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STRATEGY ON SANITATION FOR  
**HIGH RISK COMMUNITIES  
IDENTIFICATION AND PLANNING**

LAUSANNE, 30TH MARCH 2000



Edited by D.D. Genske, K. Heinrich, J. A. Hueb

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# STRATEGY ON SANITATION FOR HIGH RISK COMMUNITIES - IDENTIFICATION AND PLANNING

Proceedings of the 1st International Workshop on  
Strategy on Sanitation for High Risk Communities; Identification and Planning,  
30th March 2000,  
Lausanne, Switzerland

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FÉDÉRALE DE LAUSANNE

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Cover page. Scavengers on waste dump in Albania (Photo © EPFL, EGS)

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**TABLE OF CONTENT** **I**

<b>PREFACE .....</b>	<b>1</b>
<b>1 REFLECTIONS ON HIGH RISK COMMUNITIES..</b>	<b>5</b>
<b>1.1 On identification of high risk communities and strategies on sanitation .....</b>	<b>5</b>
<i>(K Heinrich EPFL, EGS)</i>	
1.1.1 Introduction .....	5
1.1.2 Reflection on definition of HRC .....	6
1.1.2.1 What is a community? .....	6
1.1.2.2 What is a hazard? .....	7
1.1.2.3 What is exposure? .....	8
1.1.2.4 What is susceptibility? .....	9
1.1.2.5 What is a risk? .....	10
1.1.2.5.1 Combined risks	10
1.1.2.5.2 What is a high risk?	11
1.1.2.6 Why to emphasis sanitation? .....	12
1.1.3 Proposal on definition of HRC .....	12
1.1.4 Reflections on the identification of HRC .....	13
1.1.5 Principal criteria for ideal indicators .....	13
1.1.6 Indicator sets .....	15
1.1.6.1 Quantity of indicators .....	17
1.1.7 Data acquisition .....	17
1.1.8 Candidate indicator sets .....	19
1.1.8.1 Practical explanation on indicator philosophy .....	19
1.1.8.2 Spatio-functional and socio-functional disparities .....	21
1.1.9 References .....	21
<b>2 CASE STUDIES .....</b>	<b>23</b>
<b>2.1 Towards sustainable environmental health in Albania .....</b>	<b>23</b>
<i>(S Abramowski, F Bouvet, &amp; D D Genske, EPFL, EGS)</i>	
2.1.1 Introduction .....	23
2.1.2 Albanian public health engineering project .....	24
2.1.3 Conclusion and perspectives .....	25
<b>2.2 Reducing waste water problems in low-income semi-urban communities in Kathmandu Valley..</b>	<b>31</b>
<i>(E Bolt, IRC Int Water &amp; Sanitation Centre Delft)</i>	
2.2.1 Introduction .....	31
2.2.2 What is the problem? .....	31
2.2.3 About the workshop .....	32
2.2.4 Some data resulting from the field analysis .....	33
2.2.5 What to do/possible solutions? .....	34
2.2.6 Working towards change .....	35

2.2.6.1 Annex (as produced by workshop participants).....	36
2.2.6.1.1 Introduction	36
2.2.6.1.2 Major problems of wastewater management	37
2.2.6.1.3 Problem caused by open toilet drain.	37
2.2.6.1.4 Technical need	37
2.2.6.1.5 Cost of construction	38
2.2.6.1.6 Management and operational cost	38
2.2.6.1.7 Technical capability to operate and maintain	39
2.2.6.1.8 Social Acceptance	39
2.2.6.1.9 Environmental impact	39

**2.3 A strategic response to urban sanitation in a war-torn city (Kabul, Afghanistan).....41**  
*(P Jansen, ICRC)*

2.3.1 Introduction.....	41
2.3.2 Scope of the survey.....	41
2.3.3 Problem analysis & survey methodology.....	42
2.3.3.1 Difficulties affecting sanitation in Kabul.....	42
2.3.3.2 Methodology.....	43
2.3.4 Survey results.....	43
2.3.4.1 Traditional and improved latrines.....	43
2.3.4.2 Composting and night soil collection:.....	43
2.3.4.3 Collective and individual septic tanks.....	44
2.3.4.4 Sewerage networks:.....	44
2.3.4.5 Capacity of the public services.....	44
2.3.5 Strategy development.....	45
2.3.5.1 Key principles.....	45
2.3.5.2 Possible areas for investment.....	45
2.3.5.3 Working area.....	45
2.3.5.4 Programme planning.....	45
2.3.6 Programme outputs.....	46
2.3.6.1 Improved Latrine design.....	46
2.3.6.2 Outputs from 1996 to date.....	46
2.3.6.3 Balance for full coverage.....	47
2.3.7 Future Developments.....	47
2.3.7.1 Health Education and messages.....	47
2.3.7.2 Night soil collection and use of compost.....	47
2.3.7.3 Monitoring and data base.....	48
2.3.8 Effectiveness: Effects on health.....	48
2.3.9 Conclusion.....	49

**2.4 Potential Health Risk Assessment as a Possible Approach for Planning Remedial Actions in HRC - The Case of Niono, Mali.....50**  
*(A Montangero, M. Strauss, EAWAG/SANDEC)*

2.4.1 Context and Scope.....	50
2.4.2 Water, Sanitation and Health in Niono.....	50
2.4.2.1 Transmission routes.....	51
2.4.3 Reducing Health Risks.....	52
2.4.4 References.....	54

<b>2.5</b>	<b>Identification of Diarrhoea High Risk Areas in Ouagadougou (Burkina Faso)</b> .....	55
		<i>(G Cissé, CSRS)</i>
2.5.1	Introduction .....	55
2.5.2	Aims of the study .. .. .	55
2.5.3	Methods..... .	55
2.5.4	Results .....	56
2.5.5	Conclusions .....	56
<b>3</b>	<b>ASPECTS OF IDENTIFICATION AND EVALUATION</b> .....	57
<b>3.1</b>	<b>Urban aerial sanitary diagnostics for HRC</b> .....	57
		<i>(K Heinrich &amp; C Briod, EPFL, EGS)</i>
3.1.1	Screening of High Risk Communities by means of Remote sensing .....	57
3.1.1.1	Costs .. .. .	59
3.1.2	Urban aerial Sanitary diagnostics for HRC Remote hazard mapping in Ouagadougou..... .	60
3.1.3	Reference . . . . .	61
<b>3.2</b>	<b>HRC's evaluation and qualification (priority ranking) and sanitation strategy comparison using Multiple Criteria Decision Aid (MCDA)</b> .....	62
		<i>(D Bollinger, Bureau AD)</i>
3.2.1	What is the "Bureau d'aide à la décision" . . . . .	62
3.2.2	A participatory approach is the key of success ... .	62
3.2.3	What can we offer as a standardisation or as a framework ? .....	62
3.2.4	Identifying HRC: the multiple criteria approach.....	63
3.2.4.1	Which criteria should be chosen? .....	63
3.2.4.2	How to evaluate these criteria? .. .. .	63
3.2.4.3	Commitment .....	64
3.2.4.4	Analysing the data to decide better.....	64
3.2.4.5	Choosing an multiple criteria method .....	65
3.2.4.6	Sorting the communities.. .. .	65
3.2.5	Develop strategies, compare them and set priorities for all steps of these strategies..... .	65
3.2.5.1	Building the strategies .. .. .	65
3.2.5.2	Comparison, prioritisation..... .	66
3.2.6	Advantages of Multiple Criteria Decision Aid for Sanitation strategies for HRC..... .	66
<b>4</b>	<b>ASPECTS OF ENGINEERING</b> .....	67
<b>4.1</b>	<b>Humanitarian Charter and Minimum Standards in Disaster Response (Minimum Standards in Water Supply and Sanitation)</b> .....	67
		<i>(The Sphere Project)</i>

