (KAP-survey result)	12
Table 3:	Views on how diarrhoea can be avoided or prevented (KAP-survey result)	15
Table 4:	Animal and human faeces near the house (Spot-Check result)	19
Table 5:	Events related to food hygiene (Spot-Check result)	20
Table 6:	Why people prefer water from their usual source (KAP-survey result)	24
Table 7:	What do villagers consider dirty drinking water (KAP-survey result)	25
Table 8:	Covering water containers inside the household (Spot-Check result)	31
Table 9:	Methods for keeping the water clean (KAP-survey result)	31
Table 10:	Methods for making the water clean (KAP-survey result)	33
Table 11:	Problems people feel with open defaecation (KAP-survey result)	37
Table 12:	Where do people wash clothes stained with faeces (KAP-survey result)	47
Table 13:	Handwashing observations -availed and missed occasions- (Spot-Check result)	50
Table 14:	Finger nail lengths and cleanliness (Spot-Check result)	51
Table 15:	Observed occasions when people washed their hands during the structured observation studies (Structured observation result)	51

Table 16:	When do people say they wash their hands (KAP-survey result)	52
Table 17:	How do people wash their hands after defaecation (KAP-survey result)	53
Table 18:	Selected target, behavioural factors and objectives	60
Table 19:	Average water consumption calculated per liter/person/day (Pocket Chart Exercise)	70
Table 20:	Levels of contamination on hands without washing and on hands after washing with normal water and plenty of water (Handwashing study)	71

ILLUSTRATIONS

Drawing 1:	Cooking place of a normal household in the Northern Areas	17
Drawing 2:	Women in Yarkhun (Chitral) carrying water with a wooden pole	29
Drawing 3:	An illustration of open defaecation that will be used in the promotion of latrines	42
Drawing 4:	A woman who washed clothes in a tub throws the waste water away from the channel	47
Drawing 5:	Washing hands with the use of a lota and pitcher	50
Drawing 6:	Boy washing his hands after coming from the latrine	53
Drawing 7:	An example of an important behaviour that was selected as a target behaviour: covering faeces in the qem	57
Drawing 8:	A womens' group during a participatory health education session, facilitated by a Lady Health Visitor of AKHS	60
Photograph 1:	Woman putting a token in the pocket chart	6
Photograph 2:	Woman from Hunza washing fresh vegetables	21
Photograph 3:	Girl preparing chapaties	21
Photograph 4:	Women in Yakhdeez (Upper Chitral) taking water with a lota from a protected spring	27
Photograph 5:	A woman in Yakhdeez transports water in a lota and a bucket	27
Photograph 6:	Women in Madaklasht (Lower Chitral) carrying water on their heads	28
Photograph 7:	A container and jerrycan for water storage and transportation in a kitchen in Shigri Bala (Baltistan)	28
Photograph 8:	Inside view of a bathroom with a pour-flush latrine	39
Photograph 9:	The Chaqsa, the traditional latrine in Baltistan with a coverage of nearly 100%	39
Photograph 10:	Girl washing her hand and face in the compound of her house in Hassanabad (Chitral)	44
Photograph 11:	Girl washing clothes in a stream with the help of soap and a stick	44
Map	Map of the Northern Areas and Chitral, indicating the villages selected for the in-depth studies and the villages selected for the KAP-survey	viii

GLOSSARY

Chadder	A big piece of cloth used as a scarf
Chai ke dorree	Ladle
Chapaties	Local bread
Chaqsa	Balti language for the 'compost'-latrine found mainly in Baltistan
Chukan	Shina language for the 'compost'-latrine found mainly in Hunza/Nagar
Chula	Stove
Dow dow	A word used in both Shina and Brushaski for a noodle soup
Dua	Prayer
Ganda Pani	Dirty water
Gerasim	Bacteria
Howli	In Khowar language a courtyard that may be used for defaecation
Jin-Parri	Male and female fairy
Kalma	Koranic verses
Ke Khabber	"How do I know?" or "What do I know about these things?"
Lota	A multi-purpose container often used for drinking, water collection and ablution
Musaffa bag	Water decontamination bag
Mongi	A container used for water collection and storage
Nappies	Term used to indicate any type of cloth that is used to absorb childrens's faeces. Can be a plain pajama or shalwaar, a special piece of cloth or a cloth bag filled with cowdung
Naswar	A local chewing tobacco
Nullah	Water stream
Muhallah	Hamlet or neighbourhood of a village
Purdah	Seclusion
Qem	A Brushaski word for a demarcated place used for defaecation
Saf	Clean
Sarooi	Wakhi language for a chamber with a roof, attached to the house used for defaecation
Shal	Cattle shed in Khowar language
Taviz	Amulet
Teharat	Anal cleansing with water
Wazzu	Washing hands, face and feet for prayer

ABBREVIATIONS

AKHB	Aga Khan Housing Board
AKHS	Aga Khan Health Service
AKRSP	Aga Khan Rural Support Programme
CADP	Chitral Area Development Project
LHV	Lady Health Visitor
CHW	Community Health Worker
EPI	Expanded Programme on Immunization
EPI-INFO	Software for Epidemiology and Disease Surveillance.
KAP-survey	Knowledge, Attitude and Practice survey
WSHHSP	Water, Sanitation, Hygiene and Health Studies Project
WASEP	Water and Sanitation Extension Programme

INTRODUCTION

"It is widely recognized that hygiene education and hygiene behaviour change are essential if water and sanitation programmes are to achieve maximum health benefits" (UNICEF 1995:i).

Most water and sanitation programmes are stated in terms of reducing (infant) morbidity and mortality due to diarrhoea. To reach this objective often principal attention is given to the construction of water supply systems and sanitation units. Nowadays a health education component is usually included as well. In some projects this health education aspect is little more than some token posters, in others attempts are being made to truly integrate it with the technical interventions.

The WSHHS Project emphasizes that a mix of health education activities during implementation will greatly enhance the success and effect of a water and sanitation programme in the Northern Areas of Pakistan. The Project believes that only through the hygienic use of new facilities such as taps or latrines and through improved hygiene behaviour will the Programme deliver the health benefits for which it is designed.

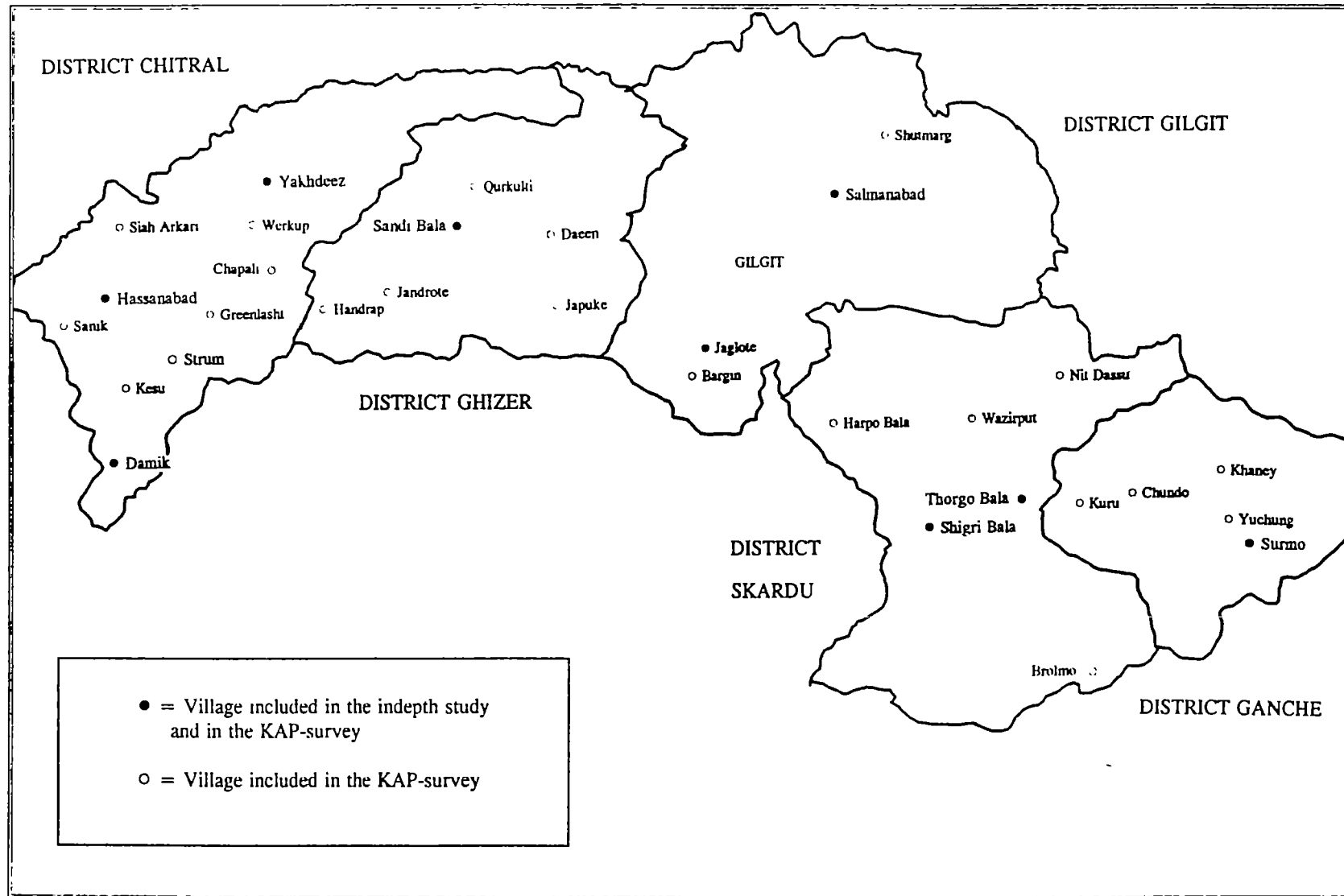
In order to develop and carry out these hygiene activities it is necessary to properly understand the socio-cultural context and the existing hygiene practices of the population. Studying hygiene behaviour, however, is recognized as being a difficult task. It often deals with people in intimate and private circumstances where it is difficult to gather information. Despite this, the WSHHS Project carried out a series of studies of domestic and personal hygiene in North Pakistan. They included a rapid assessment of the water and sanitation situation during 1993 and early 1994; in-depth household studies in 1994, a baseline KAP-survey in 1995 and a microbiological study of handwashing in 1995.

The analysis of the data has been a long process due to the complex results of many different hygiene behaviours that can vary by region, village and even within households. Based on the analysis, target behaviours were selected and possible messages identified. In developing these appropriate health messages the Project considered the socio-cultural context and the economic and physical constraints of everyday village life.

Framework of this report

This report consist of eight Chapters. In the first chapter a theoretical framework is described and the research methodologies are explained. The second chapter introduces the villagers' awareness about faecal and water related diseases and transmission routes. The usual domestic situation and different hygiene practices that take place inside the household are described in Chapter 3. Chapter 4 explains in detail management patterns of drinking water in households. Sanitation practices are described in Chapter 5. Chapter 6 deals with personal hygiene and Chapter 7 with handwashing.

Each of these Chapters concludes with a short analysis in which positive and negative behaviours are identified and categorized by changeability and importance. In the final Chapter the target behaviours for the future Water and Sanitation Extension Programme (WASEP) are selected and discussed.



Map of Northern Areas and Chitral:
indicating the villages selected for in-depth studies and the villages selected for the KAP-survey

CHAPTER 1 THEORETICAL FRAMEWORK AND RESEARCH METHODOLOGY

1.1 THEORETICAL FRAMEWORK

Many health education efforts are implicitly based on the assumption that people can be motivated to change behaviour if they have more knowledge. Therefore emphasis is usually put on providing information, assuming that once people have increased knowledge they will change their attitude, which will result in a change of behaviour. The underlying model is:

knowledge --> attitude --> behaviour

Over the last decades educational specialists have realized that this model is too simple as information is an important, but not a sufficient factor, to change people's health behaviour. For example people are not always interested in receiving information, and even when they have acquired new knowledge they are not automatically willing or able to adopt the expected behaviour. Behavioural change is a very complex process. A number of other models have been developed that can guide educators on how to influence people's behaviour.

Several models, for example, indicate that people have to realize that there is a problem. A person should be made aware first, before trying to motivate him or her to take action. Other models emphasize the need for preparing messages for specific target groups, the important role of change agents and the effect of what others will think. Nowadays it is also recognized that messages should be attractive and that 'packaging', social marketing approaches and media mixing are required to reach target audiences.

i The Precede/Proceed model

A model that is often used for planning health education programmes is the Precede/Proceed model developed by Green et al. This model is particularly useful as it enhances the understanding of the complexity of factors that influence the way people behave. It has grouped the factors that influence people's behaviour into three categories that are called; predisposing factors, enabling factors and reinforcing factors.

Predisposing factors

Predisposing factors are mainly present in the minds of people. Examples are knowledge, attitudes, beliefs, values and perceptions. In addition, socio-economic status, age, gender and family size belong to this category. In the context of this study it will become clear that people often do not understand that water can cause diarrhoeal diseases. It is unrealistic to expect that people will change a certain behaviour without a good reason.

Enabling factors

Enabling factors are often conditions in the environment that are required to perform a certain behaviour. This includes personal skills; the presence of resources like community organization; and primary health care; but also resources like time and money. It is important to investigate these enabling factors for developing a health education programme, because it is, for example, impractical to expect that people will construct pour-flush latrines if there is a water shortage in the village.

Reinforcing factors

Reinforcing factors are related to the approval and disapproval of a certain behaviour by people who are important to us in our surroundings. In the context of the study, reinforcing factors play a major role in carrying out a certain behaviour. For example it is very common that the mothers-in-law direct the daughters-in-law how to behave, and that women do not go outside to the field to relieve themselves, because this is disapproved by men. The person(s) that are significant in encouraging or discouraging behaviour may differ from one target group to another. Influential people may also include the uncle, eldest brother, health workers, teachers and village activists.

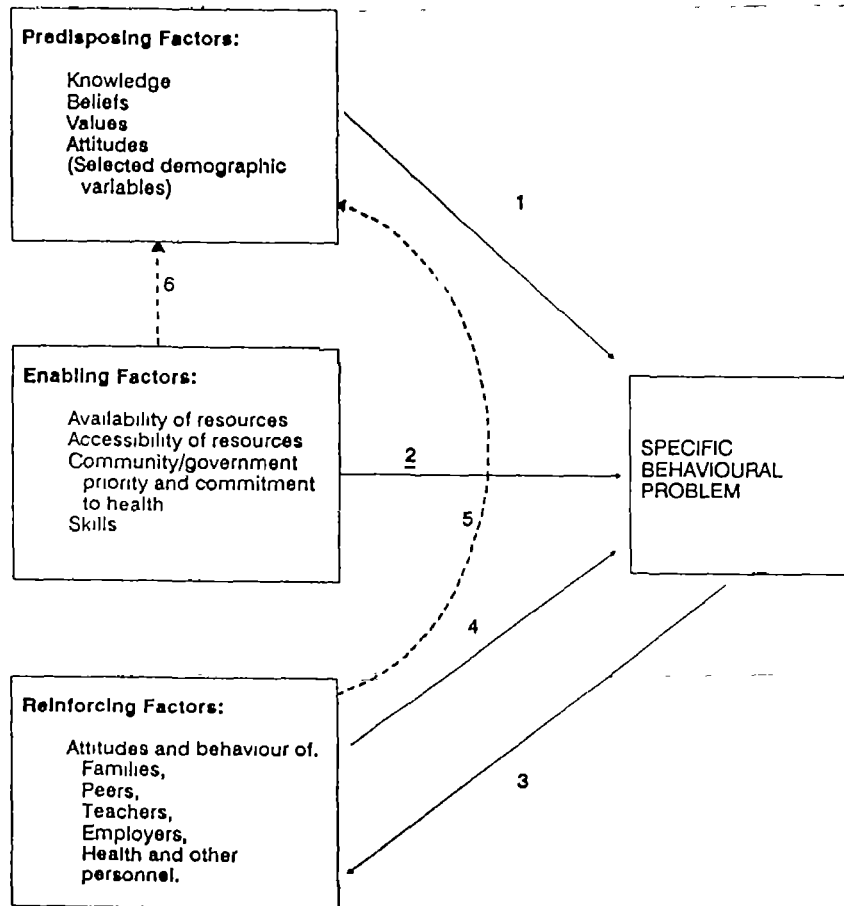


Figure 1: Three categories of factors contributing to health behaviour (Source Boot 1991:24).
 Note: Solid lines imply contributing influence, and dotted lines imply secondary effects.
 Numerals indicate the approximate order in which the actions usually occur.

ii **Target behaviours**

Many health education programmes aim to change complex behaviours. Often too many messages are used or the messages may be too complicated. To introduce, change and maintain these behaviours is too difficult and may result in little impact on peoples practices. "To achieve behaviour change, therefore, communicators must eliminate the majority of the 'ideal behaviours' and select a core of feasible target behaviours as the focus of their communication program" (Graeff 1993:64).

The data of the studies reveal a set of hygiene behaviours and it is the aim of this report to prioritize target behaviours. In order to facilitate the prioritization of these behaviours use will be made of a matrix developed by Green et al. in which behaviours can be classified according to importance and changeability.

According to Green et al. an important behaviour occurs frequently or has a potential impact on the health problem. The changeability is the likelihood that people will be able and willing to change a certain behaviour. Assessing changeability is difficult as people in one area may be more resistant to change their behaviour than in another. Most resistant are those behaviours that are rooted in cultural patterns or life styles. A high changeability is probable when behaviours are still in a developmental stage or have recently been established. In this report changeability will be assessed by considering the predisposing, enabling and reinforcing factors of a certain behaviour.

	Important	Less important
Changeable	High priority for programme focus 1.	Low priority 3.
Less changeable	Priority for innovative programmes 2.	No programme 4.

Figure 2: Matrix of health behaviours (Green et al., 1981:64)

Behaviours that are both important and relatively easy to influence are arranged in quadrant 1. These behaviours will very likely have a high priority for WASEP. The behaviours categorized in quadrant 2 are those that are important but that are more difficult to change. In some cases they will be included in the WASEP plans, as it is an innovative programme, in other cases it will be impossible to influence them. Behaviours in quadrants 3 and 4 are may be important per se but are classified as less important considering the objectives of the WASEP programme.

iii The victim blaming effect and emphasis on positive practices

Green's model is useful as it emphasizes different factors including socio-cultural aspects of the society that influence individual behaviour. Messages in hygiene education are often focused at ideal behaviours for individuals. This is often accompanied by a 'victim blaming effect' which means that the person concerned will feel blamed about his/her behaviour. During hygiene education sessions in the Project area it was noticed that a lot of village people expressed themselves as: "We are dirty people" or "We are farmers" while pointing ashamedly at their dirty looking dresses or while showing their hands.

Innovative hygiene and health education programmes like WASEP should try to avoid this victim blaming effect by motivating villagers to change within their possibilities, both socially as economically. During the development of the health education strategy the enabling and reinforcing factors of people's behaviours should be taken into account. In the field during hygiene education

activities health educators should try to see behaviour of people within their wider context. This will not be easy and in order to facilitate a more positive approach towards the community this report will not only reveal practices that have to be changed but will also highlight practices that are good, practical and beneficial. The emphasis on positive practices will be helpful to:

- give more respect to people's behaviour in their everyday life;
- raise people's awareness that certain practices are good and others should be changed;
- motivate people in the community to maintain or adopt these practices;
- give these behaviours as examples to further promote the improvements of that behaviour.

iv Development of target behaviours and messages

In the development of a hygiene education strategy for WASEP the following phases have been followed:

- ▶ The first phase consisted of data collection on current beliefs, practices and problems and a needs assessment through quantitative and qualitative research activities. The data of these activities is detailed in chapter 2 to 8 of this report, and in an additional document with the KAP-Baseline data.
- ▶ In the second phase all positive and problematic hygiene practices and beliefs were listed and classified according to Green's matrix. At the end of each of the chapters the relevant behaviours are presented. In Chapter 8 the prioritized behaviours are further classified to enable a final selection of target behaviours, considering the three behavioural factors of Green's Precede/Proceed model. Based on this selection a first draft of the behavioural objectives will be developed.
- ▶ In the third phase an action plan will be developed which will include detailed objectives, target groups, messages, methods, a time frame and indicators for monitoring and evaluation. A detailed action plan will be part of a forthcoming report on WASEP's communication strategy.