<b>5</b>	<b>ASPECTS OF COMMUNICATION</b> .....	<b>69</b>
<b>5.1</b>	<b>Water talk - Intercultural development communication</b> .....	<b>69</b>
	<i>(D D Genske, EPFL, EGS &amp; E W B Hess-Luttich, Univ Berne)</i>	
5.1.1	The challenge.....	69
	Risk research and communication conflict .....	71
5.1.3	Water talk – an African field study.....	77
5.1.4	Objectives .....	81
<b>6</b>	<b>ASPECTS OF GENDER</b> .....	<b>87</b>
<b>6.1</b>	<b>Gender and sanitation</b> .....	<b>87</b>
	<i>(E Bolt, IRC Int. Water &amp; Sanitation Centre Delft)</i>	
6.1.1	Introduction.....	87
6.1.2	Women’s involvement and gender, what is the difference? ....	88
6.1.3	Where things can go wrong .....	89
6.1.4	Health impact.....	90
6.1.4.1	Remedial action.....	90
6.1.5	Reaching women .....	90
6.1.5.1	Remedial action.....	90
6.1.6	Financing and credit. ....	90
6.1.6.1	Remedial action. ..	91
6.1.7	Legal issues.. ..	91
6.1.7.1	Remedial action. ..	91
6.1.8	Employment.....	91
6.1.9	Remedial action ..	91
6.1.10	The learning and changing organisation ..	92
6.1.11	Conclusion .....	93
<b>7</b>	<b>DISCUSSION / EPILOGUE</b> .....	<b>95</b>
<b>7.1</b>	<b>Des conditions sanitaires décentes pourraient changer la face du monde</b>	<b>95</b>
	<i>B Fournie EPF Lausanne, Presse &amp; Information</i>	
<b>7.2</b>	<b>Discussion / Afterword</b>	<b>97</b>
<b>7.3</b>	<b>Acknowledgements</b>	<b>98</b>
<b>8</b>	<b>APPENDIX</b> .....	<b>100</b>
<b>8.1</b>	<b>Indicator list (proposal)</b> .....	<b>100</b>
<b>8.2</b>	<b>Appendix: Environmental matters (provisional agenda 12.3)</b> .....	<b>106</b>
<b>8.3</b>	<b>Sanitation Appendix: Global Water Supply and Sanitation</b>	<b>114</b>

# PREFACE

*Dieter D Genske*  
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About half a year ago, the Laboratory of Ecotechnics and Sanitary Engineering of the EPFL discussed with the World Health Organisation the need of action to mitigate health problems in high risk communities. Stimulated by the WHO-Resolution *WHA51.28 Strategy on sanitation for high risk communities*<sup>1</sup> it was decided to bring together experts in the field of sanitation and to hold a workshop on the question on how high risk communities can be defined and identified, and how both preventive and curative actions can be taken.

Many came, including representatives of the International Committee of the Red Cross ICRC, the International Federation of Red Cross and Red Crescent Societies, the SANDEC-Group of the EAWAG, the IRC International Water and Sanitation Centre Delft, the Médecins Sans Frontières MSF, the Swiss Tropical Institute ITC, and experts

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<sup>1</sup> See appendix 8 2



from universities including Bern and, of course, the Swiss Federal Institute of Technology Lausanne. It was commented with relief that finally, after so much talk on water, sanitation is addressed. The statistics indicate clearly the importance of this issue: while access to safe water has increased steady over the last decade with only 15 % of the developing world left unserved, sanitary conditions have not improved at all. Today, over 3.3 billion people in all developing countries<sup>2</sup> – i.e. two out of three – have no access to even the most basic sanitary infrastructure. In countries such as Guinea-Bissau, where more than half of the population has access to safe water only one out of five citizen live in safe sanitary conditions, prompting a child mortality rate of some 20 %, i.e. one child out of five dies before the age of five (figures of 1994/95 WHO).

The workshop was started with a critical review on how high risk communities can be defined, followed by a series of case files illustrating sanitary fieldwork. In the second part aspects of identification, engineering, and communication were addressed. In the final discussion questions on future actions were raised. It was decided that the Lausanne workshop shall help starting-up a number of initiatives including the constitution of a network and the formation of working groups dealing with sanitation in high risk communities. The proceedings of this workshop, which you are now holding in your hands, are only the beginning of a more profound dialog on this issue, a dialog that will be facilitated by utilising the world wide web (<http://dgrwww.epfl.ch/GS/WHO/info.html>) and will be open to comments from all sides, including your own.

Lausanne, June 2000,  
Dieter D. Genske

*José Augusto Hueb  
Water, Sanitation and Health Programme  
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Access to safe water and adequate sanitation is an absolute prerequisite for healthy living. Yet for the poor, sanitation services are not available and water supplies are neither safe nor adequate. Sanitation is of particular concern as about a half of humanity has no access to any improved sanitation facility.

Every year, approximately 2 million people die from diarrhoeal diseases and perhaps some billions of peoples in the developing world are suffering at any one time from one or more of the six main diseases associated with hygiene, sanitation and water supply (diarrhoea, ascariasis, dracunculiasis, hookworm, schistosomiasis and trachoma). Add to this,

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<sup>2</sup> Figures vary considerably according to methods of inquiry and year of survey. Compare figures in appendix 8.2 with 8.3 (more recent).

the health, economic and social burden associated with the lack of access to an adequate sanitation facility and the time and effort wasted by women and children carrying water from distant, often polluted sources.

The World Health Organization is strongly committed to the promotion of sanitation programmes for high risk communities as crucial elements of health development, and improvement of human wellbeing. To address this issue, the World Health Assembly adopted in 1998 the *Resolution WHA51.28, Strategy on sanitation for high risk communities*. This strategy establishes the basis for the development of the work of WHO towards improved sanitation for the poor.

We hope that this joint initiative of WHO and EPFL to organise this important workshop aimed at identifying possible action towards the implementation of Resolution WHO51 28 will set the basis for extensive work to be carried out not only by WHO and EPFL but also by all the external support agencies interested in this important issue.

Geneva, June 2000,  
José Augusto Hueb



# 1 REFLECTIONS ON HIGH RISK COMMUNITIES

## 1.1 On identification of high risk communities and strategies on sanitation

*K Heinrich,  
EPF Lausanne, Ecotechnique et Génie Sanitaire  
Section Site Investigation & Risk Assessment*

### 1.1.1 Introduction

In 2000 3 31 billion people have no access to adequate sanitation. This is more than 50% of mankind. Instead, efforts to improve water supply have been relatively successful during the last decades. Nowadays 'only' 1.1 billion people have no access to safe water. Just taking these figures into account, the problem of sanitation is three times larger than the drinking water problem. Hence, in 1997 the executive board of the WHO agreed on the provisional agenda 12.3 (EB101/19) focusing on

*'Environmental matters – strategy on sanitation for high risk communities'.*

The agenda outlines an approach for environmental sanitation that seeks to identify, control or change of insanitary conditions and related human behaviour in order to prevent the transmission of diseases, especially in high risk communities. According to the provisional agenda 12.3, high risk communities (HRC) face the worst sanitary conditions and

the highest risk of contracting sanitation related diseases. Any investment in sanitation and water supply for these HRC would therefore result in a major impact. However, a key function for the improvement of sanitary conditions is the identification, qualification and quantification (priority ranking) of high risk communities, the adequate representation of enquiries being a decision base for local and national planning of remedial action in the membership states. The agenda provides a general strategy on sanitation for HRC, including general definitions and approaches. Bearing in mind the complexity of societies, environments, cultures, behaviours, individuals, vectors, diseases, etc., these preliminary definitions and basic approaches have to be specified. In these complex circumstances that evade direct measurements, indicators have to be established as substitutes or proxies that enable the set-up of strategies for solution and prevention. This paper can be seen as a contribution to this specification and an invitation to a discussion on this urgent topic.

### 1.1.2 Reflection on definition of HRC

In order to talk about HRC we need a common understanding of the terms involved. 'high', 'risk' and 'community'.

At the first glance the term 'high risk community' is simple and understandable. The words are clear and anybody could instantly mention a group of individuals at high risk. There are, for example, children and elderly as road users, pregnant women in air planes, smokers, people living next to an airport or a highway, etc.

When leaving our insured western world, considering the same term is even easier. people living in slums of mega-cities, displaced people struck by natural disaster or civil war, refugees, scavengers, under- and malnourished individuals, people consuming unsafe water and/or living in unhygienic conditions due to inadequate sanitation, etc.

However, the last example points out one problem about risk communities and their precise distinction from non-risk communities. there are overlapping or cumulative risks, here succinctly expressed by "and/or". Furthermore, the risk *can* but it *does not have to be* overlapping. In addition a time factor is involved. Just taking the case of a smoker smoking over years, a malnourished individuals eating unilateral over a longer time or a refugee in a spontaneous camp suffering from cold and hunger: the risk can be chronic or acute

The reflections above on communities at risk illustrate the complexity of the topic and the demand for an analytical approach in order to clarify the term 'high risk community'.

#### 1.1.2.1 What is a community?

Intuitively 'community' is a geographic area that is defined by the members of the community. The members of the community may be subject to same specific external circumstances and are living and interacting within a specific geographic area. Principally a community can include a small

rural neighbourhood, large metropolitan areas, a whole country or even the entire planet. The local community is part of a greater population, i.e. it is a sub-population, subset of the population or a group. However, these sub-populations can be further subdivided.

Besides the geographical component the word 'interacting' indicates the *spatio-functional* characteristic of communities. Their bond could be, for instance, economic transactions, social relationships or environmental interdependencies.

As mentioned above, a community can also be defined as a function of certain external circumstances, such as traditions, social and political conditions as well as the lack of adequate water supply or sanitary facilities for example.

A community is rather an intricately connected web than the sheer combination of isolated elements such as, economy, environment, and society

However, this rather geographical definition has to be extended by a *socio-functional* aspect: a body of individuals defined by common gender, age, social roles and position, (possibly organised) interests and goals, problems and practices also forms a community.

An individual is member of more than one community at the same time. The memberships to (sub-)communities can be unequivocal (e.g., gender), or vague (e.g., age – what is old?: life expectancy in Ethiopia 43.33 years [1997], in Japan 79.99 years [1997] (FWA, 1999)), or multiple (female-working-children) or partial (incomplete protection given by vaccination). Shared socio-functional implications of individuals of a community do not necessarily require the members living in geographic proximity to each other. Their function (e.g. profession) or a functional device (e.g. drinking water supply by tap, lack of vaccination) can be the bond among them. Tailored to the purpose of defining HRC in summary one may say:

*A community is a part of a greater population, i.e. subset of the population, which has common spatio-functional and/or socio-functional characteristics. An individual simultaneously can be member of several communities*

This definition of community implies different degrees of exposures towards a complex melange of interacting synergistic influences of the realities of life. These influences can be favourable or adverse, due to prevailing safety or hazard. The terms hazard and exposure are important in the understanding of risk.

#### 1.1.2.2 What is a hazard?

Hazard subsumes inherent unfavourable or dangerous items, conditions, actions or properties that potentially adversely affect protective receptors such as human beings or goods.

Okrent (1980) considered two people crossing the ocean, one person in a liner and the other one in a rowing boat. The

hazard (death by drowning) is the same for both individuals but the risk (probability of drowning) is different. The rower and his vehicle is more exposed to the rigours at sea than the passenger of the liner. The connecting link between hazard and risk is the exposure to the first.

In the context of environmental sanitation and the identification of HRC, hazards are manifold:

- Political hazards: e.g., unstable political system, systematic under-privileging, displacement, escape of (civil) wars.
- Socio-economical and /or socio-functional hazards: e.g., unemployment, poverty, social position and role.
- Health hazards: e.g., contact with biological pathogens, malnutrition
- Geographical hazards: e.g. lack of water (arid climates), de-centrality, marginal informal settlements<sup>3</sup>.
- Functional hazards e.g., residential factors, lifestyle (HIV), habits, profession, strategy of survival (scavengers).
- Physical hazards: e.g., exposure to weather (no shelter), flooding, poor hygienic conditions.

Although incomplete, this list shows a diverse picture of hazards potentially contributing to a risk situation for a certain community. However, considering the hazards only falls too short. The background of the potential hazards mentioned above is made up by a universal intermediate system of non-functional doings and disciplines particularly including religion, philosophy, science, education and information.

### 1.1.2.3 What is exposure?

The list of potential hazards shows two principle qualitative groups.

The first group is the universal intermediate system, i.e. the socio-economical and political complex. This framework represents to a certain degree an abstract background condition, which also determines the existence and the quality of a basic infrastructure<sup>4</sup>, for instance, in (health) education, agriculture, traffic, water supply and sanitation.

---

<sup>3</sup> These marginal settlements often are located close to hazardous industries (chemical pollution), in flood plains (flooding), at steep slopes (contaminated surface run off, landslides), etc (Blankie, et al 1994 25)

<sup>4</sup> Definition of *infrastructure* In the strict sense the inventory of an area with material facilities that form the basis for pursuing of the basic functions of existence and enabling a socio-economic development (material infrastructure) In a broader sense – that is applied here – the (immaterial) infrastructure also includes institutional (e.g., social, political and economical organisations) and the personal infrastructure (skilled people making society functioning) *Infrastructure* may also be called 'capital' (Hart, 1999) i.e., social, financial and built up capital

comprise natural entities and not manmade infrastructure. Social and natural capital are much more difficult to quantify, but they are just as important for a community as the classical financial capital or built up capital. However, this complex forms the framework for the second hazard group.