1.2 METHODOLOGY OF THE STUDY

A study of health related behaviour requires a well-designed methodology. After three rapid assessments in all the three regions of the Project, a special set of research tools were developed for in-depth observation studies. Observation, interviews and participatory exercises were chosen as techniques to increase the reliability of information. To support the qualitative data of the in-depth observation studies with quantitative data, spot checks and pre-defined formats are used in the studies. Finally a KAP survey was designed, based on the first two research phases, and conducted by the social-science team in over 600 households.

1. Rapid assessment studies in 1993-94
2. In-depth household studies carried out by female staff who lived with families in 1994
3. Baseline KAP survey carried out in 1995
4. Microbiological study of hand washing in 1995

1. Rapid water and sanitation assessments:

Four studies were carried out in all the five districts of the Project area, each taking about three weeks' field work. The methodologies included in-depth interviews, observation during household visits and village transect walks. Interview guidelines and village profile formats were developed and used in the field. Informants included doctors, LHVs, CHWs, teachers, male and female social organizers, council members, shopkeepers, local activists and village women. Results of the studies have been reported in four position papers¹

2. The in-depth household studies.

Staying overnight in villages

To enhance the Projects' understanding of hygiene behaviour at household level a separate study was initiated. For this study the collection of reliable data on daily hygiene practices was required. To enable this the two female investigators lived with the families.

Staying overnight in a village is not an easy endeavour in the Northern Areas and Chitral as women are not expected to stay in houses of strangers. With a lot of effort and kind help of the local people, the investigators managed to stay overnight in six villages in Gilgit and Chitral. In the three villages in Baltistan this was only feasible for a few nights and therefore the team stayed until the evening and returned the next morning. Other problems encountered during the observation studies are documented in Annex 1.

A few days before commencing the study the investigators and a male team member visited each village for introduction, and arranged the overnight stay. In the villages the investigators tried to stay, in terms of the socio-economic position, with average families. Preference was given to traditional single room houses without special guest rooms or latrine, to enable the observation of all the daily routines of household members. Staying in the households was physically demanding, in one case the researcher and assistant had to sleep together in a very small bed, in another insect bites caused a lot of annoyance!

1. Water, Sanitation, Hygiene and Health Position Paper 1: Lower Chitral, Position Paper 2: Upper Chitral, Position Paper 3: Baltistan and Position Paper 4: Hunza and Nagar.

Methodology of the in-depth household studies

Nine villages were selected by taking into account the geographical spread, the presence of a piped water supply scheme and the variation of sects. In each village female investigators stayed for five consecutive days with a local female assistant who facilitated the entrance in different households.

In each village ten households were selected during a village walk by considering their socio-economic status, distance to the water source, religious sect and the willingness to co-operate. In total 90 households have been included in the household study. The activities carried out in these households were:

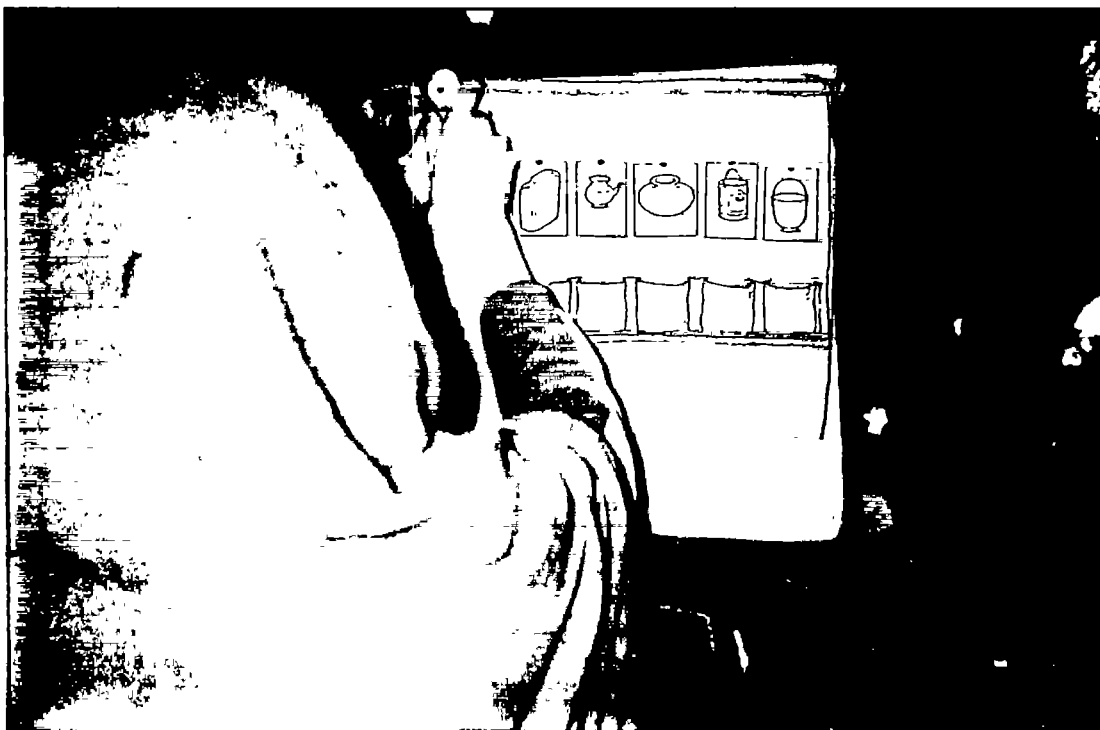
- a participatory activity to assess water consumption (pocket chart);
- spot-check observations;
- structured observations;
- interviews.

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The last two activities were more time-consuming and were only undertaken in four out of the ten households in each village

Participatory exercise (Pocket Chart):

On the first day the women in ten selected households were requested to record the amount of water that they use in a day. To record this a pocket chart exercise was developed which consisted of a cloth bag with small pockets, see Photograph 1. A small token (plastic buttons or maize) could be put in the pockets to register the number of water containers. The pockets were marked with pictures representing the different containers used for water collection in that particular household. The contents of the containers were measured on the first day.



Photograph 1. A woman in Hassanabad nailing the pocket chart on her kitchen wall

Once a day at a fixed time the investigator visited each household to note the number of tokens in each pocket. The pocket chart exercise not only involved the women actively, it also enabled the investigator to enter the households. This facilitated making spot-check observations in all the houses.

Spot-Checks

A spot-check is a structured observation whereby the presence or absence of signs of behaviour is recorded. For example, the presence of covered or uncovered water storage containers. Spot-checks were carried out immediately upon arrival of the observer in each of the households. A pre-defined spot-check format was developed (see Annex 2) and filled during our daily visits to ten households.

Structured observations

Out of the ten households four were chosen for extensive observations of about nine hours. During one period in the morning and one period in the afternoon the investigators sat in the households to observe all activities taking place. The investigators did not disclose the purpose of the visit but said they wanted to know more about the life of village women. During the observation period at least one preparation of a meal was included. Compensation for the meal was given in the form of food essentials to the hosts.

Special structured observation formats (see Annex 3) were developed on which observations regarding water management, handwashing, disposal of faeces, food hygiene, personal and domestic hygiene were noted during the observation period.

Background interviews

During the observation period in four households, the investigator usually sat quietly in a corner of the kitchen. However, for about half an hour a set of was asked in an informal way. For this a short questionnaire was developed (see Annex 4) that focused on water, diarrhoea and health education and on the demographic features of the household. The questions also helped to create a more relaxed atmosphere inside the household.

3. The baseline KAP-survey

A KAP-survey questionnaire was developed after completion of the in-depth observation studies. It consists of a format with 46 questions regarding demographics, water, sanitation and handwashing. The objective of the survey was to:

- Substantiate the outcomes of previous WSHHS Project studies and to answer or verify any deficiencies in the existing data;
- Provide additional data for the final selection of appropriate programme and policy decisions, particularly in the field of hygiene education;
- Develop a baseline instrument that can be used in WASEP;
- Provide crude baseline data on a number of hygiene behaviours and other social indicators.

In each of the three regions, seven villages were selected at random. Also the three villages were included where the in-depth studies were carried to allow triangulation of data from these studies. In each village ten males and ten females were interviewed, bringing the total respondents to 600. The survey was conducted in the summer of 1995. The data of the survey format were entered in the

computer with a data-entry programme of the EPI-INFO programme. Also the results were analyzed using this epidemiological computer programme. The results of the KAP-survey are integrated in the respective chapters of this document. In a separate document the entire KAP-survey results will be presented without narrative.

4. Handwashing study:

To check the validity and appropriateness of promoting the message: "Wash your hands with plenty of water before the meal" the Project investigated the reduction of E-coli bacteria on hands after washing thoroughly with ordinary water. A testing methodology was developed by the microbiologists and the investigators. The test is based on a method that is used by the ICDDR in Bangladesh. In sterile plastic containers 100ml Ringer Solution and a small quantity of Tween 20 is put. People rinse their hands in this solution. After taking the sample back to the laboratory a small quantity of this liquid is filtered with a membrane technique. The membrane with a special media is incubated for 18 hours. After this period the number of E-coli colonies can be counted. The results of the microbiological test and the answers to a small number of questions that were asked were entered in the computer and analyzed with the EPI-INFO computer programme (see Annex 8).

CHAPTER 2

AWARENESS OF TRANSMISSION ROUTES FOR FAECAL AND WATER RELATED DISEASES

2.1 FAECAL AND WATER RELATED DISEASES IN NORTH PAKISTAN

The annual surveys of AKHS field modules indicate that in 1994 diarrhoea and dysentery accounted for 25% to 50% of mortality of children between one and five years. Diarrhoea is usually seen as a seasonal disease with the majority of cases during the hot summer months of May to August, but severe cases are also reported in Autumn and even in Winter. One of the main goals of future interventions in water and sanitation will be the reduction of faecal and water-borne diseases like diarrhoea and parasitic infestations² and the reduction of water-washed diseases such as scabies³.

WASEP aims to help reduce the incidence of diarrhoeal diseases by impeding transmission routes of faecal contamination through promoting hygienic latrines, improving the quality of water through water supplies and by improving hygienic practices.

Three main transmission routes of faecal contamination⁴ are prevalent in diarrhoeal diseases: water to mouth, hands to mouth and food to mouth (see Figure 3). To assess villagers' understanding of these transmission routes local ideas and beliefs were studied with particular emphasis on perceptions about diarrhoea. Over 30 in-depth interviews with women were carried out during the domestic study and several questions in the KAP-survey focused on diarrhoea and disease transmission.

In the interviews and the KAP-survey the questions about contamination routes were posed by using different approaches. One way was to ask respondents to mention all the causes of diarrhoea, and to give their opinion as to whether the disease could be prevented and how. The other way was to ask the question more directly by asking whether the respondent believed that human faeces, childrens' faeces, hands and drinking water could transmit diarrhoea and how these diarrhoeal diseases are spread.

². Exact figures on the incidence of worms are not present as many people do not usually go to health facilities with this complaint. Villagers think that it is very common for children to have worms (93% of the respondents in the KAP-survey mentioned this). During the in-depth interviews water was explicitly mentioned as being one of the causes of worms. Small worms are sometimes visible in water and it is believed that by swallowing them they will infest the stomach.

People are aware that treatment with tablets is effective and 52% of the respondents said they had given their children a treatment within the last two years.

³. *Water-washed* diseases, like skin infections are closely related to hygiene and the *quantity* not *quality* of water. The most common example is scabies which is a common ailment occurring frequently during the colder months of the year when washing is difficult (see Chapter 6.1).

⁴. Human faecal contamination of the environment, water and fingers creates the conditions for the transmission of diarrhoeal disease to a new host. Animal faeces may harbour pathogenic organisms in their faeces, such as *Campylobacter* in chicken faeces and *Cryptosporidium* in cattle dung. A number of studies have noted the presence of animals and these organisms in environments where the incidence of diarrhoea is high (WHO 1992; 3 and 4).

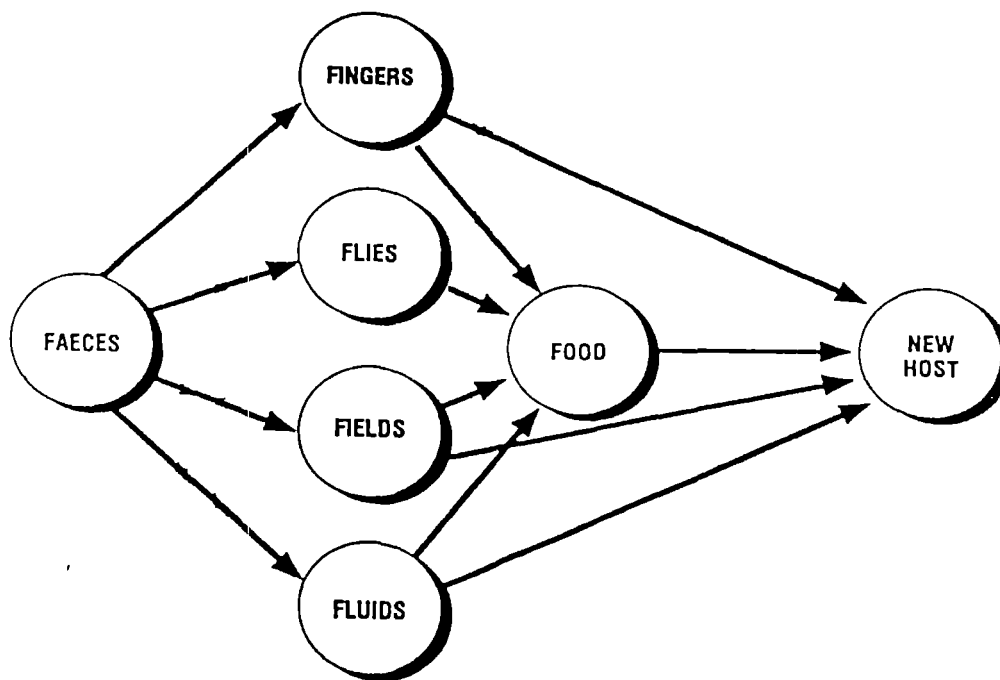


Figure 3: The main faecal-oral transmission routes
(adapted from New Directions for Hygiene and Sanitation Promotion, WHO: 1993)

2.2 VILLAGERS' PERCEPTIONS ABOUT THE CAUSES OF DISEASE

Causes of diarrhoea according to the villagers

In the KAP-survey villagers were asked to mention all the causes of diarrhoea they could think of. 11% of the respondents could not give a single answer, 23% gave one answer, 32% gave two, 22% three and 12% gave four or more answers.

Food as a cause of diarrhoea

Many people are of the opinion that diarrhoea is connected to food. In the KAP-survey 61% of the respondents mentioned one to three causes that were related to food. Particularly unbalanced food is considered an important cause mentioned by nearly 40% of the respondents. In the in-depth interviews village women explained that unbalanced food may include too many spices, too much oil or sugar, or too much meat, particularly beef. The other two causes are food or fruit that is not properly washed (23%) and food that is old (19%). There was little difference between the answers of women and men.

Weather

Very hot weather and changes in the season are believed to be important causes of diarrhoea in the months from May to September. In the KAP-survey 37% of the respondents gave this answer.

KAP-SURVEY RESULT		
What are the causes of diarrhoea?		
(multiple answers)		
n= 600		
	#	%
Unbalanced diet	239	40
Weather	223	37
Dirty water	150	25
Food not properly cooked, unwashed fruit	137	23
Food is old	113	19
Dirty hands	80	13
Children putting dirty things in their mouths	77	13
Open defaecation	55	9
Flies	54	9
Mothers' milk of poor quality	31	5
Bacteria	30	5
Personal hygiene	25	4
Jin/Parri or God's will	24	4
Worms in the stomach	9	2
Teething	5	1
Bottle feeding	4	1
Other	54	9

Table 1: Causes of diarrhoea according to the villagers

Dirty water as a cause of diarrhoea

When asked about the cause of diarrhoea, 25% of the respondents mentioned dirty water as a possible reason. In the in-depth interviews people were asked what makes water dirty. Most answers included causes such as animals crossing channels, open defaecation, children playing etc. Although this indicates that people are aware that human and animal activity can contaminate drinking water they normally do not believe that their own drinking water is effected by this! (See section 2.3 and Chapter 4.2).

Dirty hands

13% of the respondents in the KAP-survey mentioned dirty hands as a possible cause of diarrhoea.

Mothers' milk and bottle feeding

In the in-depth interviews many women expressed beliefs about mothers' milk as a possible cause of diarrhoea. Mothers who carry heavy loads or work in the sun get weak and this effects their lactation resulting in diarrhoea of their child. Talking openly about breast feeding is a sensitive subject but nevertheless in the KAP-survey 5% of the respondents (including men) mentioned mothers' milk as a cause. Bottle feeding may have a high contamination risk because bottles are not sterilized, the teat is usually uncovered and can get dirty and because of the unhygienic quality of water that is used to prepare the milk. Only 4 respondents (0.7%) gave this as a possible cause.

Putting dirty things in the mouth, sanitation, flies, hygiene and bacteria

Several other causes were mentioned in the KAP-survey, all scoring fairly low between 12% and 5%. Examples are children putting dirty things in their mouth (12%), open defaecation (9%), flies (9%) personal hygiene (5%) and bacteria (5%).

Causes outside the direct control of humans

Although in the KAP-survey only 4% respondents mention Jin or Parri, spirits or evil eye as a cause of diarrhoea, the results from informal interviews show that quite a lot of people believe that it is the will of God or supernatural powers that effect the outbreak of disease. Many elder Balti-women for example believe diarrhoea is an illness occurring by the will of God. Interestingly this opinion was usually not shared by the younger mothers of the same household.

2.3 VILLAGERS' AWARENESS OF TRANSMISSION ROUTES

Besides asking the villagers about the causes of diarrhoea, more explicit questions were posed about the transmission routes from a bio-medical perspective. Villagers were asked whether they believed that adult faeces, childrens faeces, water or hands can spread diarrhoea. Also villagers were asked about their perception of bacteria.

Awareness of human faeces as a cause of diarrhoea

402 respondents (67%) believed that diarrhoea could be spread through human faeces. Nearly one fifth of the respondents (20%) said that this was not possible. One respondent added in English: 'no, human faeces are not infectious'. The other 15% could not answer the question. This high score seems to indicate that the respondents' awareness of the health hazard of faeces is very high. But if we look at the response of how faeces spread disease, interestingly a large majority (65%) answered that wind, dust or smell spreads the disease. This means that it is believed that the most important contamination route is through the air! This is a classic example of how different the perception of outsiders and insiders can be. Another surprising result is flies, as about 36% of the respondents believe these may spread disease. 28% of the people mentioned that faeces can spread disease by contact from one person to another and 16% mentioned water as a possible contamination route. Other transmission routes scored much lower (see Table 2).

KAP-SURVEY RESULT		
How do you think that human faeces can spread disease?		
(Multiple answers, n = 402)		
	#	%
Dust, wind or smell	262	65
Flies	146	36
From one person to another (hands, feet, mouth?)	113	28
Water	66	16
Mouth or feet of animals	18	4
From fields	20	5
Other (...)	24	6
Don't know	19	5

Table 2: Villagers ideas about how human faeces can spread diarrhoea?