The quality of infrastructure is a direct link to the second hazard type, which is hence, less abstract or more 'real' in the sense that it affects the receptors (human beings or goods) directly. The 'real' agents such as biological pathogens, can be measured directly (e.g. faecal coliform count in the drinking water) or assessed indirectly by indicators such as health statistics, e.g., incidents of diarrhoea per year.

The indirect and 'abstract' political, socio-economical entities are only assessable by indicators, such as unemployment rate, percentage of people working in the informal sector, participation of women in political committees, etc..

Exposure towards a certain hazard provides a further part in risk assessment. A given exposure may be the same to a certain community (e.g. a group sharing the same latrine), but realisation of an adverse effect depends on a further factor. the individual susceptibility.

The definition of exposure in the context of HRC could be.

*A receptor being subject of indirect 'abstract' political, socio-economical entities and/or getting in direct contact with 'real' chemical, physical or biological agents<sup>5</sup>.*

#### 1.1.2.4 What is susceptibility?

The susceptibility of an individual or a community can be seen as modifier of exposure. Returning to our example of the ocean liner and the rowing boat, we readily anticipate that the person in the rowing boat is not only more exposed to the rigours at sea, thus also more vulnerable, hence the oarsman reacts more sensitive to a storm, for instance, due to size and construction material of the boat. If drowning actually occurred, it could be called disaster. That is, disaster can be seen as the realisation of hazard (Orkent, 1980) The probability of disaster is increased in the rowing boat.

A disaster due to environmental sanitation is more probable to occur within certain 'weak' communities such as children, women, disabled and elderly. These sub-populations being socio-functional communities, are relatively more susceptible towards adverse health factors. Their capacity to anticipate, cope with, resist and recover from disaster is relatively decreased compared to the average.

Exposure and susceptibility determine the 'probability' of realisation of disaster and hence constitute the link to the term 'risk'

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<sup>5</sup> See also USEPA. 1999 Sociodemographic Data used for Identifying Potentially Highly Exposed Populations.



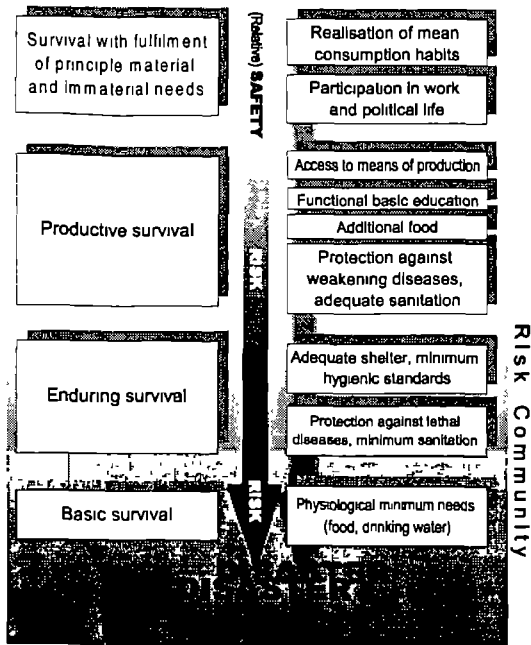


Figure 1: Survival levels and living standards related to safety, risk and disaster (after Nohlen, 1989: 279, modified)

### 1.1.2.5 What is a risk?

'Risk' is sometimes taken synonymous to 'hazard' but 'risk' has the additional implication of the chance of a particular hazard actually occurring (Smith, 1992). That is, risk is the probability that an adverse effect towards a receptor, i.e., life, health, and/or the environment will occur as a consequence of the exposure towards a hazard (such as exposure to a biological pathogen). The realisation of a risk is called disaster in the context of HRC ultimately manifested in a high mortality. Figure 1 shows the hierarchic transition from safety towards increasing risk and disaster as well as the connected involved survival levels and living standards.

Some risks can be measured or estimated in numerical terms (e.g., percentage). These measures or estimations have to consider the elements of reality illustrated in figure 2.

#### 1.1.2.5.1 Combined risks

As already mentioned in paragraph 1.1.2.1, an individual is always member in various communities. Since in this paper the base for identification of communities is the 'risk', it is likely that one and the same member or group is simultaneously exposed to several hazards and hence, is at risk in a cumulative manner. To determine risk communities, it is necessary to establish a holistic view over the time, that considers the interconnections between multiple sources and media, vectors and pathways, and leads to multiple end-points (USEPA, 1997). The assessment of combined risks supplies a broader insight and is thus more realistic. A realistic view has less the character of a model and is therefore more complex and more sensitive to misjudgement at the same time. For example, it is generally difficult to measure exposure, let alone incidence and individual susceptibility. Although data and information<sup>6</sup> assessment has a key function in identification of HRC, it is the Achilles heel of the appraisal, especially in so called developing countries. Consequently the question is, how complex such an evaluation can and has to be, in an attempt to reflect reality by pointing to people at risk on the one hand and to be technically feasible on the other hand. Technical feasibility is depending on the degree of detail to be surveyed as well as methods and standards applied for a nation and/or global wide inquiry. It has to be seen in the light of countries with extremely high dynamic of demographic and spatial changes (migration into cities and subsequent urbanisation). Due to this processes

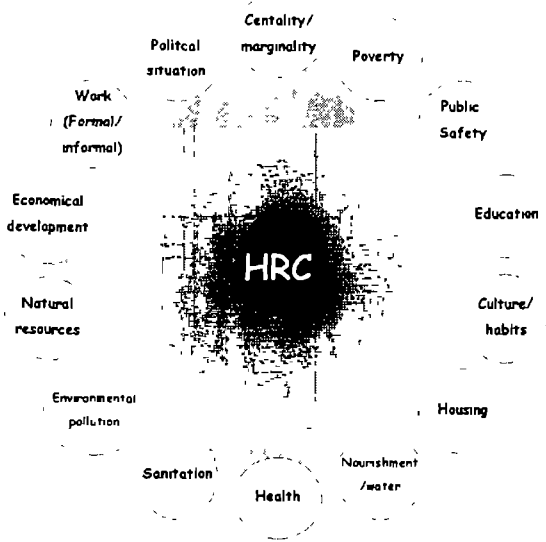


Figure 2: Aspects influencing and forming HRC (as they are reflected in the list of indicator in appendix 1)

<sup>6</sup> Definition *data* The word 'data' (lat 'datum' = 'a given entity') is more global than the word 'information'. Data can be numerical and alphanumerical, i.e., coded. The expression stands for raw data, which is an entirely or only partly ordered set of information particles, such as physical measurements of properties.

Definition *information* Etymologically the word 'information' can be derived from the Latin words 'in = into' and 'forma = shape, form'. As soon as data, i.e. information particles are analysed and concatenated (shaped, formed), it becomes (useful) information that that can be employed to give answers to questions (Heinrich, 2000)

data accessibility and availability is essential in those countries.

### 1.1.2.5.2 What is a high risk?

A synergistic risk assessment may facilitate the judgement of what actually is considered to be a high risk. Furthermore, some question remain:

- What are the terms low, medium and high referring to at all?
- Do they have absolute or relative character?
- If they are relative, to what reference level are they relating?

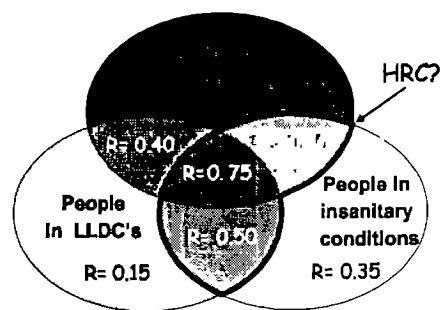
One indicator for deciding if a risk is high or low could be the aggregate, i.e. just the number of hazards and risks identified for a certain community. Susceptible groups may be exposed to a variety of hazards, such as the lack of water, malnutrition and inadequate sanitary conditions and resulting increased hazard of infection. An example is shown in figure 3. The intersection of all 3 sets could be a high risk community for instance, having a high probability of disaster. One also could possibly define a threshold level for example at  $R = 0.5$ <sup>7</sup>. However, being exposed to insanitary conditions may already sufficiently indicate a HRC.

This approach would help to identify HRC. Furthermore, it also reveals the origins of problems and hence enables a first step towards a solution strategy.

There are some questions about defining 'high risk':

- Actually, what is the reference scale of any quantification of risk?
- Do we have to define an ideal standard-non-risk community following the example of the market basket analysis?
- Perhaps there is one of the more than 191<sup>8</sup> states on earth that can be defined as an example to be taken as reference base?
- Instead, do we need a dynamic, locally-cultural definition of HRC<sup>9</sup>, that is based upon a fundamental flexible basic definition (framework)? Are there next to spatio-functional and socio-functional characteristics other properties to be considered in order to define HRC?

This paper cannot answer all of these questions. Instead, it should be seen as an incentive for further discussion by showing some possible pitfalls to avoid or ways to tackle the



R= Risk LLDC = Least Developed Countries

Figure 3. Exemplary sets of risk communities

<sup>7</sup> "Due to the current state of practice and limited data, the aggregation of risks may often be based on a default assumption of additivity" (USEPA, 1997: 3)

<sup>8</sup> An enumeration is difficult because of divided countries (e.g. China, Korea) or not/ not completely acknowledged ones such as West-Sahara, Cyprus)

<sup>9</sup> The perception of risk is sometimes deeply rooted in cultural understandings of people (Douglas, M. & Wildavsky, A., 1982)

problem on identification and strategies on HRC with special regard to environmental sanitation.

#### 1.1.2.6 Why to emphasis sanitation?

Because there is no sewage disposal without water supply, improved supply networks and the on-going demographic pressure and urbanisation caused a discrepancy<sup>10</sup> between the supply of safe water and safe sanitary conditions. As mentioned earlier, in 2000 about 3.3 billion people<sup>11</sup> have no access to adequate sanitation whereas 'only' 1.1 billion people have no access to safe water. Lacking safe conditions, diseases, such as diarrhoea, hookworm, schistosomiasis, trachoma, ascariis and dracunculiasis can readily spread in the sensitive triangle of water supply, hygiene and environmental sanitation. The figures above demonstrate the necessity of tackling the problem of environmental sanitation, hygiene and health.

#### 1.1.3 Proposal on definition of HRC

Bearing in mind the considerations above, a High risk Community could be defined as:

*A spatio-functional and/or a socio-functional set of individuals as part of a greater population, that is defined on the same evaluation system and that shares exposures to both,*

- *indirect and adverse political, socio-economical, environmental background entities and*
- *direct physical hazards also including chemical and biological pathogens*

*while simultaneously possessing an increased susceptibility towards these health hazards<sup>12</sup>.*

Generally issues of concern for a HRC community can be circumscribed with the following questions

- What is the quality of life for all members of a community now?
- Do people satisfy their basic needs?
- How do we measure quality of life?
- How is the quality of life affected by environmental sanitation?
- Is environmental sanitation a health concern?

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<sup>10</sup> The discrepancy in provision of safe conditions in water supply and sanitation exists because generally sewage disposal networks are constructed, with a phase delay, after supply networks. This is a result of the fact that the main function of domestic water supply is to collect and drain the water extracted in human residential and working areas, after it has been used, together with the produced waste that can be washed away (Ekardt, 1994)

<sup>11</sup> Figures vary considerably according to methods of inquiry and year of survey. Compare figures in appendix 8.2 with 8.3 (more recent)

<sup>12</sup> A numerical threshold value for distinction between HRC, risk community and no risk community could be achieved by overlapping indicators sets according to the principle shown in figure 3

- How involved are people in improving health relevant circumstance within their community?

During identification of HRC these question should be regarded, i.e the indicators should try to point out these issues.

#### 1.1.4 Reflections on the identification of HRC

The previous considerations and definitions allow a discussion of indicators for the identification of HRC with special regard to environmental sanitation. First however, it is necessary to develop criteria to guide the selection of HRC indicators in the light of the goal to create adequate sanitary conditions. After having defined the criteria, a conceptual framework for different indicator sets has to be chosen before specifying the proper indicators.

#### 1.1.5 Principal criteria for ideal indicators

The main questions about the ideal set of indicators are:

- What makes an indicator a good HRC indicator?
- What sources of data exist for a specific indicator?
- How are indicators actually being used?
- What do indicators say about a community at risk?

These all are questions of concern to anyone involved in community indicator work (Hart, 1999)

An indicator monitors the quality of a system by pointing towards an issue or condition. Indicators are typically used to observe and describe complex circumstances that evade direct measurements. They measure indirectly the status quo of a system. Indicators enable the set up of strategies for solution and prevention.

In order to guide the selection of effective indicators, it is wise to apply essential criteria against which the selection of principal HRC indicators could be assessed. These principal criteria are:

- Relevance
- Reliability
- Comprehensibility
- Scale resilience (population and time)
- Assessment and use of linkages
- Data accessibility
- Action orientation (usability)

A *relevant indicator* represents an important, pertinent and salient aspect of the subject under investigation and tells something significant about the system (Hart 1999, Chrvala & Bulger 1999: 27).

It is also important that some of the indicators measure the causes of the problems, not just the status quo and the

effects. This forms part of the pressure-state-response<sup>13</sup> concept (Hart 1999) where,

- the pressure corresponds to activities causing the status quo (important but frequently neglected),
- the state describes the status quo of a system and
- the response contains actions to change the present state.

A *reliable indicator* is trustworthy and valid for the universe under consideration.