Villagers were also asked if they believed children's faeces can cause diarrhoea, and at what age the faeces of children become harmful. The KAP-survey indicates that 34% of the respondents are aware that faeces of a young child (3 months old) are harmful i.e. they can spread diarrhoea. The other 66% of the respondents were not sure about this risk. These respondents were asked at what age they believe children's faeces become harmful. Many people could not answer this question particularly in Baltistan (89% no answer). If we exclude the data from people who couldn't answer the question the data of Gilgit and Chitral indicates that at least 80% of the people believe faeces become harmful only when a child is older than one year, and several people mentioned ages of three to five years!

Awareness of diarrhoea through drinking water

Dirty drinking water was mentioned by 25% of the people as a possible cause for diarrhoea. By dirty water most of the people mean water with visible particles or worms in it. The respondents were therefore asked in the KAP-survey whether their normal drinking water can spread diarrhoea. More than 50% of the respondents answered with a firm NO!

This figure was higher in Baltistan where 70% of the respondents believe their drinking water cannot cause diarrhoea. Whether people are using tap water or traditional sources, did not influence this outcome.

These figures indicate that less than half of the people make a connection between their drinking water and the occurrence of a disease like diarrhoea. Although awareness is slightly higher in Chitral and Gilgit, generally the understanding that drinking water can be a cause of disease is inadequate.

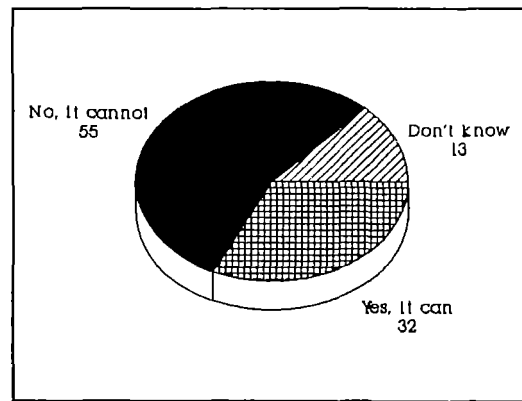


Figure 4: Awareness of water as a possible cause of diarrhoea .

Awareness of the spread of diarrhoea by hands

In the KAP-survey, questions were included about the awareness of the respondents as to whether 'apparently clean-looking hands' could spread diarrhoea. Whilst posing the question the investigator showed his or her hands to the interviewee. Interestingly more than 50% of the people answered that they could imagine hands spreading such a disease. 31% said this was not possible, while the other 15% couldn't answer the question.

Those who agreed with the question (n = 321) were asked how they thought diarrhoea would spread from hands to people. Multiple answers were given. 9% of the respondents could not give an answer to the question. 25% of the respondents gave an answer that related to unspecified dust or dirt that one can see on hands. More than half (54%) mentioned that some sort of dirt 'we cannot see with the naked eye' was the cause of spreading disease. Another 33% of the people (mostly men) explicitly mentioned bacteria as the cause of transmitting the disease. It therefore seems that about half of the villagers have quite a good awareness about hands as a transmission route.

Awareness about food as a cause of diarrhoea

Although 61% of the respondents give one, two or three causes of diarrhoea that were related to food, most of them think that diarrhoea is caused by food that does not suit the stomach. A lower percentage of people (23%) answered that diarrhoea can be caused by not washing vegetables and fruit. Only 19% of the interviewees mentioned old food as a possible cause. This indicates that some awareness exists about food hygiene as one of the transmission routes of diarrhoea.

Local understanding of bacteria or germs

A basic problem that needs to be addressed is that people have little understanding of pathogens. As long as people have no understanding of germs, they will not understand why certain practices need to be changed. During the KAP-survey people were asked what they thought was a gerasim, a bacteria or germ in Urdu. People could give multiple answers. More than a quarter of the people could not answer the question.

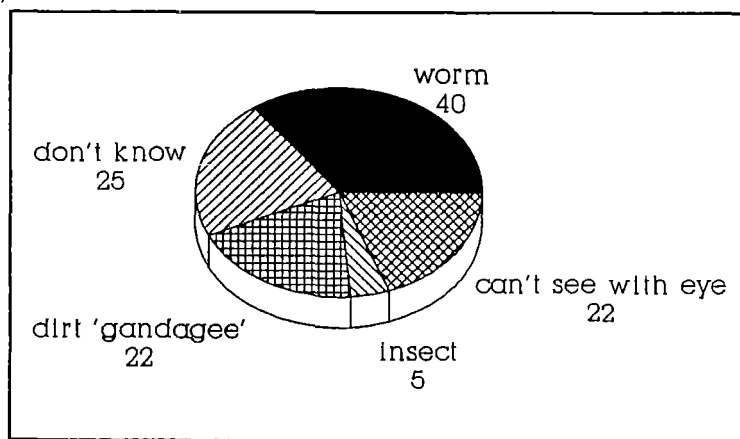


Figure 5: What is a gerasim?

Of those who did give an answer the majority (40%) believe bacteria are very small worms. A smaller group believed it was another type of insect (5%). Many people added an undefined type of dirt, gandagee in Urdu. 22% of the respondents were able to explain that a gerasim is an organism that 'we cannot see with the naked eye', many of them could add that special glasses or a microscope would be required to see it.

2.4 PREVENTION AND TREATMENT OF DIARRHOEA

Prevention

In the KAP-survey it was investigated to which extent people in the area are aware of preventability of diarrhoea. Exactly one third of the people did not give an answer to the question. Of the remaining 400 respondents 21% said that diarrhoea could not be prevented, thus indicating that they could not influence this disease. The majority (79%) said that diarrhoea can be prevented. However the investigators doubt the significance of this answer. During the interviews many respondents were confused about the meaning of 'prevention'. This is reflected in the high number of 'don't know' answers and in the initial response of: 'yes, by medicines' or 'yes, we give ORS'. The question often had to be explained again in other words which might have influenced the answer without truly understanding the difference between prevention and treatment.

The 315 people who answered that diarrhoea could be prevented were asked 'how' they think this is possible. On average a third of these respondents (33%) could give one measure to prevent diarrhoea, another third of the respondents mentioned two measures and the others three or more. In Table 3 the different answers are presented. Again food related measures are mentioned frequently although washing fruit scores lower than expected. Interestingly also personal hygiene is mentioned fairly often.

KAP-survey result		
How can you avoid or prevent diarrhoea?		
(multiple answers)		
n = 315		
	#	%
Protect food	143	45
Personal hygiene	143	45
Protect water	88	28
Eat less food	61	18
Better sanitation	58	18
Wash hands	54	17
Wash fruit	46	15

Table 3: Views on how diarrhoea can be avoided or prevented

Treatment

A mild diarrhoea that lasts for a day or two is considered as a part of normal life which mothers tend not to worry about. If the diarrhoea remains for a longer time, is very frequent or turns into dysentery, treatment may be given. In the first instance a normal diarrhoea may be treated with home remedies, these may include local herbs and special food. In the areas where AKHS is operating women mentioned giving ORS (oral rehydration solution) or WSS (wheat salt solution) to children with diarrhoea. Some mothers stop giving any food or liquid to young children with diarrhoea, although this practice is becoming less common nowadays.

Alongside the home treatments many villagers will seek treatment in the form of a small prayer (dua and tayiz) from traditional healers. They may also purchase medicines from a local shop, dispensary or Health Centre. They may also start treating with medicines (usually strong stomach ailment treatments such as antibiotics or Flagyl) that were left over from a previous prescription. In areas with AKHS facilities mothers may take their children to Community Health Workers or to the Health Centre. In other areas sick children may be taken by their father or another male family member to see a doctor.

2.5 ANALYSIS OF THE AWARENESS OF GERMS AND TRANSMISSION ROUTES

There is a some awareness about germs and the different transmission routes of diarrhoea. According to local people dirt, is spread through the air (wind, dust or smell), food and to a lesser extent through dirty water and hands which can cause diarrhoea. It is also believed that the hot weather or changes in weather affect the body and can cause diarrhoea.

From a bio-medical point of view most diarrhoeal diseases are caused through faeces (from humans and animals) and we therefore focus on the faecal-oral transmission routes. The main transmission routes are through water, hands and food which to some extent corresponds with the villagers explanation. When explicitly asked, villagers put most emphasis on food and hands as the main transmission route while drinking water as a cause of diarrhoea is given less importance.

	Important (for WASEP)	Less Important (for WASEP)
Feasible⁵ awareness factors for promoting, strengthening or encouraging	<ul style="list-style-type: none"> ● Some awareness about germs in water and on hands ● Some awareness that diarrhoea can be spread through faeces but people are less aware about the actual transmission routes ● Perception that children faeces are harmless ● Some awareness is present that hands can spread diarrhoea ● Some awareness is present that food can transmit diarrhoea and that it can be prevented by protecting the food ● Perception that having worms is normal for children 	<ul style="list-style-type: none"> ● Some awareness that one should give liquid to a child that has diarrhoea⁶ ● Some awareness that diarrhoea can be prevented by personal hygiene ● Increasing awareness about the use of ORS and WSS when a child has diarrhoea⁶ ● Little awareness that bottle feeding and pacifier are possible causes of diarrhoea⁶
More difficult awareness factors for promoting, strengthening or encouraging	<ul style="list-style-type: none"> ● People's concept about germs often refers to worms or other visible organisms ● Perception that human faeces are spread by the wind, smell or dust ● There is little awareness about water contaminated by invisible pathogens ● Little awareness that normal drinking water can transmit diarrhoea and that it can be prevented by protecting drinking water ● Little awareness that open defaecation can spread diarrhoea 	<ul style="list-style-type: none"> ● Belief that the will of God or super-natural powers can explain diarrhoea ● Strong perception that the hot weather or a change in the weather can cause diarrhoea ● Perception that mothers' milk can cause diarrhoea

⁵. Green's matrix has been designed for the categorization of hygiene behaviours. In this matrix instead of behaviour, awareness and perceptions are classified. Therefore the titles of Changeable and Less Changeable have been changed into 'feasible' and 'more difficult' awareness factors.

⁶. Although this behaviour is categorized as less important for the WASEP it is an important target behaviour that is promoted by AKHS.

CHAPTER 3 HYGIENE PRACTICES IN THE HOUSEHOLD

3.1 HOUSING AND DOMESTIC HYGIENE

Rural built environment

The traditional housing pattern throughout the region consists of houses with a large room used for cooking, eating, sleeping and storage. People sleep on the sides of this traditional house on slightly elevated platforms. In the middle of the room people can sit on a wooden floor with rugs. Tables and chairs are never used inside houses. Cooking takes place on open wood fires or on improved cooking stoves called *chula*, usually located in the centre of the room. Smoke goes through a hole in the roof or through a chimney if the household is using a *chula*. Nowadays villagers have started attaching rooms to the traditional house for sleeping. Some of these 'bungalows' or 'guest rooms' have attached bathrooms and/or pour-flush latrines. The traditional house, however, remains the centre of activities and thus the focus of the observations was on this part of the house.

Around the house is a courtyard with stables for cattle, with an open kitchen for use during the summer, and space for doing household chores such as washing, drying vegetables etc. The size of the courtyard and the space between houses depends on the availability of land. In most villages in Chitral, Ghizer and parts of Gilgit the courtyards are spacious and have a wall around them. In some parts of Gilgit and Baltistan the villages are more congested, the houses are attached and often double storied.



Drawing 1: Cooking place in a common household in North Pakistan

Bedding inside households

In most houses people sleep very close together on the elevated sides of the house or in the guest rooms, usually on cotton or felt mattresses and under quilts. Sheets are sometimes used to lie on but not for covering. In Chitrali villages and to a lesser extent in Gilgit it was observed that people air this bedding in the daytime. After sunrise in the morning the women spread all quilts, blankets and mattresses on a wall or a drying line in the sun. In particular the beds of infants were put in the sun daily, as the children urinate in the bedding during the night. Instead of washing them, mothers prefer to dry these in sun.

In Baltistan it is not a custom to dry the bedding in the sun. In the villages in Baltistan beds were usually found to be spread out in the rooms with children playing on them with dirty feet and hands. It was observed that bedding was dirty looking and full of dust. In the village Shigri Bala for example the investigator suffered a lot from insect bites that she got during her night stay with the family.

In other places the dried bedding is usually folded and kept in a corner. In Gilgit there were different practices, in some villages women put beds outside whenever it is sunny, but in others they always keep them inside the house.

Sweeping of floors and compounds

It is a common practice that in the morning the women sweep the living area of the house, the porch and the courtyard. As women usually sweep only once a day dirt accumulates in the living area through mud, earth and dust from shoes, remains of firewood, playing children and food scraps. The rugs in the living area were observed to be full of mud and dust. In households where elders chew *naswar*, the local tobacco, they very often spit saliva or sputum in the corners of the living area. The practice of sweeping has been emphasized by AKHS as part of their training to CHWs and TBAs to promote more hygiene in and around the house.

Wearing shoes inside the house and near the cooking place

Only after the in-depth studies in Chitral investigators realized that dirty shoes inside the house might cause a health problem as the same shoes are worn in the cattle shed or near defaecation sites. Likewise walking barefoot outside may be harmful. During the in-depth studies in Gilgit and Baltistan observation on footwear was included in the spot-checks. It must be mentioned that the investigators could not always enter the kitchen during spot-checks and a relatively small number of observations were possible in Gilgit and Baltistan (n= 62 and 24 respectively). The data indicates that about 45% of household members were observed wearing shoes near the cooking place.

Shoes usually have dirt and mud on the bottom. Spot-check data indicates that in Chitral, Gilgit and Baltistan respectively 30%, 55% and 62% of households had visible signs of dirt on the floor, partly caused by shoes. The main health risk involved in this dirt is that small children are eating bread or put other items in their mouth that may have been lying on the floor. If the floor is dirty contamination of utensils and food is also possible.

Animal faeces in the yard and on the floor of the house

In the past it was a tradition to keep cattle inside or very near to the house. Nowadays it is more common to keep animals in sheds at a distance from the house. In congested villages and in Baltistan animals usually live on the ground floor while the people live on the floor above them. In all areas animals can wander in the courtyards and goats occasionally manage to come into the houses. Chickens are usually able to enter the house and during hatching they are commonly kept in a corner of the room. The spot-checks indicate that in 28% of the courtyards in Chitral and 81% of the

courtyards in Gilgit, animal faeces were present. Animals roam in the fields where they were found to be eating human excreta. In Baltistan and Gilgit the chickens and sometimes the cows were found to be entering the lower compartment of the traditional compost latrines. By coming into contact with (fresh) human excreta the animals may transport pathogens from the fields and latrines back towards the households.

Particularly in Chitral human faeces were also observed in the courtyard. This problem will be discussed in detail in the Chapter on sanitation.

SPOT-CHECK RESULTS ⁷	Chitral		Gilgit		Baltistan	
	# spot checks n = 117	%	# spot checks n = 88	%	# spot checks n = 96	%
1. Presence of animals inside the house						
- chicken	51	44%	22	25%	10	10%
- goats	7	5%	4	5%	4	4%
- cat/dog	17	15%	9	10%	90	9%
2. Presence of chicken faeces on the floor of the house	44	38%	19	22%	10	10%
3. Presence of cattle dung in the courtyard	33	28%	71	81%	40	41%
4. Presence of human faeces in the yard or next to the house	68	58%	3	3%	7	7%
5. Presence of human faeces on the floor of the house	3	2%	1	1%	--	--

Table 4: Animal and human faeces near the house

3.2 FOOD HYGIENE

Dirty food utensils

Another possible source of disease transmission is contaminated utensils used for eating and drinking. During observations it was found that people may keep dirty plates and pans until the next meal but not longer than 6 hours after the meal. Observation of unwashed utensils was included in the spot-check observation list. The figures below indicate that in 50% to 75% of the households no unwashed utensils were present during the visits of the investigators. The slight variation between Chitral and the other regions may be explained by the fact that it is more common for women in Gilgit and Baltistan to work in the fields. Because of their heavy workload it is difficult to wash utensils immediately after using them. In Chitral purdah is more strict and as women work less in the fields it allows them to perform these household chores immediately.

Covering and properly storing food inside the house

A similar regional variation arises if we look at food covering or storage. Again the situation in Chitral appears to be most hygienic as nearly 90% of the household food such as chapaties, curry,

⁷. In the three regions respectively 117, 88 and 96 spot-checks could be made. The first column gives the number of times a situation was observed per region. The second column calculates the observations as a percentage of the spot-checks made in that region.

rice and dairy products is covered properly. In Chitral women not only cover food but also prefer to keep it in a relatively high place where it is out of the reach of children or animals. It is a custom in Chitral for children to ask their mothers if they want to eat some bread.

In one out of the five spot-checks in Gilgit food was left uncovered which indicates that some awareness is present. In Baltistan food was covered in less than half of the cases which implies that little attention is given to this. For example bread is usually found to be lying uncovered near the cooking area. Animals like chickens, goats and cats were observed to be smelling and licking food near the cooking places.

In poorer households cooking two meals at a time is a way of saving firewood. Storage of food is common as many households use cooked vegetables, meat or rice from lunch also for dinner, or from dinner for breakfast. In particular during the summer the food attracts a lot of flies and might be a potential health risk as it goes off quickly due to the high temperatures. There is some awareness about the problems caused by food that is not properly stored. In the KAP-survey 19% of the respondents specifically mentioned old food as a possible cause of diarrhoea.

SPOT-CHECK RESULT ⁸	Chitral		Gilgit		Baltistan	
	# spot checks n = 117	%	# spot checks n = 88	%	# spot checks n = 96	%
1. Dirty plates and pans		n = 115		n = 88		n = 81
- not present	86	75%	45	51%	48	59%
- present	29	25%	43	49%	33	41%
- not possible to observe	2				15	
2. Is food covered properly?		n = 100		n = 74		n = 59
- yes, food is covered	71	71%	57	77%	25	42%
- no, food is not covered	29	29%	17	23%	34	58%
- not possible to observe	17		14		37	

Table 5: Spot-checks on food hygiene

Washing raw vegetables and fruits

The need of washing vegetables and fruits becomes clear as in Gilgit and Baltistan fresh human excreta is used as manure for the vegetables. Whereas in the Chitral and Ghizer area people defaecate in open places which can indirectly contaminate the fruit and vegetables. A positive observation made was that vegetables are usually washed before cooking or eating as salad. But despite washing salad, earth was found on leaves or on the bottom of the plate (see Photograph 2). Also it was noticed that women and children bring vegetables from the field and eat them on the way without washing.

Fruit is often eaten directly from trees. The health risk of this practice may not be as high as for people who eat the fruit that falls on the ground. Also unwashed fruit is offered to elders and children who usually accept the gift. During other observations a mother or adolescents mashed unwashed fruit with their fingers and put it in the mouth of infants.

⁸. During the study it was not always possible to carry out spot-checks on food hygiene. In Baltistan particularly it was difficult to enter the kitchen. The number of impossible observations are mentioned in the Table. Percentages have been calculated on the total number of observations that were possible per situation. Therefore the 'n' is slightly different in each of the cases.

Fruit for guests is almost always washed and served on plates, on the other hand people rarely bother to wash fruit before eating it themselves. This seems to indicate that people have some awareness about the need to wash fruit but that they do not practise it themselves. In the KAP-survey 23% of the people mentioned unwashed fruit as a possible cause of diarrhoea (see Chapter 2).



Photograph 2: A woman from Hunza washing fresh vegetables



Photograph 3 A girl preparing chapatties

3.3 ANALYSIS OF DOMESTIC HYGIENE

In this chapter different hygiene practices in and around the household are described. The identified positive and problematic behaviours are categorized in the matrix below.