The *comprehensibility* of indicators makes them understandable also to people who are not experts. This could for instance be the (field) auditors themselves or other researchers, decision makers who try to plan remedial actions or the community itself. It is necessary to elaborate indicators that address people (e.g., in the communities, or decision makers), in order that they understand what is their personal influence on the problems and their potential contribution to solutions. This will also support acceptance and participation for actions to be taken within the HRC and help prevent backlash against these measures (Hart 1999, Chrvala & Bulger 1999: 27)

The *scale resilience* of an indicator guarantees a universal expressiveness and applicability to communities of different sizes as well as different socio-functional and spatio-functional background. What is a HRC in Istanbul is not necessarily the same like a HRC in Dacca or Port-au-Prince. HRC's and applicable solution strategies in metropolitan areas will differ from solutions in rural areas. *Scale resilience* supports also the capability of monitoring over the time (time series), because it ensures validity over the whole observation period (Chrvala & Bulger 1999: 27).

The *assessment and use of linkages* (such as in figure 4) of different facets of reality satisfy the needs for proper description of complex systems. Traditional indicators tend to be narrowly focused on one aspect of a community (e.g., GNP, per capita income). When focusing only on increasing numbers of fresh water network connections while disregarding missing sewer system and purification plants, one may just be setting the community (or others) up for more problems down the road (Hart 1999).

Data acquisition is governed mainly by *accessibility* of information. Especially in so called developing countries, publicly available, recent and reliable statistical data is a crucial point in the inquiry process. Just regarding the high dynamics of demography and urbanisation, the demand for fresh data becomes obvious and to fall back on existing data

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<sup>13</sup> The *pressure-state-response* framework was developed for environmental issues and works well for those types of indicators. It is harder to apply this framework to social and economic issues. It helps to establish a context and draw a boundary around a problem before deciding what the pressures, states, and responses are (Hart 1999). Another difficulty with pressure-state-response discussions is that some things may be a pressure in one context and a state or response in another.

will be the exception. This fact stimulates the design and application of new indicators that are tailored to the problem of HRC

The *action orientation* of the chosen indicator intends to galvanise action and enable operation at all levels starting with the individual and leading via the local (high risk) community, to higher administrative units, such as the city, the province, farther to national and international units. It also encourages action by the public, organised (self-help) groups, NGO's, etc. Indicators have to be understandable and user friendly, especially with regard to the community itself and involved decision makers. If indicators are not used by the people, they will not have any effect on what people do. Indicators need to help people see how they can change their behaviour to have a positive effect on the well being of the community (Hart 1999, Chrvala & Bulger 1999: 27).

The characteristics mentioned above describe the ideal properties of an indicator for HRC. Regarding the situation of data acquisition and the related considerable effort, it is possible that not all criteria always can be met during application of HRC indicators.

### 1.1.6 Indicator sets

The identification of HRC has to consider a complex network of interactions between different aspects of reality. It is necessary to assess how the needs and different aspects of a community are linked as it is hint at in figure 2 (key aspects) and specified in figure 4.

All these different issues and needs are intertwined and each can be described by a set of indicators. These indicators should be categorised. However, the categories are not mutually exclusive, that is one indicator can point to several issues. Key aspects of reality for HRC's can be seen in figure 2. HRC are located in the centre of a 'sphere of influence' than being connected with straight lines to the other compartments. This reflects the fact that relationships during identification of HRC depends on judgement and interpretation and therefore is somewhat subjective.

Indicators of HRC's must be partly different from traditional ones. HRC's are complex since they are the result of multiple synergistic factors. Classical indicators for instance on economy (e.g., GNP) or health (e.g., diarrhoea rates) rather reflect an image of isolated aspects of the reality. It is helpful to assess if the indicators establish links between the different segments such as

- the material infrastructure (built capital) such as buildings, housing, water supply network, latrines, sewers, purification facilities, etc ,
- the personnel infrastructure (human capital), i.e. the people's skills, abilities, health, and education level, etc.,

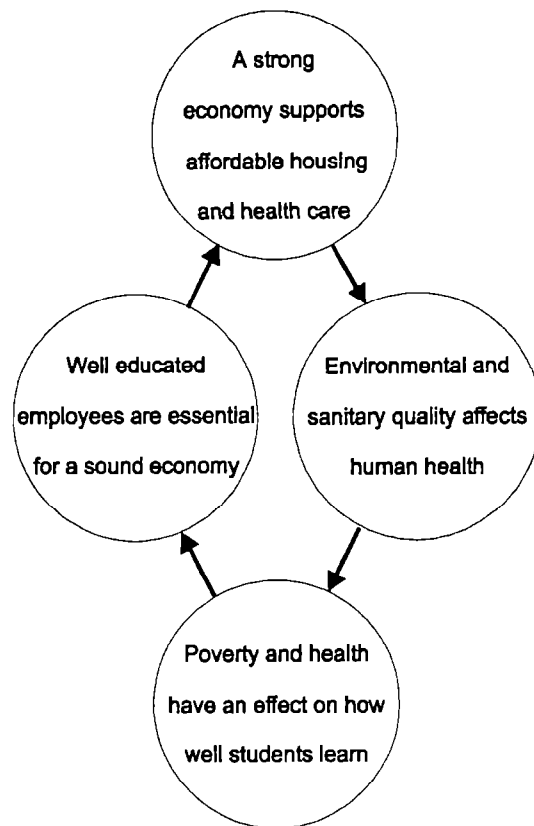


Figure 4: Example of linked aspects possibly assessed in (HR)C

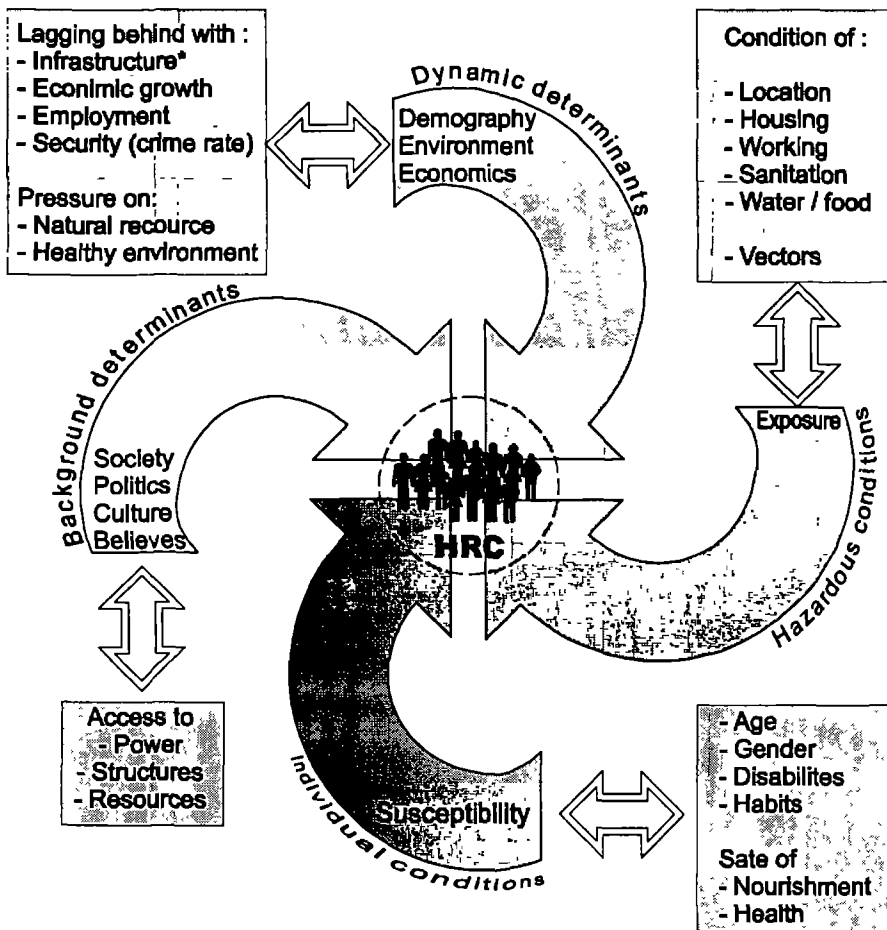


Figure 5: Vortex of HRC regarding environmental sanitation

(\* The underlying foundation or basic framework (as of a system or organisation) supporting the fundamental functions of existence (Grundda-seinsfunktion), such as working, (self)-supply, education, recreation, mobility, accommodation, especially the system of public works (e.g. Education, health) of a country, state, or region including also resources as (skilled) personnel, buildings, or equipment required for an activity)

- the socio-economic capital and institutional infrastructure, manifested in specific socio-functional sub-communities such as, relationships, families, neighbourhoods, social groups, inequality among these communities, business, working, administration, governments, cultural and political system.
- the participation potential, i.e. the ability of sub-communities to participate in decisions, to co-operate, work together, to communicate and exchange information and to interact positively.
- the state of centrality/marginality<sup>14</sup>, i.e. the detachment to proper material and immaterial infrastructure.

<sup>14</sup> Definition *centrality*. the degree of a location being a central location of a spatial unit (e.g. region)

Definition *marginality*. De-central location The approach is based on a theoretical model of central locations/cities of Christaller (1933) Central places have spatial relationships and functional influence on their zone of influence, i.e. less central places This can be settlements within a city, region, or country, The model is based on the idea that a central location is providing central services and goods not only to the inhabitants itself but also to its surrounding communities The more and the wider the spectrum of facilities and goods provided, the higher the centrality of the place (e.g. a city centre) In contrast a de-central or marginal location cannot provide any service or goods possibly not even for its own population, let alone the vicinity The degree of marginality can be

- the environmental situation.

The segments of reality mentioned in figure 3 are specified above and belong to different levels of the identification process of HRC. Figure 5 illustrates the dynamics behind the development of HRC and the different levels of influence and figure 6 shows the practical levels of data acquisition for HRC.

#### 1.1.6.1 Quantity of indicators

The quantity of indicators depends upon many factors, including the abilities of the surveyor, the size of the organisation concerned with data administration, the type of audience the results will have, the available inquiry time, the number of issues (segments) involved and the specific underlying question. Hart (1999) mentions for indicators of sustainability that “if the indicators will be used by different departments within large organisations, 50 to 100 might make sense. If the indicators are to be used to keep the public informed, a smaller number of 10 to 20 would make more sense”.

For example, the US Interagency Working Group on Sustainable Development Indicators initially identified 400 possible indicators, which were finally reduced to 40.

#### 1.1.7 Data acquisition

Considering the dimension of the task (3.3 billion people) and the time pressure involved (demographic and urban explosion) it would help to fall back on readily available data and information where ever possible.

National data is relatively easy to get, but it may not be relevant at the local level. This national data would possibly rather support traditional indicators (e.g. income per capita) and the data usually is not very recent or outdated due to very dynamic developments<sup>15</sup>. The dynamism is a crucial point especially regarding the vigorous urbanisation and demographic development. National data form basically the background determinants but also the dynamic determinants in the identification vortex of HRC in figure 6.

Proper and recent data for spontaneous squatter settlements in the out skirts of the cities will be difficult to get. For the regional and local level, sources such as aerial photos allow a fast and specific assessment, for instance, of population distribution, density, (spatial) marginality, but

expressed, by the existence of education services, health services, traffic facilities, access time/km (index) and or distance to next central place of higher and highest degree (e.g. province capital, capital)

<sup>15</sup> Examples of age of data and data reliability. The last national census in Cuba dates back to 1981, in Germany to 1987, in Tanzania to 1988, in Switzerland to 1990 Turkey, for instance, recently (1997) performed a census. The reliability of the census data is, however, influenced by dynamic urbanisation increase of urban population about 10% from 1990 (61.2%) to 1997 (71.6) (FWA, 2000). For a reasonable planning statistical extrapolations must be made. Did the urbanisation continue at the same rate until 2000 (i.e. an increase by 4.46% to 76%) Where did these 2,802,000 affected people settle during the last 3 years?

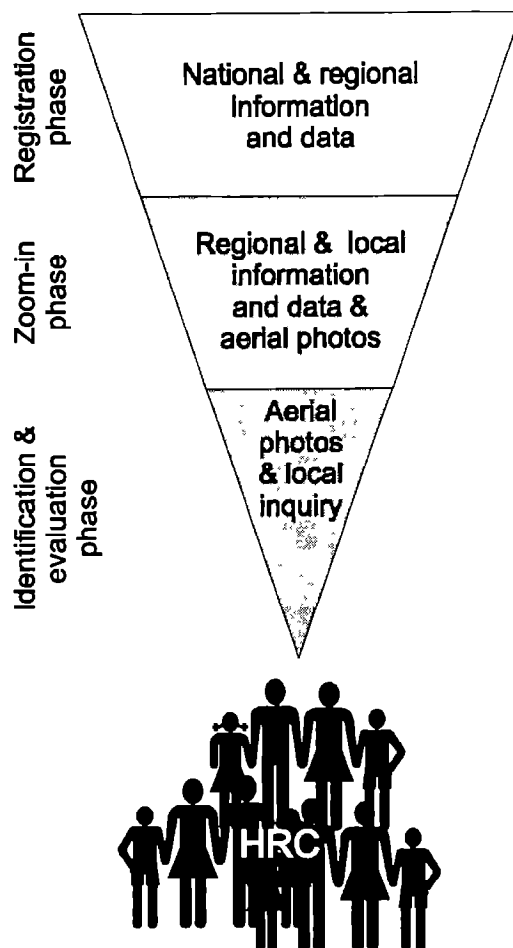


Figure 6: Zooming in on HRC through different data and information levels



also for environmental and sanitary impacts in new squatters. Aerial photos<sup>16</sup> can cover several aspects of identification high risk communities (Briod 2000) especially during the zooming in phase. Their strength is the detection of spatio-functional relationships that indicate potential HRC. Aerial photos can be very recent but need a skilled interpretation effort (Heinrich & Briod 2000 - in this publication). Field surveys and spot checks should supply supplementary data and information to complete the picture during the last phase of identification and final evaluation.

However, the conjunction of traditional data, information and indicators, aerial photos and field surveys concentrating on a minimum of indicators could be useful at different levels of the inquiry (background, regional, local) for the assessment of HRC (Brady, 1991). Figure 6 illustrates the general idea of data and information acquisition in different zoom-in phases for the identification of HRC.