	Important (for WASEP)	Less important (for WASEP)
Changeable	<ul style="list-style-type: none"> • Vegetables are usually washed before eating but often not thoroughly • Fruit is normally washed for guests but not for themselves • Food is not covered and stored properly • Food is not always reheated sufficiently • Dirty shoes are worn inside the house near the cooking place 	<ul style="list-style-type: none"> • Bedding is dried and sometimes aired in the sun • Floors are swept in the morning but more frequent sweeping can be encouraged
Less Changeable	<ul style="list-style-type: none"> • Children drop food on the ground and put it back into their mouth • Animals are sometimes present nearby the cooking place 	<ul style="list-style-type: none"> • Children urinating in beds • People spit saliva, sputum or naswar inside the house • Utensils are washed directly after the meal or within a short time afterwards • People walk barefoot outside • Animals are kept in the courtyard

CHAPTER 4 DOMESTIC WATER MANAGEMENT

4.1 WATER SOURCE SELECTION AND CONCEPTS OF WATER QUALITY

Villagers in the Northern Areas and Chitral have access to a number of water sources for their domestic water needs. Depending on the situation of the village these may include small streams (nullah), small channels, springs, rivers, water pits and snow melt. A description of the present sources used for water collection is given in Annex 7.

Source selection

The choice of water from a particular source depends on a set of criteria that may vary, depending on the purpose and available alternatives. Water for the cattle, for example, will be selected by looking for the nearest source, with plenty of water and easy access for animals. Another example is washing vegetables, which women prefer to do in running and clear water.

Women make a reasoned selection of the source they will use for drinking water. After analyzing the results from the field studies, a list with criteria in a descending order of importance has been prepared. The results from the KAP-survey largely support this analysis (see Table 6). Given a particular village context we believe that women will generally use the following criteria for selecting a good drinking water source during the summer time⁹:

- water should have a good taste and no smell;
- water should be clean¹⁰ i.e. not contain visible particles or dirt such as small leaves, insects, visible signs of irrigation or bubbles from soap);
- water should be nearby;
- water should be cold (a strong concept particularly in Chitral and Gilgit);
- water should be fresh or running;
- water should be clear (in the sense of transparent, without turbidity).

The following two cases are examples to illustrate how the above mentioned criteria may affect domestic water management. In Seenlasht, a village near Chitral town, a piped water supply is functioning properly. We talked with a woman from the village about water. She pointed to the very turbid Lotkoh river below the village and said:

" I have to go far to fetch drinking water, a trip to the river takes me at least 20 minutes. I need cold water from the river for drinking, the water from the pipes is too warm, we don't like it".

Thorga Bala, a village in Baltistan, also has a piped water supply providing cold water. In the early mornings, however, women usually take drinking water from channels because they say it is more fresh than water coming from the storage tank.

⁹. In the winter months usually fewer water sources are available and people may not have any choice than to take water from the only source available. Criteria for choosing a water source will be different in winter, as cold water is no longer an issue and many sources are no longer turbid.

¹⁰. Most villagers do not have much awareness about contaminated water. Thus for the people 'clean' water, in the bacteriological sense, is not an issue.

Many other examples can be given where women prefer to collect water from a particular source. Beside the above mentioned criteria for good drinking water, there are practical constraints such as accessibility and time availability that influence source selection. For example if women have plenty of time they may go to a far away spring to fetch cold and clear water, whereas on a busy day the cold but turbid river water may be considered as sufficient.

KAP-SURVEY RESULT		
WHY DO YOU PREFER TO TAKE WATER FROM THE SOURCE YOU USE?		
(n = 600)		
	#	%
Clean (no visible particles)	314	52
No other source available	199	33
Nearby and easy	157	26
Cold	146	26
Running	40	7
No turbidity	23	4

Table 6: Why people prefer water from their usual source (multiple answers)?

Local concepts of water quality

Many people prefer to collect water in the early morning or late evening as water is colder and considered to be cleaner i.e. before water has been used for irrigation or clothes washing. Villagers will, for example, always try to fill traditional water pits early in the morning. Figure 6 on page 25 gives the data of the KAP-survey on the water collection timings.

It is a religious belief that running water will become clean when it flows with high volume and velocity. This belief is related to the local concept that running water recites 'Kalma' (Koranic verses) and that after every seven steps the water will become pure.

The confusion between clean and clear water

During its work in the field the WSHHSP team has come across a confusing conceptual unclarity about water. In English one can make a distinction between clean water (referring to un-contaminated water) and 'clear' water which is transparent and non-turbid. In Urdu however the word saf translates both as clean and clear. During discussions with villagers this leads to confusion and misinterpretations. For example in a village meeting about clean water the staff will use it in the sense of 'uncontaminated' water while villagers usually perceive this as meaning 'clear' water, because they do not have a clear understanding of germs in water. Messages about clean, uncontaminated water, are understood as implying 'clear' water. Similarly if villagers talk about dirty water (ganda pani) they usually mean the visible quality of water and not bacteriological contamination, as is shown in the table below.

KAP-SURVEY RESULT WHAT IS DIRTY DRINKING WATER? (multiple answers, n = 600)		
	#	%
The water is turbid	364	61
The colour changed after irrigation/clothes washing	350	58
Particles are visible (pieces of grass, insects)	220	37
Worms are visible	73	12
Water is stagnant	49	8
The taste is not good	34	6
Bacteria are present	30	5
Other (dead animal, dirty cloth in the channel etc.)	52	9

Table 7: What do villagers consider dirty drinking water?

4.2 WATER COLLECTION

Transportation, a female task

Water collection is almost exclusively the task of women and girls. From a young age onwards daughters are expected to help their mother and sisters with carrying water. A woman pointed at her daughter and said that she was about five years old when she started carrying small containers.

In most of the area it is exceptional that men will collect water. Younger men sometimes transport water if women are ill, water is needed after dark, sources are far and inaccessible or usually in the winter. In some villages in Lower Chitral it was observed that men collected the water and it was explained that due to purdah the women were not allowed to leave the compound.

Timing of water collection

As stated in the previous section water is often collected in the early morning or late evening. If we look at the data from villagers who do not have tap water 31% of the respondents prefer the morning while another 28% use both the early morning and evening, making a total of 59%.

The level of E-coli in the water during those times of the day is usually lower than at other times of the day. The decision of women to collect water in the early morning or late evening makes sense from a microbiological point of view.

The other 41% of the respondents do not avoid taking water during the day and fetch water whenever it is needed. Many of these respondents take water from traditional water pits. Microbiological samples taken from these pits show that this is a highly contaminated water source.

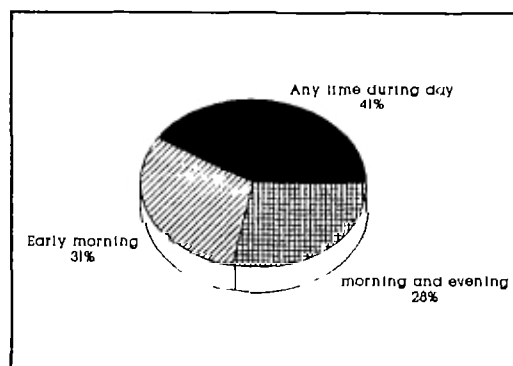


Figure 6: At what time of the day is water collected?

People also collect water throughout the day from springs. Samples taken at the source indicate that this water is usually not contaminated. The bacteriological quality of tap water varies considerably but generally the data indicates that this water is not free from contamination.

The physical burden of water collection

The task of collecting water in the summer is usually fairly easy. In many villages channels bring water close to the houses and girls and women can be seen collecting water in small containers. These include buckets, cooking pans, coolers, recycled Dalda tin cans and lotas with a capacity ranging from two to twelve litres. The KAP-survey indicates that in the summer 66% of the households collect drinking water at a distance of less than 5 minutes from the home.

When sources are at some distance women usually accompany each other and talk about the events of the day. For transportation they use large containers such as round aluminium pots, pans and big buckets, square Dalda tin cans and jerrycans ranging between 10 to 23 litres. These containers are usually rinsed out at the source. Sometimes they use a piece of cloth or some mud to rub the inside of the container. They put the container under the flow or fill it with a small metal bowl.

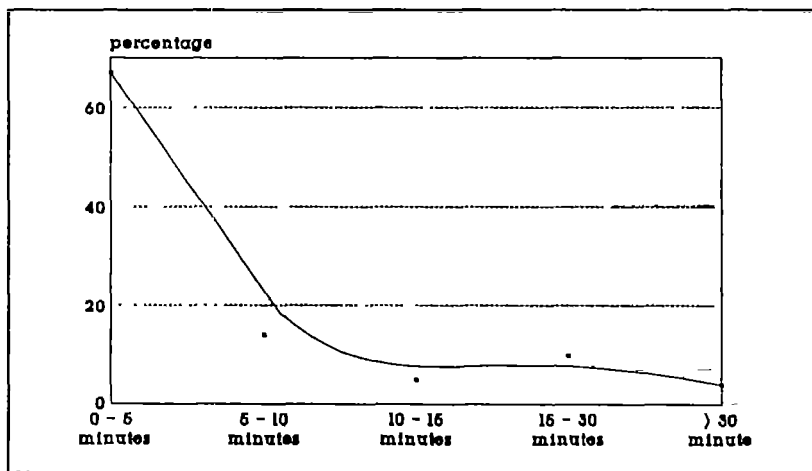
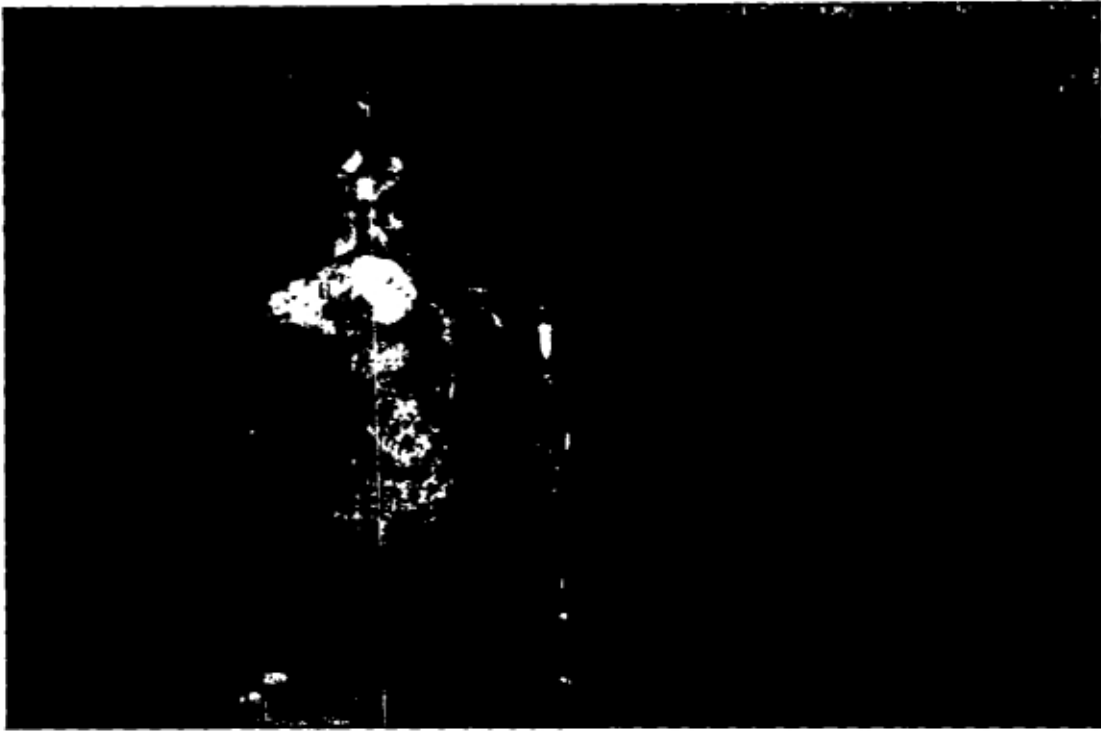


Figure 7: Average time spent on collecting water per round-trip in summer

In the winter months the distance to water sources is usually further. There are large variations between and within villages but for most households a round-trip will take between 10 and 15 minutes. There are, however, a number of villages particularly in Baltistan with extreme problems where women have to walk over slippery paths to far-away rivers or springs. The collection time in these isolated cases has been reported to be around one hour.

Not surprisingly women often expressed pain in their necks, backs and shoulders due to carrying the heavy loads of water. In Yarkhun several women had got the idea to reduce the burden of water collection by carrying a shoulder pole. The pole was carried on the shoulders of two women and transported three buckets of water at the time. In this way there was less discomfort to carry the same amount of water. In the winter months in Baltistan men sometimes transport water in jerrycans or big drums on their donkeys.



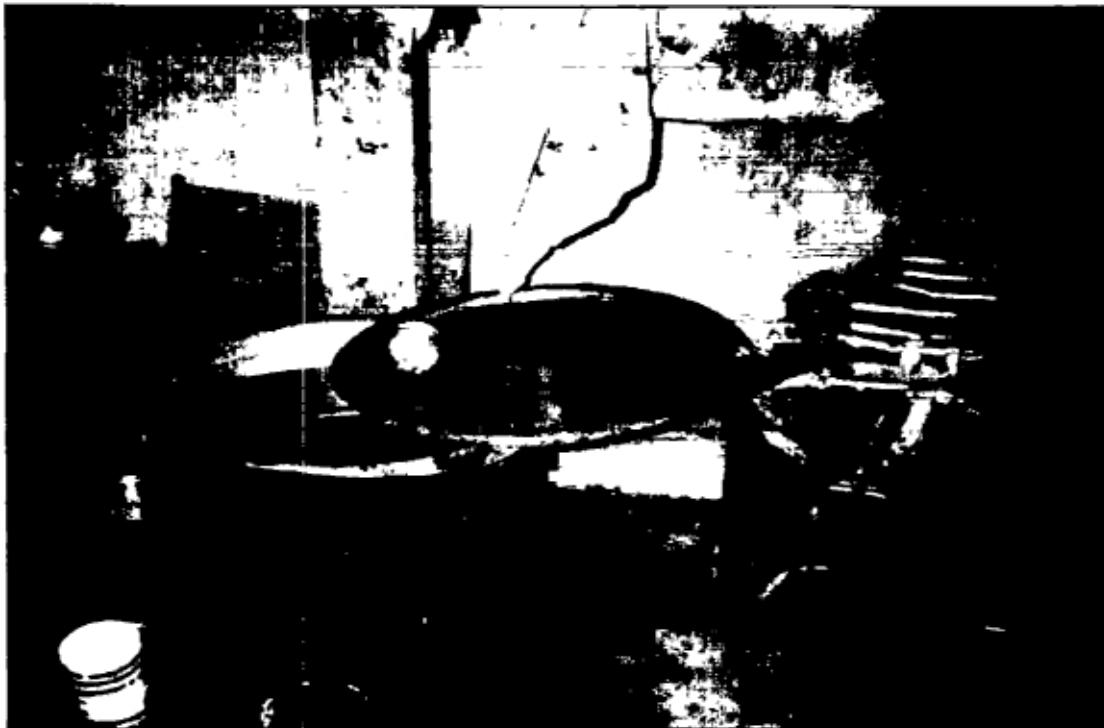
Photograph 4: Women in Yakhdeez (Upper Chitral) taking water with a lota from a protected spring



Photograph 5:
A woman in Yakhdeez transports water in a lota and a bucket



Photograph 6: Women in Madaklasht (Lower Chitral) carrying water on their heads



Photograph 7: A water storage container and jerrycans for transport in a kitchen in Shigri (Baltistan)

Carrying containers and contamination of water

The way women carry containers varies from place to place. In Chitral the bigger pots are carried on the head (see Photograph 6) and buckets on the shoulders with two hands supporting them. Smaller containers are carried in the hands (see Photograph 5). In Baltistan and Gilgit transporting containers on the head is not common. In Baltistan women often carry the heavy 5 gallon jerrycans on their backs, supported by a rope or with the help of a basket. In Gilgit women usually carry containers on the shoulders or in their hands.

During transportation containers are often left uncovered. It was observed several times that scarves (*chadder*) hang in the water. Women who carry containers on their shoulders touch the water with their hands. In these ways water may get contaminated before it reaches the house.



Drawing 2: Women in Yarkhun carrying water with a pole

4.3 DRINKING WATER INSIDE THE HOUSE

Storage of water

It is very common for people to store water in the house. In every kitchen one will find at least a small container for storage. It depends on the distance to the water source and the season as to how much and for how long the water is stored. People will store more water when a source is far, and they will store more water in winter when there is a shortage. Both the spot-checks as well as the KAP-survey show that in 75% of the households water is stored. The data indicate no difference in this practice between households without access to a water supply and those with a private tap stand.

Water storage containers and microbiological sampling results

When water is stored for more than 5 to 6 hours it is usually kept in a special container that is larger than most of the containers used for fetching water. The storage containers include a typical big round steel pot (*mongi*), and big buckets, pans, plastic drums, jerrycans, barrels and water coolers. Microbiological sampling of water in these storage containers shows high contamination, particularly in summer.

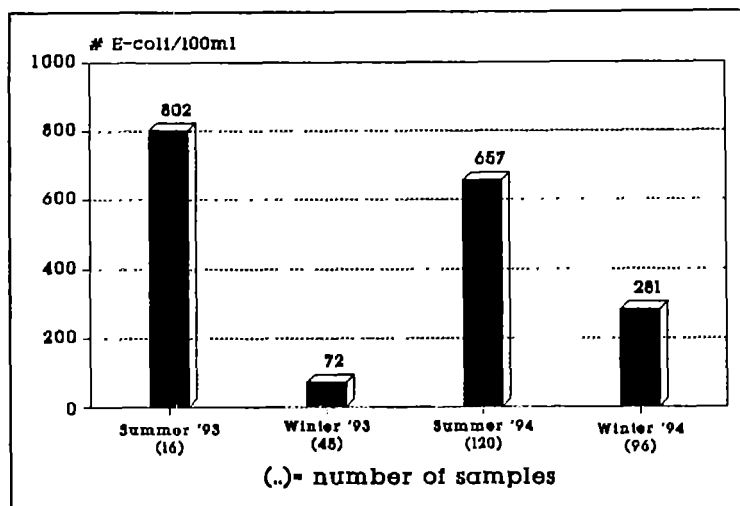


Figure 8: Contamination levels of the water from storage containers inside the household

Methods to keep and make drinking water clean

In the KAP-survey a question was included about the methods people know for keeping and making water clean. The question was first posed as a knowledge question (i.e. what methods do you know?) and secondly as a practice question (i.e. what methods do you practise?).

Methods to keep the water clean

Taking water from the storage vessel

Household members have three ways of taking water from the storage vessel. The most common and unsafe way is to use a glass or container without a handle so that fingers will touch the water. A second and safer way is to use a ladle, jug or cup with a handle and a third way is pouring water, a practice that is used with small or nearly empty containers.

In a third of 251 spot-checks a ladle (chai ki dorree) or special cup was present (see Photograph 7). Interestingly a higher percentage was noted in Baltistan. The presence of cups or ladles may indicate that a safe method is used, but during observations it was found that the cups are not placed in a clean place, or that people drink from the same cup. Taking water with a ladle seems to be a method used not as a conscious effort to keep drinking water clean but because it is convenient. In the KAP survey, for example, only 5% of the respondents mentioned a ladle or cup as a way to keep water clean.

Covering

More than 70% of the respondents answered that covering of the storage container is a good method and 63% said they were practising this method. See Table 8 for the results. This practice was confirmed during the observation studies. In 55% of the 249 spot-checks on water storage the containers were properly covered with metal lids, plates or pieces of wood, see Photograph 7. Cloth was never used for covering. In another 20% of the cases some containers were covered while others were not. Only in 25% of the cases was water not covered at all. The percentage of uncovered containers was lowest in Chitral and highest in Baltistan.

This data indicates that people are aware of the importance of covering water containers and that it is quite a common practice. Due to the fact that this practice is already reasonably integrated into the mainstream of hygiene behaviours, it is likely that other people can adopt it more easily.

SPOT-CHECK RESULTS	Chitral		Gilgit		Baltistan	
	# spot checks n = 111	%	# spot checks n = 56	%	# spot checks n = 82	%
All containers covered	68	61	27	48	35	43
Some containers covered	15	14	10	19	16	19
No containers covered	28	25	19	34	31	38

Table 8: Covering water containers inside the household

Rinsing out storage containers

Unlike the fetching containers, storage vessels are not commonly rinsed out. In several households the containers were observed to be very dirty with black dirt stuck to the sides and green algae growing on the bottom of the cooler or pans. In the KAP-survey 11% of the respondents mentioned washing containers as a means to keep water clean.

The use of water coolers

For storage of water, plastic water coolers are also used particularly for storing drinking water during the summer. The water cooler is a relatively new device that was successfully introduced about a decade ago. It is a plastic container of 12 to 16 litres with a screw-fitting on the top and a small tap at the bottom. If it is functioning properly it is a good way of keeping water cool and clean. Unfortunately the tap of the water cooler easily gets broken and people were observed taking water from the top instead of from the tap. The KAP-survey indicates that in Chitral 82% and in Gilgit 67% of households have a water cooler. In Baltistan this figure is only 30%.

KAP-SURVEY RESULT METHODS FOR KEEPING WATER CLEAN (n =600)					
	What methods do you know?		What methods do you practise?		
	#	%	#	%	
Covering	433	72	381	64	
Use cooler or special container	250	42	217	36	
Use of a ladle	28	5	26	4	

Table 9: Methods for keeping the water clean (multiple answers)

Methods to make the water clean

Beside methods such as covering containers and safely taking water, other ways of making water clean were studied during fieldwork. It became clear that many people do not treat their water. Earlier it was mentioned that many people do not relate the occurrence of illness to their drinking water. Hence it is not surprising that treating drinking water is not commonly practised.

Boiling water

Boiling water in order to purify it is not a usual practice in the area. In the KAP-survey it was mentioned by 12% of the respondents as a known method and only 3% said they practised this method. There is little understanding that boiling is a method to kill pathogens. People have several reasons for not boiling water. Firstly, people are reluctant to boil water as it consumes a lot of wood. Secondly, people do not like the taste of boiled water. A woman in Damik said:

"We got the message from a doctor to boil the water because he said that people get ill from drinking the water directly. We indeed boiled the water and tried to drink it but its taste was awful and we never boiled water again".

A third reason is related to the concept that boiled water is actually used as a treatment as it is seen as having a 'cold' effect on the body¹¹. For example when children have diarrhoea or vomit, boiled water is used to prepare ORT. It is also given in cases of fever, abdominal pain and infected glands. It must also be noted that 'boiling water' in the village context is usually not more than heating up the water without actually reaching its boiling point.

Settling water

In the KAP-survey about 19% of the respondents mentioned settling water as a method of making the water clean. Two methods are used for settling. One is to leave the water in the storage vessel and then take water from the top. The other is to use a traditional water pit. In particular, in villages with turbid water sources in Hunza/Nagar and in Chitral, water is usually kept in water pits which has some effect on the level of suspended solids.

The Musaffa bag

In the late eighties the AKHB promoted the use of the water cooler in combination with the Musaffa bag, and started promotion again in 1994. The Musaffa bag is a small cloth bag containing one kilogramme of silver coated sand that can decontaminate clear water if placed on the bottom of a plastic water cooler or any other storage vessel. The WSHHSP has extensively tested the efficacy of the Musaffa bag and concluded that the bag purifies clear water within four hours but is not effective in turbid water. The taste and smell of the water remains fairly neutral although some effect has been reported. Under normal conditions the bag can last for 6 months (see forthcoming WSHHSP Report).

¹¹. It is common for people in the area to classify food and their physical state according to 'warm' and 'cold' categories. In the literature this is called a naturalistic perspective. Cold food is considered useful to cure 'warm' diseases, and warm food is good for a 'cold' disease. Thus for example 'dow dow' which is perceived as a cold food will help curing a warm disease such as diarrhoea. Walnuts are warm food and should be eaten in the winter, not summer.

Bleaching powder

Bleaching powder as a means of purifying drinking water at a household level was introduced through AKHS in the Northern Areas during the cholera outbreak in 1993. In different villages in Gilgit and Chitral people were aware of the possibility of disinfecting water with bleaching powder. Some families claimed to use it, which they could not substantiate after probing. Based on the experience of the WSHHSP in 1993 and 1994 with household level distribution of bleaching powder it was concluded that due to the strong taste and smell of the water, villagers were not ready to use it regularly to purify their drinking water. Microbiologically it was found that in turbid water the bleaching powder was less effective than in clear water.

KAP-SURVEY RESULT METHODS FOR MAKING DRINKING WATER CLEAN (n=600)				
	What methods do you know?		What methods do you practice?	
	#	%	#	%
Settling	113	19	88	15
Boiling	75	13	15	3
Wash container	69	12	59	10
Filtering through cloth	56	9	21	4
Use bleaching powder	34	6	4	1
Use Musaffa bag	9	2	4	1

Table 10: Methods for making the water clean (multiple answers)



A woman cleaning a water storage container

4.4 ANALYSIS OF BEHAVIOURS ASSOCIATED WITH COMMUNAL AND DOMESTIC WATER MANAGEMENT

In this chapter the different hygiene practices related to water sources, water collection and water use are described.

	Important (for WASEP)	Less important (for WASEP)
Changeable	<p>Communal:</p> <ul style="list-style-type: none"> • Awareness is present about water becoming dirty by clothes washing, bathing and ablution, human and animal faeces. • Human and animal activities are carried out before the inlet of the tank • Water supply tanks are not always properly covered and cleaned • Water tap stands are not well maintained • Taps are left open or are not repaired¹² <p>Domestic.</p> <ul style="list-style-type: none"> • Storage containers are not cleaned frequently • Covering water storage containers is usually practised but can be further encouraged • While taking water from the storage container people contaminate the water but have some awareness about the use of a separate cup or ladle 	<p>Communal:</p> <ul style="list-style-type: none"> • People consider spring water clean at the source but also while running in the channels
Less Changeable	<p>Communal:</p> <ul style="list-style-type: none"> • People have a strong preference for drinking cold from unprotected sources, even if they have a tap • People collect water early morning or late evening when the water is considered 'clean' <p>Domestic.</p> <ul style="list-style-type: none"> • If water is needed it is collected from channels, nullahs and rivers during the day • No awareness that water can get contaminated during collection • People collect water from water pits that are proved to be highly contaminated 	<p>Domestic:</p> <ul style="list-style-type: none"> • Physical problems due to carrying heavy containers • People rarely boil water to purify it

¹². Considering the overall objective of WASEP is to reduce the faecal and water related diseases, this point might be considered less important. However due to its technical significance it is categorized as important and changeable.

CHAPTER 5 SANITATION AND HYGIENE PRACTICES

In this chapter the existing sanitation practices and beliefs are described and analyzed within a framework of positive and risky hygiene behaviour. The sanitation practices can be divided into two main categories: disposal systems that completely dispose of human faeces; and systems that accumulate human waste to use it as a fertilizer for agricultural purposes.

As is shown on the Map (see page viii) this differentiation roughly coincides with the area situated at the west of Gilgit comprising of Ghizer and Chitral for disposal systems, and east of Gilgit, including Hunza/Nagar, Skardu and Ghanche where human excreta may be used as manure. Within these two areas different types of latrines are found and each of them is discussed in detail before analyzing the implications for health education¹³.

5.1 DISPOSAL SYSTEMS

Three disposal systems are discussed in this section:

- i Open defaecation;
- ii Pit latrines;
- iii Pour-flush latrines.

i) Open defaecation:

Open defaecation is the usual sanitation system in Chitral, Ghizer and some parts of Gilgit. It is far more unusual for villagers to use open places in Baltistan and Hunza/Nagar. Men normally use places at some distance from the houses at the end of fields, behind bushes or boulders. Women and children use places nearer to the house such as the standing maize crop, in or near courtyards or in animal sheds.

Open fields

Where open areas or orchards are available men and women will prefer to use these for defaecation. The selection of open places for defaecation varies per season, fields are used when crops such as wheat and maize provide privacy, at other times of the year orchards with bushes or areas with big boulders may be preferred. Stones or mud-lumps are used for anal cleansing while water for ablution will be used in second instance. In some villages where open defaecation is prevalent, such as in Jaglote in Gilgit tehsil, faeces were observed near the water channel indicating its use for ablution.

In or near the compound

In villages where purdah is stronger and open places are not available defaecation takes places nearer to the house. As mentioned before in Chapter 3 human excreta was regularly observed in or near courtyards, particularly in Chitral. In the village Damik for example, women do not want to go to places away from the house and use small courtyards (*howli*) to relieve themselves. During the household studies the investigator accompanied the four women of the host family in the early morning.

¹³. The disposal of children's faeces and washing of soiled clothes is discussed separately in Chapter 6.

"It was still dark when the women woke me up. I went with them to the small courtyard. The women sat down at such a distance that they couldn't see each other clearly, so I did the same. After defaecation they washed themselves in the channel that was running through the yard. In the daytime the women sometimes use this compound for the same purpose but I also observed they sat near the boundary wall or behind a tree. They took a lota to wash themselves because if they use the channel they may be spotted by people".

Hassanabad is another example of a village where some tightly clustered houses do not have fields nearby. In some households no other suitable place was available than behind the house. Women from these households reported:

"We clean the defaecation place regularly. We collect the faeces with a shovel and transport it with a wheelbarrow to the open place near the river or dispose of it near our fields¹⁴. In winter time we do this every two months, while in summer we do this more regularly".

Animal sheds

In Chitral, Ghizer and some parts of Gilgit, women and children may have to use cattle sheds (*shal*) to relieve themselves¹⁵. These sheds provide purdah but using them is considered a bit shameful and people did not like to discuss the issue. Women sometimes also bathe or change their dress in animal sheds. Sheds are used both when empty or with animals present. Before defaecation the women will take one or two stones from outside to clean themselves. Faeces are often left behind without being covered. Occasionally faeces will be covered with some dry animal dung. From interviews and observations we have concluded that animals eat faeces in the sheds, particularly in winters when little food is available.

Problems associated with open defaecation

Hygiene related problems

The following risks of open defaecation were identified:

Contamination of drinking water. Defaecation in open fields may pose a health risk if faecal matter is washed into water channels during rain or irrigation, and when people use the channels for anal ablution and washing hands. The water from these channels is used for drinking.

Faecal matter into the house. Faecal matter nearby houses may pose a risk of pathogen transmission particularly through shoes or bare feet, animals, flies and hands.

Contamination of lota. The use of a lota for anal cleansing is positive as it indicates that the water channel will not be used for this purpose. Nevertheless it was observed that using a lota may not be safe as it can be a transmission route of faecal matter to the mouth. It was found that some lotas were

¹⁴. A similar type of shallow latrine is found in Hunza where its contents are systematically used as fertilizer in the fields (see page 40). In Chitral, however, the WSHHSP has concluded that open defaecation on fields or dropping faecal matter on fields like in Hassanabad is not a conscious or systematic effort of villagers and thus should not be classified as a 'composting'-system.

¹⁵. In traditional houses in Gojal defaecation takes place in one of the animal sheds near the door into the house, an area called *sarooi*. Faeces accumulate here and are later collected and used as fertilizer.

taken from the house, placed on the ground near the defaecation place and then used again in the kitchen to take water from a storage container or to drink from.

Animals eating faeces. Open defaecation will very likely lead to animals eating faeces from the animal sheds or the fields, particularly in the winter when they are hungry. On itself this is positive as faeces around the household are disposed of. There is a risk however, if the faeces are contaminated with eggs of the tape worm they develop in the tissue of cows. If the meat is not properly cooked the tape worm can develop inside the human who eats it. Also the dung of animals can spread different pathogens to people through drinking water and through direct contact causing various diarrhoeal diseases, for example Cryptosporidium and campylobacteria.

Problems related to privacy and convenience

Besides the hygienic problems associated with open defaecation a question was included in the KAP-survey about the problems people have with open defaecation. Out of 600 respondents 474 answered the question while the others said they never use open defaecation. Many of these are living in Baltistan. 15% of the users say they do not have any problem with open defaecation.

The main problem mentioned by 54% of the women and 45% of the men (n = 474) is the lack of privacy (see drawing 4 on page 42). In households without any secluded place women have to wait until dusk before they can find a suitable place to relieve themselves! Women explained that they drink and even eat less during the day to avoid urination or defaecation before it is dark. An example of how severe this problem may become is a family who were living in a congested village in Yasin. Due to the constant anxiety about finding a suitable place the women developed both mental and physical problems. The women's sanitary constraints were one of the main reasons for this family to buy land in a village in Ishkoman with plenty of open space. Other problems that were mentioned are presented in the Table below.

KAP SURVEY RESULT		
What problems do you face with open defaecation ?		
(multiple answers)		
(n = 474)		
	#	%
Purdah	232	49
Unhygienic	190	40
Smell	154	33
Stepping in faeces	84	18
Walk to a proper place	55	12
Problem in the night	39	8
Problem for the old and sick	27	6
Disturbance by animals	11	2
No problem with open defaecation	69	15

Table 11: Problems with open defaecation

ii) Pit latrines

Pit latrines are the only traditional latrine in the area west of Gilgit and in Chitral. They are present particularly in higher altitude areas such as Phander in Ghizer and Madaklasht in Chitral. The WSHHSP inventory indicates that the total number of pit latrines is 350 in Ghizer and about 400 in Chitral. Usually pit latrines are constructed near the home. They consist of a hole of three to four feet deep with a simple slab of stone or wood to cover it and a half wall to provide some privacy. If a latrine fills up it is closed and a new one is constructed. In a few isolated cases in Ghizer a different type of pit latrine was identified. It consisted of a very shallow pit. After faeces had accumulated these were washed out with channel water into fields or back into the channel. This type of latrine is unacceptable under any circumstances and should be discouraged altogether.

Villagers mentioned three main reasons for building pit latrines: protection against the weather, cleanliness in the village and the provision of privacy to the family members - mainly women. Other advantages are that it is a dry system, which cannot freeze and stones or mud-lumps can be used for anal cleansing. Users reported that smell and quickly filling up of the latrine were its disadvantages.

The hygienic condition of pit-latrines varied considerably. In Kalkattak, for example, hundreds of latrines were observed that were very well managed: they were clean, the pits were dry and without smell. Some of the pit-latrines in Phander, Madaklasht and Arkari were also maintained fairly well while others had faeces around the squatting hole and the pit contents were wet and a bit smelly. The observations point to the need for regular maintenance and cleaning of the squatting platform for the latrine to remain hygienic. If latrines are poorly maintained they may turn into a source of disease and pose a bigger health risk than open defaecation.

iii) Pour-flush latrine:

The pour-flush latrine was introduced in the seventies and has been promoted by different organizations since the late 1980s. A pour-flush latrine consists of a ceramic commode that is connected with a pipe to a soak pit, sometimes a small ventilation pipe is also included. The latrine is flushed by pouring water into the commode with a container. The pour-flush provides the owner privacy, comfortable use and is considered as a status symbol within the community. Nowadays it is a very popular type of latrine. The WSHHSP inventory indicates that over 9,000 rural households in Chitral and 6,000 in Gilgit region have a pour-flush latrine, a coverage of 23 % and 12 % respectively. This figure is much lower in Baltistan as people have already a traditional latrine and see less need for this system.

A well maintained pour-flush latrine is hygienic and has the advantage that it can be used as a bathroom. Unfortunately the latrine has a number of disadvantages that disqualify it as the ideal sanitation system for North Pakistan. The latrine needs to be flushed with water which usually leads to an increased work load for women. Due to the water seal the latrine tends to freeze and sometimes break in high altitude areas during the winter. The water seal also makes it impossible to use traditional mud-lumps and requires toilet paper or water for anal cleansing. The use of paper is a luxury and it is an economic disadvantage that the latrine construction is considered to be expensive. Finally, in areas where human waste is used as fertilizer, an additional disadvantage is the fact the faeces are disposed of and cannot be recycled.

A last socio-cultural disadvantage is that not all people who have constructed a pour-flush latrine actually use it. At present a relatively high number of owners try to keep the latrine for guests who may visit the house. Latrines therefore are very often constructed near guest rooms. There is evidence that the tendency to reserve latrines for guests is slowly changing, particularly in villages where the men are exposed to urban lifestyles like in Hunza and Gojal. Nevertheless it is expected that without awareness raising and motivation the pour-flush will remain under-utilized in the majority of villages



Photograph 8: Inside view of a bathroom with a pour-flush latrine



Photograph 9: The Chaqsa, the traditional latrine in Baltistan with a coverage of nearly 100%

5.2 'COMPOSTING' SANITATION SYSTEMS¹⁶

Different types of traditional 'composting' systems are found in the area east of Gilgit.

- i) Qem
- ii) Single chamber latrines (the Chukan and the Chaqsa)

i) Qem

This is a simple latrine used by women and children and to a lesser extent by men. It consists of a small demarcated flat place in the field or the compound. A less common type of qem includes a shallow pit in the center and a plank that is used for squatting above it. In most cases the users defaecate on the flat ground and use mud-lumps or soil for anal cleaning. Adults usually cover faeces with some soil if this is available. Children normally do not cover and it is a task of the women in the household to do this for them. Depending on the habit of the family the faeces are brushed together daily, or are heaped up when the site fills up. This pile is located in or nearby the qem. During observations of qems several were found to be well maintained with the contents brushed neatly aside and covered. Nevertheless in many others faeces were spread around in the qem and many flies were present. One of the investigators, for example, had to be careful not to step into partly covered faeces. She squatted next to a big pile of faeces and soil covered with many flies. In most qems the contents are exposed to open air and sunlight and the faeces desiccate quickly. The latrine had remarkably little smell.

The heap inside or near the qem is removed whenever necessary. Women use baskets for carrying the mix of dry faeces and silt to the fields or vegetable gardens. The mixture is used as fertilizer.

ii) Chukan and Chaqsa

The chukan¹⁷ is a traditional latrine that is common in Hunza and Nagar in Gilgit District. The Balti-latrine or chaqsa¹⁸ is present in nearly 100% of households in Baltistan, see Photograph 9. The basic design of these latrines is similar, although the Balti-latrine is bigger and the management of the contents is slightly different. The 'compost' latrines are an integrated part of local -agricultural-tradition and the majority of the farmers are not going to change this custom. A man in Baltistan said:

"This is the system we inherited from our forefathers. It is the same as our elders used. It is a good system and that is why we are keeping it. It gives everything we need: it is cheap, gives privacy, is a safe place to dispose of excreta and more importantly it gives us manure for our fields".

The 'compost' latrine has a squatting platform with one to five holes on top of a single chamber in which human excreta is accumulated. On the squatting platform a small heap of soil is kept and after defaecation the soil is used for anal cleansing and to cover the faeces in the chamber below.

¹⁶. The word composting is placed in parenthesis because microbiological samples indicate that a true composting process reaching a high temperature does not take place inside the latrine.

¹⁷. See WSHHSP, Water, Sanitation, Hygiene and Health. Position Paper 4: Hunza/ Nagar. 1994.

¹⁸. See for a complete description of the latrine, management patterns and microbiological efficacy WSHHSP, Issue paper 6: The Balti-latrine. A socio-technical study of a traditional sanitation system in Baltistan, 1995.

Sometimes people will perform ablution above the hole but this is only common in Skardu and Rondu. In other areas people try to avoid the contents of the latrine getting too wet. Occasionally also sweepings or organic material may be put in the latrine. Addition of large quantities of animal manure and silt is typical in Baltistan.

Once or twice a year the contents of the chamber are emptied through an opening in the chamber. Emptying usually takes place in the months of November and/or around February. In Gilgit emptying is mainly a task for women, in Baltistan it is usually a task for men. The contents of the latrines in Baltistan are usually a completely dry and odorless material without any sign of faeces. In Gilgit the contents may be less dry as the amount of additional soil and animal manure is less. Only if contents of latrines are wet, for example if owners used water above the hole were they observed to be smelly.

The contents of the latrine are transported to the fields by women in baskets and by men in wheelbarrows and put on heaps. After the winter this manure is spread on the fields by women. They use forks and shovels but also use their hands to break any hard lumps. For vegetable gardens it is a custom to take a relatively fresh mix of soil and excreta and directly apply this to the fields.

BOX 1

The qem or chukan: local preferences for one system or the other

In villages in Hunza and Nagar households have either a qem or a chukan. It is interesting that villagers have made a conscious choice to use one or the other. People with a qem said that their system is easier to manage than the chukan. Faeces can be properly covered and it is more convenient to empty the dry contents. These qem-owners also say that the contents of the chukan can smell and that they would not like to go inside the chamber with their heads during emptying time. Those who own a chukan on the other hand, explained that it is cleaner and easier to use because you do not squat near the faeces and do not need to worry about stepping into the faecal material as you do in a qem.

Microbiological sampling of the latrine contents

In the above mentioned sanitation systems a decomposition process of the contents takes place. The theory of composting sanitation is that two processes will help destroy pathogens. First the temperature rise and second the retention time will destroy pathogens, making the manure safe to use as a fertilizer. The WSHHSP is carrying out tests to understand more about the level of pathogen destruction in the latrines. In 1994 and 1995 samples have been taken from the contents of different latrines in Gilgit and Baltistan. The main parameter studied is the number of viable *Ascaris* ova, which is considered a standard indicator of the presence of other pathogens in excreta-based manures.

The preliminary results show that some pathogen destruction takes place, but that this process is not complete. The presence of certain types of organism indicate that a rise in temperature does not take place in the latrine. Although reduction of viable *Ascaris* has been noted, in about half of the latrines still viable eggs were found at the bottom of the pit. In drier systems destruction is significantly greater than in latrines where the contents are wetter. This seems to indicate that the principal mechanism of these latrines is not composting but desiccating. Investigations into the decomposing process will continue over the winter of 1995-96.

Re-use systems: health risks and contamination routes

The faecal matter of these types of latrines are likely to contain a variety of pathogens, including the eggs of parasites. Pathogenic bacteria (E-coli, Shigella Campylobacter) are the main cause of diarrhoea and helminth eggs can develop into worms inside the body (hook worm, round worm, Trichuras and Ascaris worm and the tape worm). These diseases are caused when people come into contact with food, water or fingers that are contaminated with these pathogens.

Contamination of food. Relatively fresh excreta may be used as fertilizer for vegetables and crops. In particular salads are likely to be a transmission route. Also fruit that has fallen to the ground if eaten unwashed can contain pathogens. After defaecation or working with manure people also transmit bacteria and pathogens from their hands to edibles during the preparation or consumption of food.

Contamination of water sources. After defaecation people may perform ablution in the field at the side of the latrine or the nearby channel. This latter behaviour contaminates the water. Pathogens can also be spread through the surface water after irrigation of fields where latrine manure was applied.

Contamination of hands or feet. Usually soil or mud-lumps are used for anal cleansing and hands are washed with water. Also during brushing the qem or emptying the contents women and men can come into contact with fresh excreta. At the time of emptying, transporting and spreading the manure hands of villagers will definitely come into direct contact with faecal matter. Feet may come into contact with faeces during use of the latrine or after the manure is applied to the fields. If dirty shoes are not removed or if people walk barefoot this can contaminate the household. People who walk barefoot have the risk that the hookworm passes into the sole of the foot.

Contamination through animals and flies. Animals and flies are attracted by uncovered faecal material in and around the 'compost' systems. They can transmit pathogens into the house and consequently to people.



Drawing 4: An illustration of open defaecation that will be used in the promotion of latrines

5.3 ANALYSIS OF SANITATION BEHAVIOUR

This chapter describes the hygiene practices related to the different present sanitation options. The identified practices are structured in two matrixes; one for disposal sanitation and the other 'composting' sanitation.

DISPOSAL SANITATION

	Important (for WASEP)	Less important (for WASEP)
Changeable	<ul style="list-style-type: none"> • The number of pour flush latrines is increasing but people often do not use it themselves 	<ul style="list-style-type: none"> • Faecal material from open places or shallow latrines are disposed off in channels • Lotas are multi-purpose devices and are used for ablution and drinking
Less Changeable	<ul style="list-style-type: none"> • People defaecate in the open fields and do not dispose off faeces in a safe way • After defaecation in the open field, howli or shed covering of faeces is not practised • By using the shed, howli or practising open defaecation people can easily step into faeces • Women strongly need privacy to relieve themselves • People defaecate nearby the channels 	<ul style="list-style-type: none"> • Stones and mudlumps are used for anal cleansing • Animals eat human faeces deposited in the fields and in the cattle sheds

'COMPOSTING' SANITATION

Changeable		<ul style="list-style-type: none"> • Women break hard lumps of 'compost' with shovel and forks but also with their hands • Lotas are multi-purpose devices and are used for ablution and drinking
Less Changeable	<ul style="list-style-type: none"> • The 'fresh' content of the latrine is used on the fields and on the vegetable gardens • People come into contact with latrine manure during emptying and transporting it to the fields • Covering faeces in a qem, chukan and chaqsa is practised but should be encouraged further • By using the qem people can easily step into faeces • People do ablution above the hole of the chukan and chaqsa which makes the content wet 	<ul style="list-style-type: none"> • Mudlumps and soil are used for anal cleansing • Animals enter the qem, chukan and chaqsa and eat human faeces



Photograph 10: Girl washing hands and face in the compound of her house in Hassanabad (Chitral)



Photograph 11. Girl washing clothes in a stream with the help of soap and a stick

CHAPTER 6 PERSONAL HYGIENE

6.1 BODY WASHING

It is common that people wash their hands and faces after waking in the morning. If soap is available people may sometimes use this but normally only water is used. Part of this freshening up is cleaning of the mouth with a finger and rinsing it. During the day people sometimes use a small stick made out a special type of wood or walnut leaves to clean their teeth. Using a tooth brush and paste is usually only practised by men and women who have been living in cities. Those who regularly say their prayers will perform religious ablution called wazzu, which will include cleaning the anal area with water (teharat).

Queries about how, and how often, people wash the rest of their bodies have been largely impossible due to the intimate character of the subject. Information from local health workers and key-informants indicates that bathing is not as frequently practiced as people say. It is not rarely to hear that in winter people never wash themselves. However, in principle, bathing is required after having sexual intercourse and after the menses according to Muslim standard of sanctity and purity. For body and hair washing soap is used. Often people use small pieces of clothes washing soap. Usually cold water is used that has been placed in the sun to take off the chill.

In almost every village a number of households have private bathrooms. The KAP-survey indicates that about 60% of people have such a facility. The bathroom can be a small room inside the house or guest room with a proper drainage system. In another 16% of the cases people have a pour-flush latrine that is used as a bathroom. If no real bathroom is present most people make a temporary bathing place by hanging a curtain in a room, or use the store room or cattle shed. The 'bathroom' can also be a small demarcated place in the courtyard with a simple drain to remove water.

In Sunni and Shia villages it is fairly common to find communal bathrooms. Sometimes they are separate for men and women. These are usually constructed very near or even above water channels¹⁹. In the summer people also bathe themselves in channels or rivers with their clothes on.

6.2 CLOTHES WASHING

Women are solely responsible for washing the clothes of all household members. They prefer to do the laundry in or near running water like channels or nullahs. The actual washing is done in shallow metal bowls or on large flat stones. Sometimes water from the channel is placed in the sun before using it for washing. For rinsing the soapy clothes the women say it is very convenient to use running water as it requires much less effort. Where a piped water supply system is available women may use the tap to do a small wash, but otherwise they will prefer fast flowing water from channels and streams. Where running water is not available women will try to put off washing clothes and, only when it is really needed, use a tub and buckets.

In summer women wash clothes more often than in winter. In the summer clothes washing takes place at least weekly. In that period people work on their fields and, because of the hot weather, the local dress, the 'shalwaar kameez' get dirty quickly. Washing in the winter is done less regularly, in some cases perhaps once a month. In winter running water is usually further away, the water is very cold and clothes do not get so dirty as in summer. Nonetheless, the frequency of clothes washing varies per household as it depends on individual preferences and the availability of soap. In some households women were observed wearing clean clothes, while in others they wore filthy looking dresses which they never changed during the investigators five day stay in the village.

¹⁹ In Hoper in Gilgit and Thorgo Bala in Skardu District bathrooms for men are located higher up in the village where the water is considered clean. Strikingly the female bathrooms are situated lower down in the village and they use the water that has passed through the inhabited area.

In villages there is some awareness that clothes washing will make the water dirty. As explained in Chapter 3 people use the terms 'dirty' to signify that the water changed colour because of irrigation or clothes washing. In most villages people realize that the activities of inhabitants of upper muhallahs effect the water. Several villages were identified where village leaders agreed upon the rule not to wash clothes and utensils in the channels. Often a community health worker or village activist makes the others aware and tries to motivate a change of behaviour. Nevertheless in all these villages women continue with their practices.

6.3 DISPOSAL OF CHILDREN'S FAECES AND WASHING OF SOILED CLOTHES

Young children of up to two or three years were observed defaecating indiscriminately around the house. When they do so their mothers will clean their bottom with a stone, a maize cob or an old piece of cloth. They will throw the stone or cob somewhere outside in the yard, but the piece of cloth will be put in a tree or in a hole in a wall. Mothers expressed an awareness that faeces in the courtyard is dirty but added that they cannot constantly be cleaning up. If they see faeces nearby the house they most of the time cover them with soil and throw them with a shovel into the nearby fields or into a traditional latrine. It was also noticed that children who take care of a smaller brother or sister sometimes cover the faeces with a hand full of soil, but they rarely remove them. It is not common to dispose of childrens' faeces in the latrine.

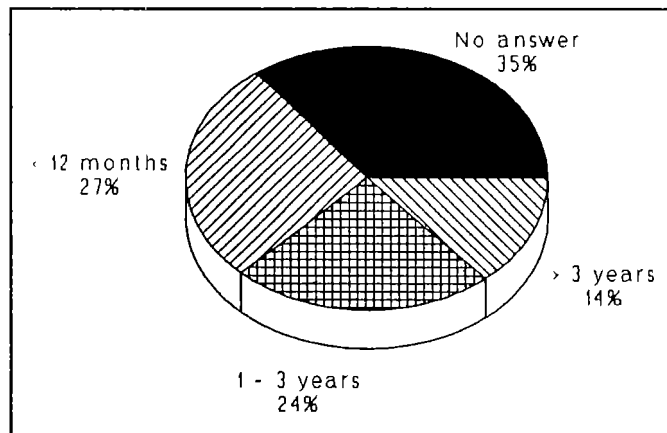


Figure 9: At what age childrens' faeces become harmful?

The KAP-survey indicates that 204 respondents (34%) believed that faeces of a child of three months can spread diarrhoea. The other 396 respondents were asked: 'at what age do children faeces become a possible way of spreading diarrhoea'. As explained in Chapter 2 many respondents, in particular from Baltistan had difficulties answering the question. The data from Gilgit and Chitral (see figure 9) show that 20 % of the respondents believe that children faeces become harmful between the age of six months and a year, or when children start eating solid food. 26% believe that faeces become harmful when the child is between one and three years. 15% believe the child should be older than 3 years for the faeces to become harmful. The other 39% could not answer the question.

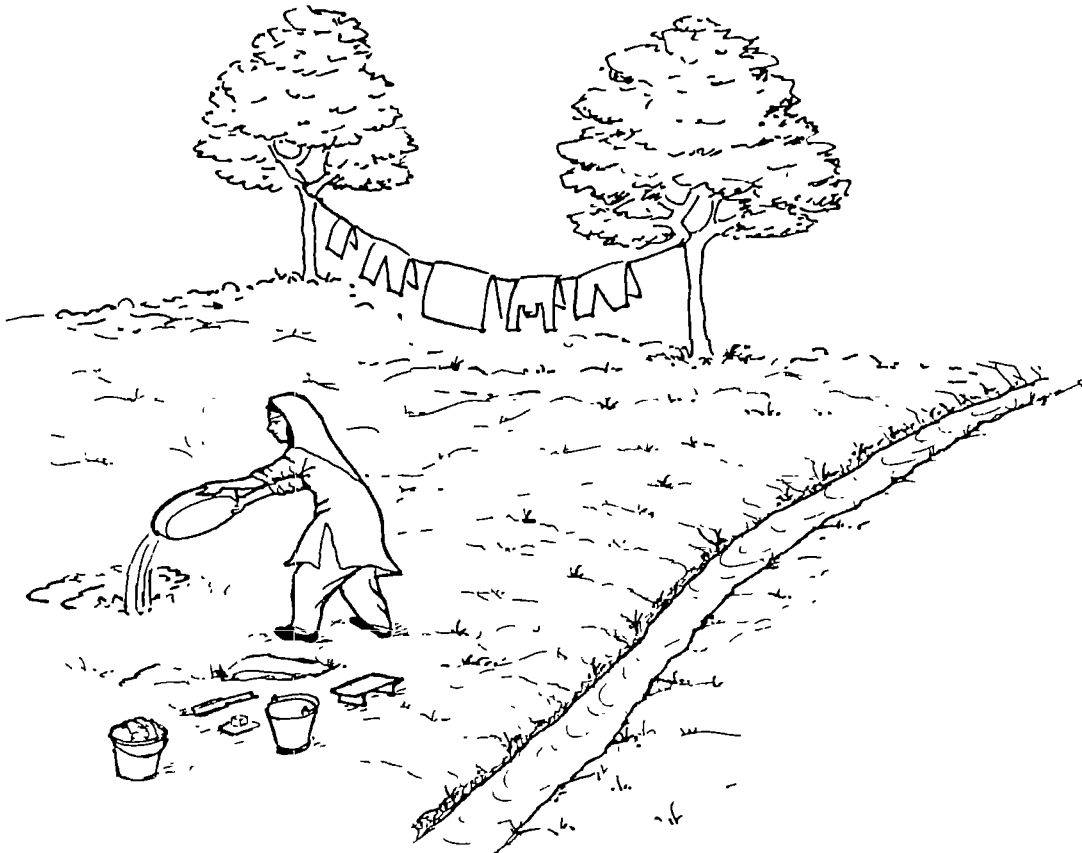
Considering these concepts it is not surprising that mothers after cleaning their babies bottoms were rarely observed to wash their hands. As most of them do not realize the possible contamination risk it is also not surprising that mothers are not very careful about washing stained clothes.

45% of the respondents mentioned that soiled clothes are washed in channel water. Another 3% of the respondents explicitly mentioned that they use a channel that is not used for drinking water practices. It was never observed that childrens' nappies or even soiled clothes of sick adults, were washed separately in a bucket. Nevertheless, 30% of the people say they wash these clothes in a bucket and throw the water into the field or into the compound (see drawing 5).

People who have access to a tap will not commonly use this for washing soiled clothes. 17% of people with a communal standpost use this for washing; whereas, 30% of the people with a household-tap will use it. The others will use the channel or a bucket.

KAP-SURVEY RESULT WHERE DO YOU WASH SOILED CLOTHES? (n = 600)		
	#	%
Wash in a bucket, throw the waste water in the compound	95	16
Wash in a bucket, throw the waste water in field or shed	96	16
Wash in any channel	273	45
Wash in a channel that is not used for drinking water	18	3
Under the tap	41	7
Other (river, nullah)	48	8
Don't know	29	5

Table 12: Where do people wash clothes stained with faeces?



Drawing 5: A positive behaviour: woman who washed clothes in a tub throws the dirty water away from the channel

6.4 ANALYSIS OF BEHAVIOUR RELATED TO PERSONAL HYGIENE

In this chapter practices related to personal hygiene are described. The focus has been put on body washing, clothes washing and disposal of children's faeces and clothes soiled with faeces as these behaviours are most related to water-borne and water-washed diseases.

	Important (for WASEP)	Less important (for WASEP)
Changeable	<ul style="list-style-type: none"> • Little awareness of the risk of contaminating drinking water by washing soiled clothes in channels 	<ul style="list-style-type: none"> • People generally wash hands and faces in the morning but do not bathe regularly • A separate handkerchief (usam) is used to clean childrens' noses
Less Changeable	<ul style="list-style-type: none"> • Children's faeces found in the courtyard are covered with soil and thrown in the nearby fields • Women prefer to wash clothes in the channel or river and if not available under the tap²⁰ • After cleaning the bottom of a child, the stone, maize cob or piece of cloth is left lying in the yard 	<ul style="list-style-type: none"> • Clothes are washed at least once a week in summer but less often in winter

²⁰. For the technical component of WASEP this behaviour is considered important

CHAPTER 7 HAND CLEANLINESS

7.1 A STUDY ON WASHING HANDS

An element of the study of hygiene behaviour was a series of studies to handwashing. Four different research techniques were applied:

- structured handwashing observations in households;
- spot-checks;
- a number of questions in the KAP-survey;
- a series of microbiological tests of hands (for preliminary results see Annex 8).

The methodology of the spot checks, survey and microbiological tests are explained in Chapter 1.2. Detailed results from these studies will be reported in a separate Issue Paper²¹. In this chapter only the main results and conclusions are presented.

Structured handwashing observations

Structured observations on hand cleanliness were made of four household members²² in 39 households. Every time the concerned person cleaned or washed his or her hands during the nine hour observation period this was noted on a specially designed format (see Annex 5). On the format it was specified when (the occasion) and how the hands were cleaned (the quality). Hands of over 150 people were observed.

A special feature of the study was that observations also included moments that the person could have cleaned hands but did not do it. The addition of this aspect allows us to analyze when people do not wash their hands. Nine possible handwashing occasions were pre-defined:

- | | | | |
|------|--------------------------|-------|---------------------------------------|
| i. | before preparing food; | vi. | after handling animals; |
| ii. | before eating; | vii. | after sweeping; |
| iii. | before feeding children; | viii. | before going for a visit; |
| iv. | when visibly dirty; | ix. | changing nappies/contact with faeces. |
| v. | after working outside; | | |

As handwashing after defaecation cannot normally be observed this occasion could not be included in the observations. Also not included was handwashing before praying because it is always practised in the same prescribed manner.

7.2 RESULTS OF OBSERVATIONS AND KAP-SURVEY QUESTIONS ON HANDWASHING

In total 673 structured observations could be made. 515 of these were missed occasions and 158 were availed occasions (see table 13 and 15). This signifies that one out of every four or five handwashing occasions (23%) result in actually washing hands. The Table below shows these figures specified by region.

²¹. See forthcoming Issue Paper with the work title: Handwashing as a hygiene education message. A study assessing behavioural and microbiological aspects of handwashing.

²². Where possible the observations included three women: the mother, daughter-in-law and/or the eldest daughter(s), and one older son or husband. The latter were often not present inside the house and could only be observed infrequently.

SPOT-CHECK RESULT	# of total observations	Not washed occasions	Washed occasions	% Washed
Chitral	n = 290	214	76	26%
Gilgit	n = 226	173	53	24%
Baltistan	n = 157	128	29	17%
	n = 673	515	158	23%

Table 13: Total handwashing observations and availed and missed occasions

The research technique of structured observation, with an investigator sitting inside the household, may have positively influenced the frequency of handwashing. We assume that the number of handwashing occasions is the maximum score. Without the presence of the investigator the average figure of 23% availed handwashing occasions may have been lower.

When do people wash their hands ?

Before preparing food, eating food and feeding children

Handwashing before preparing food could be observed regularly. More than 50% of the occasions for handwashing were availed as 62 of a total of 118 women washed hands. This seems to indicate that it is a fairly normal custom to wash hands before food preparation, although this practice can be further encouraged. The KAP-survey data also shows that 57% of the respondents mentioned they normally wash their hands 'before preparing food'.

Handwashing before eating food was practised in only 14% of the occasions (34 of the 271 occasions). From the KAP-survey however, a totally different picture emerged. 77% of the respondents said they wash hands before eating. The difference between the two figures indicates that people may have the awareness and the intention to wash their hands but do not manage to do it. The figure of 14% is surprisingly low considering the custom of offering guests a traditional wash-basin and a pitcher to wash their hands before a meal (see drawing 6).



Drawing 6: Washing hands with the use of a lota and pitcher

There were very few children, 3 out of 34 occasions, who washed hands before eating, unless after being asked explicitly by their parents. This indicates that children hardly ever wash their hands before eating, while their hands are usually dirty looking²³. Another alarming result was that only one woman out of 70 occasions washed her hands before feeding a small child.

After work outside, and visibly dirty hands,

After working outside 29 out of 44 occasions were used (65%) by respondents indicating that this is a fairly common practice. It is less common to wash hands which look visibly dirty. Out of 51 observations of dirty looking hands only seven people washed their hands (14%). The pre-defined category 'visibly dirty' was not always easy to judge. In some cases womens' hands looked dirty but they were actually chapped and even after thorough washing they still looked dirty. In such cases these observations were not included. In the KAP-survey the figure of washing hands when they look dirty was higher (25%).

SPOT CHECK RESULT	Nails short	Nails long	Nails clean	Nails dirty
n = 215	194 = 90%	21 = 10%	34 = 16%	181 = 84%

Table 14: Finger nail lengths and cleanliness

During spot checks hands and finger nails of women were observed. 59% of the hands looked clean while 41% looked dirty. It is very common for people to have short nails but nevertheless the majority are dirty, see Table 14.

STRUCTURED OBSERVATION RESULTS				
ON WHAT OCCASION DO PEOPLE WASH THEIR HANDS?				
	Total #	Not availed	Availed	% availed
i. Before preparing food	118	56	62	53
ii. Before eating	271	237	34	13
iii. Before feeding children	10	9	1	10
iv. After work outside	73	44	29	40
v. When visibly dirty	58	51	7	12
vi. After handling the cattle	31	23	8	26
vii. After sweeping	25	17	8	32
viii. Before going for a visit	30	23	7	23
ix. Contact with nappies/faeces	26	24	2	8
Other	31	31	16	-
	---	---	---	
	673	515	158	

Table 15: Occasions when people washed their hands during the observation studies

²³. Out of 206 spot checks on children's hands and faces 63% were noted down as looking dirty!

KAP-SURVEY RESULT		
WHEN DO YOU WASH YOUR HANDS?		
(multiple answers)		
(n = 600)		
	#	%
Before eating	462	77
Before prayers	312	52
After waking up	283	47
After work outside	202	34
Before preparing food	173	29
When visibly dirty	155	26
After defaecation	142	24
After eating	120	20
After cleaning utensils	85	14
After work with animals	73	12
After changing nappies	36	6
Before feeding children	31	5
Before visiting others	20	3

Table 16: When do people say they wash their hands?

After handling cattle, sweeping and before going on a visit

During the nine hour observation period in each household only a small number of observations could be made of these three pre-defined occasions. The limited number of observations (see Table 17) make it difficult to analyze the results and draw conclusions about these behaviours.

Hand cleaning after contact with children's faeces

Only a limited number of observations were possible on washing hands after changing nappies or contact with children's faeces. Women often went outside to a separate place to change the dirty pants or the nappy and to clean the child's bottom. In only two out of 24 occasions women washed their hands with water after this activity. In the KAP-survey 12% of the female respondents mentioned this as a normal handwashing occasion. It is a local belief that children faeces are harmless²⁴. Also see the discussion of the KAP-survey results in Chapter 6.3.

Handwashing after defaecation

Observations on handwashing after defaecation were impossible. Instead a set of questions on handwashing after defaecation was included in the KAP-survey. The possible bias of socially desirable answers was reduced by putting the questions in a careful sequence and creating an open atmosphere during the interviews. To be on the safe side the figures below on the occurrence of handwashing and the use of soap should be seen as maximum scores. In daily practice handwashing will very likely be less frequent (see drawing 7).

²⁴. A study in Bangladesh (Hoque 1993) shows that mothers had more bacteria on their hands after cleaning their children's bottoms than after performing ablution themselves.



Drawing 7: Boy washing hands after coming from the latrine

The answers of the KAP-survey indicate that on average 10% of the people do not wash their hands at all after defaecation. The main reason is that they use a stone for cleaning and they do not see any reason to wash their hands. Handwashing practices after defaecation vary between Gilgit and Chitral and Baltistan. In Gilgit and Chitral over 50% of the respondents wash their hands with ordinary water, while this figure is much higher in Baltistan (83%). Nearly a quarter of the respondents in Chitral and Gilgit say they wash with water and sometimes with soap²⁵. 18% of the people in Chitral and Gilgit say they always wash with soap. The figures for washing with water and sometimes soap, and always with soap are lower in Baltistan, respectively 6% and 5%.

KAP-SURVEY RESULT (n = 600)	HOW DO YOU WASH YOUR HANDS AFTER DEFAECATION ?			
	do not wash	wash with water	with water and sometimes soap	with water and always soap
Chitral	7 = 13%	109 = 55%	48 = 24%	36 = 18%
Gilgit	13 = 6%	105 = 53%	46 = 23%	36 = 18%
Baltistan	12 = 6%	166 = 83%	12 = 6%	12 = 5%

Table 17: How do people wash their hands after defaecation (region wise)

²⁵. Soap is very often not even available in households. Earlier in the Chapter 5 an example was given of the investigator who accompanied the women during open defaecation. This was an economically well-off family. After relieving themselves the women washed their hands with water. The investigator wanted to wash her hands with soap. When she asked for soap it could not be provided.

7.3 QUALITY OF HANDWASHING

Soap is not commonly used in the area. This is reflected in the observations on the quality of handwashing. Out of the 156 people who were observed washing hands only 5% i.e. 8 people used soap! Four of these people washed with soap after coming with dirty hands from the fields, three after waking up in the morning and one before going visiting.

Use of clean water

For handwashing people use clean and preferably clear water, i.e. water that has not been used before. In a few exceptional cases it has been observed women washed their hands with dish water. Hands are often washed in a way that somebody else, often a child, pours water with a lota over the hands. People rarely use any local alternative to soap.

Thoroughly rubbing hands

A very important observation was made during the 158 observations of handwashing. In 151 cases the people washed their hands completely and did not leave a single spot unwashed. They washed hands with clear water and thoroughly rubbed at least three times. The seven persons who didn't wash their full hands either washed only the palms or the finger tips of their hands.

Drying hands

After washing most people let their hands dry naturally in the air or keep them near the fire. In only four cases women used a piece of cloth or their chadder to dry their hands. An interesting point made by Hoque (see footnote 24) is that women who used their clothes to dry their hands after handwashing, had higher contamination levels after drying the hands than before drying. We have not proved this ourselves but considering that many chadders are not clean the same might be true in North Pakistan.

Using a towel to dry hands is not a custom. However, in Ghizer and Chitral it is a common practice to use a towel directly after the meal to wipe off the food remnants from the hands. These towels are often multi-purpose and used for bathing, to clean noses, faces and even children's bottoms. Such towels are washed occasionally and are a possible route of contamination.

The acceptability of washing hands with other alternatives to soap

Besides using soap for handwashing the Project wanted to assess the acceptability of other cleaning agents. During the observation studies two women were observed who used flour and water to clean their hands. Apart from the cost, the smell of soap is one reason why women prefer not to use it, as becomes clear from the following example. A woman from Sandi Bala in Yasin explained:

"Soap affects the smell of my hands and this will spoil the taste of the bread. Therefore I always wash my hands with flour before preparing dough. I also wash dishes with flour as I fear that my husband will get angry when the dishes have a soapy smell".

Observations and personal experience of the investigators also shows that washing hands with soap needs quite a lot of water to rinse it off. Without running water or a tap it is difficult to remove all traces of soap.

In the KAP-survey four questions were posed to assess the acceptability of handwashing agents other than soap, such as flour, ash and soil.

Flour

Generally people thought that flour would be the most acceptable alternative to soap (46 %). 29% of these respondents added that women already have the custom of using flour for handwashing. It is important to add that several of the male respondents considered the use of flour as an old fashioned practice and it was regarded more acceptable alternative by women than by men.

Ash

Using ash for handwashing has been promoted in hygiene education programmes in other parts of the world. In the Project area this is not a traditional practice. When asked if ash would be an acceptable device for handwashing some people clearly expressed they could not wash with ash as it makes their hands rough. Nevertheless 57% of the respondents in Baltistan thought ash might be an acceptable alternative to soap. In Gilgit and Chitral this was much lower, about 25% on average. In the latter two regions people mainly use ash for cleaning utensils and as an insect repellent for vegetable gardens.

Soil

The use of soil was the least acceptable alternative for soap. Particularly in Chitral this was considered unacceptable by 80% of the people. Also in Gilgit most people (66%) do not think it is a good washing agent. Still one fifth of all the women say they sometimes use soil for washing hands. In Baltistan the response was slightly more favourable, with about 40% of the people responding that mud can be used for handwashing. Several respondents added that soil was only good for washing very greasy hands. But most of the respondents were surprised about the question, wondering how a dirty matter as soil could make hands clean.

Other agents

A few people mentioned apricot nuts as a possible hand cleaning agent and 22 respondents mentioned a variety of substances which included shampoo, leaves, snow, Dettol, paper tissues, oil and white spirit.

7.4 ANALYSIS OF HANDWASHING BEHAVIOURS

In this chapter the practices related to hand cleanliness are described. During the study general trends in hand cleanliness were investigated using structured observations, spot-checks, a survey and microbiological tests.

	Important (for WASEP)	Less important (for WASEP)
Changeable	<ul style="list-style-type: none"> ● Hands are usually washed before preparing food but should be encouraged further ● During handwashing people rub their hands thoroughly but do not use plenty of water ● People let their hands dry naturally and rarely use towels or chadders ● People are aware that guests like to wash their hands before eating but often do not wash themselves ● Children's hands are often dirty and are rarely washed before meals ● Washing hands after contact with children's faeces or changing 'nappies' is not commonly practised ● Finger nails are usually kept short but they are usually dirty 	<ul style="list-style-type: none"> ● Washing hands after handling the cattle is not commonly practised ● People sometimes wash hands before going visiting ● Washing hands after sweeping the house is sometimes practised ● People regularly wash hands after coming back from work in the field
Less Changeable	<ul style="list-style-type: none"> ● Most people wash their hands after defaecation but only with plain water and usually without soap ● People rarely wash hands with soap 	<ul style="list-style-type: none"> ● In Gilgit and Chitral regions people use the same towel for a multitude of purposes. Also women use their chadder similarly. Towels and chadders are often not clean.

CHAPTER 8 TARGET BEHAVIOURS AND BEHAVIOURAL OBJECTIVES

One of the aims of this report is to present and examine field data and use this analysis to develop a communication strategy for WASEP. Consequently in chapters two to seven water and sanitation related practices and local perceptions were described, and at the end of each chapter behaviours were analyzed and categorized according to 'importance' and 'changeability' with the help of Green's matrix. For an explanation of this model see chapter 1. In total 55 behaviours have been prioritized as important, 28 of which may be considered relatively easy to change, the other 27 behaviours are less likely to be changed.

The next steps in the process of prioritizing behaviours for the WASEP communication strategy are described in this Chapter. These steps include the selection of a set of 'target behaviours', the identification of factors that influence these behaviours and the formulation of behavioural objectives.

8.1 THE SELECTION OF TARGET BEHAVIOURS

In a series of meetings the investigators and a health professional of AKHS have examined all the behaviours that were categorized as 'important for WASEP'. After initial discussion, the team decided to select a limited set of target behaviours in the four different fields of water management (on communal and domestic level), sanitation (disposal and composting), handwashing and food hygiene. For the final selection of the WASEP target behaviours the team took five criteria into account:

- i Is a change of the behaviour important for achieving WASEP's objective of reducing faecal and water related diseases;
- ii Is the behaviour important for the success of the technical components of WASEP;
- iii Is it possible for WASEP to influence the predisposing, enabling and reinforcing factors of the behaviour;
- iv Is it practical for people to perform or change the behaviour;
- v How frequent is the behaviour.

With the help of these criteria all the practices were ranked and decisions were made as to what behaviours should be selected as the target of the Programme and which ones are of secondary importance.

For example none of the general hygiene practices was selected because the team felt it was not realistic to expect that people could change these behaviours. Also most of these behaviours have an indirect effect on faecal and water related diseases as compared with other behaviours. Other examples are 'washing fruit' which was rejected as a target behaviour as observations indicate that fruit is often eaten from trees directly and that washing of all fruit is not very practicable. With regard to domestic water management 'taking water from containers with a ladle or clean cup' is very important. But this behaviour was not selected because observations indicate that in large households the use of such a ladle or cup is not practicable; the cup or ladle is often left on the floor and is used for drinking directly.



Drawing 8: An example of an important behavior that was selected as target behaviour:
Covering faeces in the qem

The following 14 target behaviours were finally selected:

Water related behaviours

Communal level:

- Water supply tanks are not always properly covered nor are they cleaned
- Human and animal activities are carried out before the inlet of the tank

Domestic level:

- People have a strong preference for drinking cold water from unprotected sources, even if they have a tap
- Storage containers are not cleaned frequently
- Covering water storage containers is usually practised but can be further encouraged

Sanitation related behaviours

Disposal sanitation

- The number of pour-flush latrines is increasing but people often do not use the facilities themselves
- People defaecate in open places and do not dispose of faeces in a safe way

'Composting' sanitation

- Covering faeces in the qem, chukan and chaqsa is practised but should be encouraged further
- People do ablution above the hole of the chukan and chaqsa which makes the contents wet

Handwashing behaviours

- People are aware that guests like to wash their hands before eating but often do not wash themselves
- Washing hands after contact with children's faeces or changing 'nappies' is not commonly practised
- Most people wash their hands after defaecation but only with ordinary water and not with soap
- During handwashing people rub thoroughly but do not use plenty of water

Food hygiene behaviour

- Vegetables are usually washed before eating but not very thoroughly

WASEP's barriers of faecal-oral contamination

WASEP aims to change or improve these target behaviours and thus interrupt or block the different faecal-oral contamination routes. The WHO makes a distinction between primary barriers, which can prevent infectious organisms from getting into the environment and secondary barriers that avoid, remove or destroy infectious organisms before they enter the mouth (WHO 1993: 11). In WASEP the promotion of behavioural changes in the safe disposal of faeces and the emphasis on avoiding activities in the area before the inlet to the tank aims at establishing a primary barrier. Secondary barriers for example will be encouraged by keeping storage containers covered, washing hands and covering faeces in the 'compost' latrines. The effect of behavioural changes on the disease transmission patterns are depicted in Figure 10.

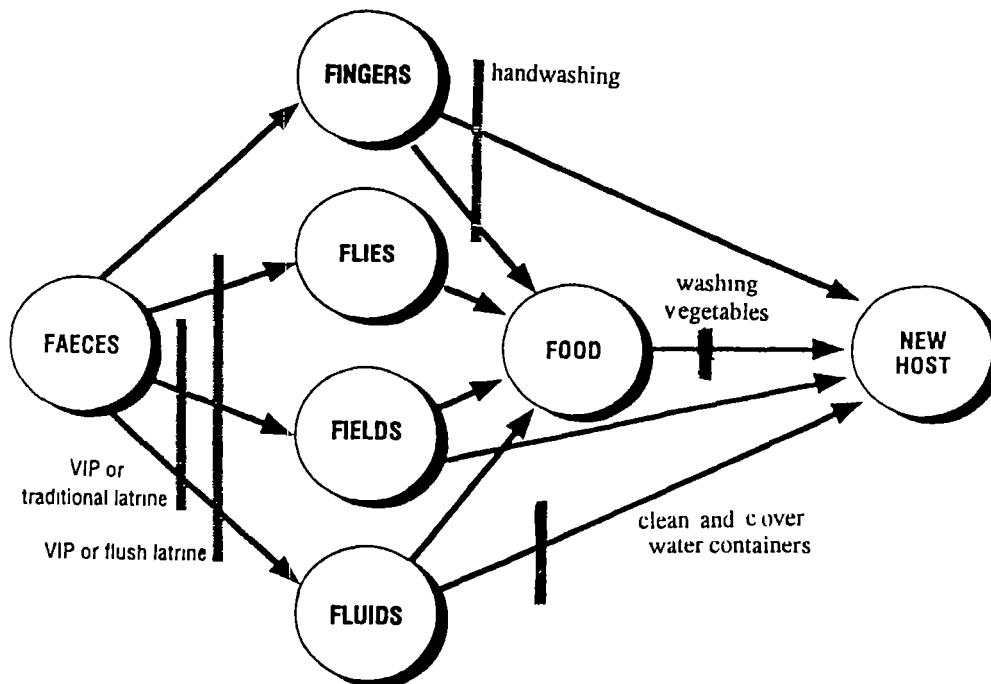


Figure 10: Proposed WASEP-activities: barriers of contamination routes (adapted from WHO 1993).

How to influence behavioural change?

After the selection of these targets the team looked at how the different factors -predisposing, enabling and reinforcing- could be influenced in order to change, encourage or promote that particular behaviour. Different possibilities to influence these factors were identified and although each target behaviour requires a different approach it was concluded that activities to influence the predisposing factors and enabling or reinforcing factors would be most effective. In Table 18 the plausible behavioural factors that affect the target behaviour are arranged (see columns two, three and four). The factors that have most potential to positively affect the target behaviour are white, the factors that are important but which are less likely affect the behaviour are shaded.

8.2 FORMULATING BEHAVIOURAL OBJECTIVES

After selecting the target behaviours and the behavioural factors that may be influenced it is useful to formulate behavioural objectives i.e. what behaviour WASEP tries to promote, encourage or change. Once very clear behavioural objectives are developed it is much easier to develop a good and effective communication strategy. The behavioural objectives should be stated as precisely as possible e.g. 'in order to ensure that educational efforts are focused rather than scattered' (Green et al : 1980:65). Each behavioural objective should answer the question: *Who* is expected to achieve *how much* of *what* behaviour by *when*?

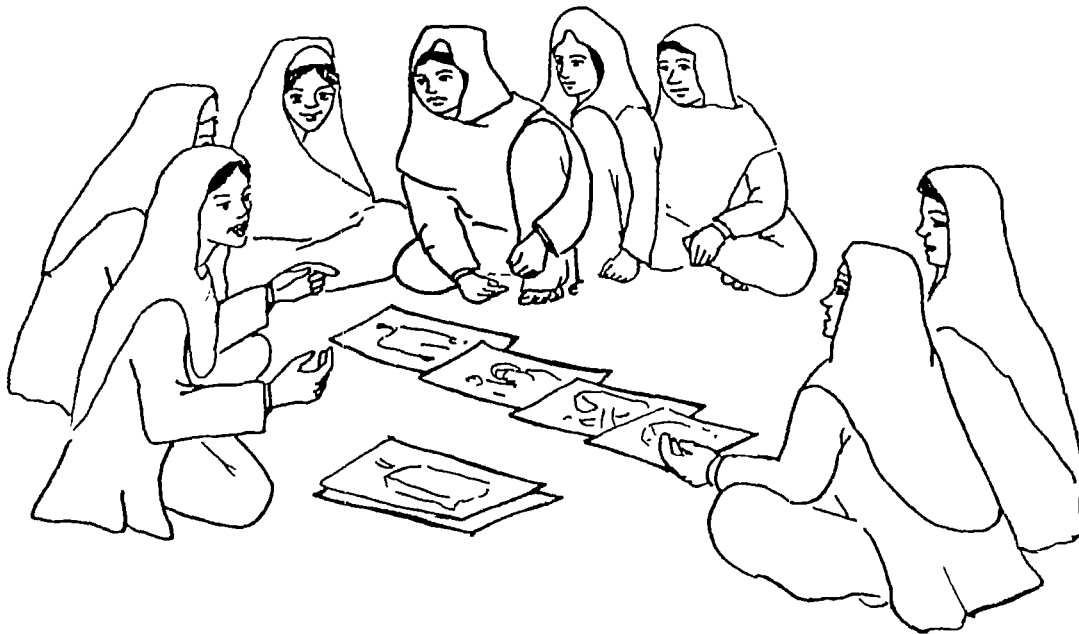
- ◆ Who: the people expected to change
- ◆ What: the action or change in behaviour or health practice to be achieved
- ◆ How much: the extent of the condition to be achieved
- ◆ When: the time in which the change is expected to occur

In this report the behavioural objectives have been formulated as precisely as possible within the within the present limitations of our knowledge, see the last column in Table 19. The tentative objectives leave open the extent and time frame of the behavioural change because the precise baseline data of villages and the resources of WASEP are not yet known. Once the resources of WASEP are confirmed and villages selected, these objectives can be formulated more precisely.

8.3 WHAT ARE THE NEXT STEPS TO DEVELOP WASEP'S COMMUNICATION STRATEGY?

After formulating the behavioural objectives we are now in a position to start developing the practical aspects of a communication strategy. A detailed strategy will be developed in a separate document that will be drafted, tested and finalized during 1996 in preparation for the implementation of WASEP in 1997. The document will define the following stages:

1. Formulation of behavioural objectives (refining the objectives of this report)
2. Selection of target groups (for example men, women or children, latrine owners etc.)
3. Preparation and selection of messages (for some behaviours one, for others several messages may have to be developed, if possible for each specific target group)
4. Select and develop the means to communicate these messages (participatory health education, banners, posters, story cards etc., separately or in a mix)
5. Prepare the involved organizations of the developed messages and strategy (who, when, training needs etc.)



Drawing 9: A womens' group during a participatory health education session, facilitated by a Lady Health Visitor of AKHS

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ANNEX 1: PROBLEMS ENCOUNTERED DURING THE OBSERVATION STUDIES

The observation time

The researchers felt that the observation was too limited. Due to the fact that it was culturally unacceptable for the investigator to be out in the village after sunset, structured observation could only be carried out between 8 o'clock in the morning and 6 o'clock in the evening. The observations made in the evenings and early mornings were therefore restricted to the homes of the host families.

Focus on women

The focus of study, in the first place was on the hygiene behaviour of women and children simply because they are the ones who are at home whereas men are usually outside. After the selection of houses it was necessary to explain the purpose the study to the male members in order to ask for their permission. In some households the husband stayed inside the home and interfered with the work. In these situations it was impossible to talk with women openly. Women kept silent as they are supposed to respect their husbands and to consider them more knowledgeable than themselves. In one case when the investigator was talking to a woman at the time her husband came inside and said:

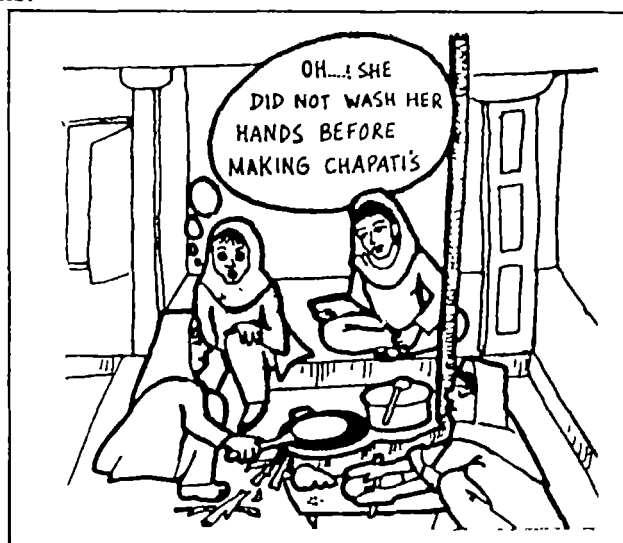
"Why don't you ask me? She, (pointing to his wife), does not know anything". After that the researcher explained she was interested in the household activities carried out by the women, the man angrily said: "How can they know? They are like animals. They do not know anything".

The summer season

As the diarrhoea rate is highest in the warm season the observation study was carried out during the summer months. It was anticipated that observations made during this time are most useful. What the researchers had not anticipated was that during this season women were very busy in the fields and they were not at home all the time. This sometimes made the task of observing boring and difficult. Consequently in some households the number of observations were less than required.

The presence of the researcher and assistants:

Changes in behaviour as a result of the presence of the researcher may have influenced some of the results. At first it was hard for the assistant to make observations unnoticed. Particularly in the case of handwashing observations the women felt that they were being scrutinized! Later it was decided not to inform the assistants about the focus of study and this enabled a more conducive atmosphere for making the required observations.



**ANNEX 2
SPOT CHECK INFORMATION FORM**

Village name :
 Household name :
 Visit date :
 Number of visit : first / second / third / fourth / fifth

	Spot 1		Spot 2		Spot 3	
	Date:	Time:	Date:	Time:	Date:	Time:
Domestic and environmental hygiene	Yes	No	Yes	No	Yes	No
Water:						
Water stored?:						
- inside the house						
- inside and outside						
Storage containers?:						
- all covered						
- some covered						
Presence of ladle or special cup for taking water?						
What is location storage containers?:						
- directly on the floor						
- on a shelf?						
Food:						
Is cooked food in the house covered?						
Are dirty plates and pans visible?						
Animals:						
What animals present in the house?						
- chicken						
- goat/sheep						
- dog/cat						
Personal hygiene:						
Are hands of women who handle food visibly clean?						
Nails of these women: - short?						
- clean?						
Are the children's hands and faces visibly clean?						
Are men/women/children:						
- walking barefoot?						
- walking with shoes near cooking place?						
Are people spitting inside the house?						
Environmental Hygiene:						
Are animal faeces visible in the yard?						
Are human faeces present in the yard?						
Are animal faeces present on the floor of the house?						
Are human faeces present on the floor of the house?						
Is mud or dirt from shoes present in the house?						
If latrine is present:						
Is it in use (stains, water present, other signs)?						
Is water present?						
Does it look clean?						
Is there a brush/cleaning material?						

Remarks and other observations:

ANNEX 3: STRUCTURED OBSERVATION LIST

GENERAL OBSERVATIONS

Village name	:	
Total number of households	:	
Name of respondent	:	
Date first visit	:	morning / afternoon
Date second visit	:	morning / afternoon

DOMESTIC WATER MANAGEMENT

- Which source(s) of water is/are used for drinking?
- Do the women clean containers before collection?
- How do women carry the water (go with them for water collection)?
- Do the women go together to the source? With how many?
- Do men sometimes collect water? On what occasions?
- How long does it take women/men to reach the drinking water source?

- After collection, is the water poured into (a) storage container(s)?
- What type of water storage containers are used in or outside the house?
- Do the household members clean their storage containers?

- How do the household members take water from the storage containers?
What utensils do they use?
- Do the household members settle (consciously), boil or treat their drinking water?
- Do the people utilize waste water? Where do they throw the waste water? (e.g after washing the dishes)?

- Do you see stagnant water or rubbish around the water points in the village?
- Are there places near the houses with stagnant water?

PERSONAL HYGIENE

- How often are women using chadders and duppattas to clean or dry:
hands:
noses:
bottoms:
- What about the length and cleanliness of nails of the women and children?
- What are the play objects people give to small children?
- Are the play objects which people give to small children reasonably clean?

BATHING

Observations/ questions:

- Do people wash themselves in the morning?
- When do people bathe?
- Where do men/women/children bathe?
- How do women/ men/ children bathe?
- What water source do they use for bathing?
- Do they use soap during bathing?
- What do they use to dry themselves?

CLOTHES WASHING

- Where do people wash their clothes?
- When do people wash their clothes? How often? Is soap used?
- Where do people put the stained clothes?
- What do people do with bedding (sun drying, washing)?
- Where do people keep their bedding?

FOOD HYGIENE:

- What do you observe about a special towel used for cleaning hands after the meal?
- Do people wash raw food/fruits thoroughly before eating?
- Are there many flies in or around the house?

DEFAECATION PRACTICES

- Do people go together for defaecation?
- Where do people defaecate if they use the field (separate places men/women/children)?
- What people use for anal cleansing?
- Do you observe faeces at the special defaecation places?
- Do women/ men/ children wash their hands after defaecation?
- Where do people deposit the stools of infants and small children?
- Is there a time pattern in defaecation practices?

ANNEX 4:
QUESTIONNAIRE FOR BACKGROUND INFORMATION

WATER

- Is there enough water available during the whole year?
- What is your opinion about the water (taste, temperature, cleanliness)?
- When your drinking water is of better quality (season)?
- Do you consciously settle your drinking water?
- Do you sometimes boil water for drinking? When was the last time?
- In what cases do you boil or treat your water?
- How does your drinking water get contaminated?
- Do you think that the water you drink can cause diarrhoea?
- Do you reuse waste water?
- What problems generally, do you face with your drinking water during the year?

DIARRHOEA

- What words do you use for diarrhoea?
- What is diarrhoea?
- How do you describe certain types of diarrhoea? Are there certain types that do not require any intervention?
- What can be the causes of diarrhoea?
- What do you do when your child has diarrhoea?
- What do you expect from the action taken and the treatments given?

HEALTH EDUCATION

- Has any health education been given in the village? For whom? By whom?
On what topics?
- What do you still remember from it?
- Was it useful to you? Why?
- Did anything change in the household or in the village? If yes, what has changed?
- Do you think it will be useful for you to attend (more) health education sessions? Why?
About what topics do you like to learn more?
- Is there any male or female health committee in the village?
What are their tasks? How often do they have meetings?

ANNEX 6: WATER SOURCES

The present drinking water sources are the nullah and channels, the traditional water pits, river water, snow and the communal and household taps.

The nullah and channels

Glaciers and snow are the principal source of all water in the area. Melted water comes down from the mountains in streams, that subsequently feed the man-made channels. Villagers fetch water from these channels directly or use it to fill water pits. In the winter the villagers temporarily close the channels because there is either not enough water or to avoid freezing and damage of the channel.

Traditional water pits

Besides water channels, traditional water pits are a common source of water. These pits are filled with water from the channels late in the evening or early in the morning. Both individual and communal water pits are used. A communal water pit is shared by four to eight households. Water use from the pits becomes increasingly important in the winter months when less channel water is available. In Baltistan water pits are often only used in winter when there is a water shortage.

Springs

Spring water is also used for drinking and is usually considered clean. Most of the springs have been proved to be bacteriologically clean. They are the preferable sources as they provide cold water in summer and they are not too cold in winter.

River water

River water is used by the villagers who often do not have access to other water sources and live in a muhallah located near the river. During the summer months the people consider river water dirty because of the turbidity but as it is often a cold source they still make use of it. In winter the use of river water increases when other sources are not available.

Snow

During winter in higher altitude villages of Northern Areas and Chitral, when other water sources are frozen or not within reach, people use snow for drinking water. Due to cold weather people keep the fire burning during the day and night and use that fire to melt snow in large cooking pans.

Communal and household tap connections

Sources for piped water are usually nullahs or springs. In summer the tap water is often used for all purposes except for drinking! Stand pipes are often left open for the reason that it is considered cleaner and colder when the water is running. During winter a lot of pipe connections are kept open to avoid freezing. However in the higher up areas in Gilgit, Baltistan and Chitral the piped water system is often closed for one to three months to avoid damage of the pipes and tank.

ANNEX 7: WATER CONSUMPTION WITHIN THE HOUSEHOLD

1. RESULTS OF WATER CONSUMPTION ASSESSMENT

During the domestic studies an activity was carried out to assess the average amount of water that is used in households. The method and the objective of this activity was distinct from the rest of the study and therefore the results are presented in an Annex. To assess the water consumption a participatory method called 'pocket chart' was used (see Chapter 1.2). In all the villages the women took the exercise seriously and counted the collected water containers for three to five consecutive days. This activity allowed additional observations to be made and helped further understanding of villagers' use of water.

The overall results of the study are shown in the Table below. The average amounts are calculated per person per day (total amount of water : number of days : number of household members). The data of three of the 90 households has been excluded as these were not reliable²⁶. On average the collected amounts per household range between 50 and 400 litres per day. Per person/day this comes to 18 litres in Chitral, 14 litres in Gilgit and 16 litres in Baltistan.

	AVERAGE AMOUNT OF WATER CONSUMPTION (calculated in litres per person per day)										Average amount by village litres/ person/day	Average amount by region litres/ pers./day
	Ref.number of the selected household											
	1	2	3	4	5	6	7	8	9	10		
CHITRAL												18
Damik	15	25	21*	[36]	44	17*	[50]	40	32	21	26	
Hassanabad	9	12	7	9	9	14	7	16	12	4	10	
Yakhdeez	16*	31*	9	7	52*	11	11	23*	11	[79]	19	
GILGIT												14
Sandi	26	17	5	5	12	10	4	28	9	7	12	
Salmanabad	11*	11*	8*	13*	9*	10*	10*	14*	9*	13*	11	
Jaglote	25*	16	14*	19*	14	31	30	15*	5*	33*	20	
BALTISTAN												16
- Shigri	15	8	23	11	14	15	19	24	22	10	16	
- Thorgo	4*	15*	20*	9*	6*	10*	10*	13*	11*	8*	11	
- Surmo	18*	20*	15	13	24	15	34	13	28	18*	20	

Table 19: The average amounts of water collected during three to five days, calculated in litres per person per day

* = household with access to a functional water tap

[..] = results from households that were not included in the calculation

These figures are averages and if we look at figures per household we can see that some use less than 10 litres per person per day. In most of the villages people seem to use less than the 20 liters per person per day the World Health Organisation (WHO) recommends as a minimum provision rate.

²⁶. Two households in Damik and one in Yakhdeez are excluded. These households indicated, considering their household size and their activities, an unrealistically high amount. Both villages were nominated for a water supply scheme of the Chitral Area Development Programme (CADP). The investigators assumed that by over-reporting the villagers thought they could influence the design of their future scheme!

Factors influencing the water consumption pattern

The amounts of water used in households are not consistent. In the three to five day period considerable variation was noted. A number of factors can explain this difference.

Variation between days of the same households: Variation between the amounts used in a single household may be due to reasons like: occasional social events (guests, special occasions), household members take a bath or wash clothes on one day and not on another and or on the availability of channel water, which is related to irrigation turns.

Variation between households: Between households differences in water consumption can be explained by factors such as family size, the number of cattle kept near the house and the distance to the source. Moreover the household's hygiene standard can account for higher consumption due to more regular bathing, cooking and cleaning methods and the presence of a pour-flush latrine.

Seasonal variation: The season may also influence the amount of water used by households. The water consumption study however, was not repeated in the winter months and quantitative figures are not available. It is expected that amounts of water will be about the same as in summers, perhaps a little less. In the winter most animals will be fed and watered inside their sheds and thus more water is required. On the other hand the consumption of drinking water and the use of water for body and clothes washing will be less.

2. DISCUSSION ON THE RESULTS OF THE WATER CONSUMPTION STUDY

The results of this study give an indication of the actual amounts of water that are used per person near or inside the household. The figure does not indicate the total amount of water that should be supplied through a piped systems. This amount of water will be higher if for example tap water is used for washing clothes, utensils and vegetables (those uses were not included in the present study). It has also been regularly observed that -mainly communal- taps are running throughout the day because the tap is broken or because nobody bothers to close it. In future implementation of schemes it will be necessary to emphasize the proper use and maintenance of standpipes.

The data indicate that socio-economically well-off households consume higher amounts of water than poorer people. Richer households have more guests, prepare more tea and food and may have pour-flush latrines. They may also have a higher hygienic standard and use more water for washing, though this would need to be substantiated.

The data does not indicate that households with access to a tap have a higher water consumption than households without a water supply scheme. For example in Salmanabad (a village with a water supply with communal or household standpipes) the average consumption is 11 litres per person per day. This is less than the 16 litres per person used in Shigri Bala which is a similar village without piped water but with a variety of traditional water sources. It seems that distance from the household to the tap is the main factor that influences the water collection. For example, in Yakhdeez four households (# 1, 2, 5 and 8) have access to a nearby stand pipe. They use significantly more water than the other five households who collected water at a distance of about five to ten minutes walk.

It is a common assumption that the provision of tap water will result in better quality drinking water and use of a greater quantity. This again is expected to lead to improved health status and hygiene behaviour. The limited evidence from this study shows that access to tap water nearby the house is likely to have more impact than the provision of communal standpipes at a distance from the house.

ANNEX 8

BACTERIOLOGICAL CONTAMINATION OF HANDS AND ITS REDUCTION AFTER HANDWASHING WITH WATER

Most health education programmes promote handwashing with soap. In the Project area a number of factors may inhibit the successful introduction of a handwashing message that includes the use of soap. These factors include:

- soap is a relatively expensive product (average cost of body soap is Rs.6 about 0.20 US\$);
- soap is seen as a luxury product;
- other cultural inhibitions exist such as soapy smelling hands;
- use of soap can be impractical as a lot of water (preferably running) is required to rinse it off.

The promotion of washing hands with soap may not be realistic given these constraints. The WSHHSP therefore wanted to test the efficacy of a simpler and more practical message 'wash your hands with plenty of water before the meal'. This message builds on the local tradition of washing hands before a meal (at least when guests are present), and on the normal custom of thoroughly rubbing hands. Evidence from Bangladesh shows that rubbing is very important in reduction of contamination on hands and it was anticipated that a similar effect would be possible in Pakistan.

In order to test the efficacy of washing hands with water the social scientists and microbiologists designed a study. The methodology of this study is explained in Chapter 1. The first tests were carried out with a group who did not wash hands and a group who washed hands with a normal amount of water. The tests were repeated with a similar group who did not wash hands and a group who washed hands with plenty of water (more than they normally would have used). Over a five month period 107 samples were taken in two villages. Contamination levels of unwashed hands varied between zero and 2,000 E-Coli per sample.

For analyzing the data the level of contamination was divided into four different categories. The group of people who washed with a normal amount of water, did not show any difference in contamination levels with the group who did not wash their hands. This indicates that washing with a small amount of water does not lead to a significant decrease of E-coli on hands. The people in the third category, washing with plenty of water showed a significant reduction of E-coli on their hands, as compared with the non-handwashing group ($p = 0,009$).

E-coli/100ml (n = 107)	Not washed (n = 14)	Washed with a normal amount of water (n = 15)	Not washed (n = 42)	Washed with plenty of water (n = 39)
0 - 20	5	4	13	23
20 - 100	3	2	8	8
100 - 500	1	3	11	1
> 500	5	6	10	7
	$p = 0.3$		$p = 0.009$	

Table 20: Microbiological results of hand samples

The hands of some of the test persons remained contaminated after thoroughly washing. One person who had washed hands was found in the category with a contamination of 100-500 E-coli and seven people in the category above 500 E-coli. Thus washing hands with water is not enough to completely eliminate contamination but it does have a positive effect on the reduction of contamination on people's hands.