Usually the best data for local indicators will be found at the local level. Particularly in rural areas, data collected at a regional or national level are insufficient for working effectively in local projects. The secret to finding data is to include as many different people as possible. Data and information sources on a local and regional level could be:

- Local government agencies
- Community leaders (at all scales)
- Health officials
- Employees of the educational system (schools, universities, academic institutions, local libraries, etc.)
- Religious leaders, intellectuals
- Department of public works
- Environmental agencies
- Developing agencies working in this area (GO's and NGO's)
- Local Planning Commission

In most cases, the more local and recent the source of data, the more relevant it will be for the identification of a high risk community. In this context aerial photos also can provide useful information (Evans, 1982).

Data and information sources on a national and international level could be:

- Government, governmental agencies
- Bureau of Economic Affairs
- Census Bureau
- Bureau of Labour Statistics
- Environmental Protection Agency
- University and academic institutions, libraries
- Housing and Urban Development
- Organisations of the United Nations

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<sup>16</sup> Since short there is also satellite imagery available (Ikonos) that has a resolution similar to aerial photos

- Non-governmental organisations (world bank, red cross, etc.)

National and international organisations are useful for small scale assessments in the zoom-in phase or for comparing information across different communities and nations. They can provide data, information and indicators important for the background and the dynamic determinants (figure 5).

### 1.1.8 Candidate indicator sets

Appendix 8.1 contains the candidate indicator set for the identification of HRC with special regard on environmental sanitation. As mentioned before, the indicators are a mix of traditional ones and new ones tailored to the specific problem of HRC. The indicator try to cover as many ideal aspects of an indicator as possible. However there are weak and strong ones with this respect. Due to time reasons the vast majority of indicators stand without further explicit explanation. However, the following paragraphs give more details on some of them in order to exemplify the philosophy behind it. Many of these indicators serve also for the assessment of sustainable communities as defined by Hart 1999. In fact many of the new indicators were inspired by the indicators of sustainability. This is feasible because problems in environmental sanitation and their consequences including HRC are an expression of a not sustainable world.

However, the indicators of Hart 1999 were carefully selected out of a larger set of indicators. More than 50% of the list was newly created and fitted to the problem at hand. The indicator list is meant as a starting point for a more adjusted list, handling and evaluation of indicators for HRC that includes ideas of a multidisciplinary team of experts.

#### 1.1.8.1 Practical explanation on indicator philosophy

The problem with indicators for identification of HRC is the inherent complexity of the system to be assessed. Nevertheless, the goal must be, to reflect reality sufficiently accurate for being useful for assessing the monitoring progress, understanding sustainability, educating community members on the issues, describing linkages, motivating, focusing and designing remedial strategies and plan for concrete action.

The complexity and some interesting interconnection illustrates the following example:

"Jobs" and "Income" may include linkages to health (insurance and ability to pay for care and education), poverty (not enough income), 'crime' (solution to not enough income), charity (people who have money can afford to help others), education (people with money can afford good education for their children and themselves), transportation (the less money the worse transportation), centrality (the more time people spend commuting, the less they will use health services), etc.

One of the complex indicators used in the list in appendix 8.1, is the

*Number of hours working at the average wage needed to pay for basic needs<sup>17</sup>.*

This indicator looks not just at the average wage, but at whether it is enough to pay for basic needs. This indicator links income to the costs of living in a particular location and also addresses personal "carrying capacity" in the sense that one person only has 24 hours in each day and can only spend so many of those hours working and show the local costs of livelihood. Instead, a classical indicator would be for example the

*'Infant mortality - the number of children that do not live past their first year',*

which is frequently used as an indicator of early childhood health. However, a better indicator might be

*the number of infants being born to unwed women under the age of 18 who have not finished high school (Hart 1999).*

These babies are more probably lacking prenatal care, having low birth weight, and are living in poverty. Poverty is linked to crime, poor health, and poor education, which reduce the chances that future generations can become self-supporting members of the community. The more people understand the links, the more solutions can be developed that address the full range of problems. A different example, the diarrhoea-related admissions shows the link between water quality and health. The quantity of not treated and discharged sewage water up stream of a river shows the link between environmental sanitation, economic (welfare) as well as educational realities (hygienic knowledge), and environmental/health results. Other examples are:

- *Median income (measures the amount of money made by a person but does not measure how that compares to the amount of money that person needs to live)*
- *Distribution of personal income measures the disparity between the wealthy and the poor. There have been studies that show that overall health of a society is lower in those countries that have wider gaps between the haves and have-nots.*

The link between centrality/marginality to health as well as to social equity and housing is established by the .

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<sup>17</sup> *Basic needs* Elementary everyday necessities of individuals and their family such as of food, shelter, clothing, as well as services as water supply, proper sanitation, health care and education

*'ability of people to reach (geographically) education and health care centres'*

These are just some few examples of more complex indicators.

#### 1.1.8.2 Spatio-functional and socio-functional disparities

Surveys, especially small scaled ones (e.g. at national or international level), must possibly deal with prominent disparities incorporating local, regional, national, continental scales. It is necessary to cope with these spatial, political, economical, cultural, environmental, social, infrastructural discrepancies between different survey units while maintaining a minimum degree of small scale comparability, e.g. within one country, or even globally.

Theoretically, it would be possible to collect all thinkable indicators neglecting a global applicability of all of them. These indicators would reflect all possible differences within the world. This pool of indicators could be organised and ordered in sets (e.g., according to characteristics such as social, health, sanitation, economy, etc., similar to the indicator list in appendix 8.1) According to a weight factor assigned to each indicator, the surveyor could choose a number of indicators that reflect best the proper circumstances of the potential HRC. However, the sum of weight factors would have to reach a certain threshold value. Also it would be wise to determine general key indicators that have to be assessed in any case. This paper is meant to kick off the discussion about key indicators and weights among experts of different provenience.

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## 2 CASE STUDIES

### 2.1 Towards sustainable environmental health in Albania

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#### 2.1.1 Introduction

Before a strategy on sanitation can be developed for a specific high risk community (HRC), it is a necessary preliminary step to identify a community as a high risk one. The present project deals with the issue of identifying HRCs.

Albania is the poorest country on the European continent, with a GDP per capita of 1490 US\$<sup>18</sup>. Politically, it is under reconstruction after the collapse of the communist system in 1991. After the social unrest of 1997, the government installed in July of the same year has taken strong measures to restore public order and to revive economic activity and trade. Brain drain, a consequence of the low salary levels, is still widespread. Low tax collection, a consequence of the poor organisational status of the state, prevents health, education and environmental sectors from receiving sufficient budget. These two phenomena have a direct and negative impact on the project that is discussed below.

It is extremely difficult to obtain good information about the quality of the environment and the sanitary situation due to the lack of sufficient and reliable sources. De-

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<sup>18</sup> as a comparison, Bangladesh's and Cuba's GDP per capita are respectively 1380 US\$ and 1560 US\$

spite this situation, it is known that sewage waters are not treated but discharged directly into surface waters, and that solid waste management is clearly insufficient. There are also good reasons to believe that surface waters are in many cases subject to bacteriological contamination and that drinking water does often not meet safety standards<sup>19</sup>.

The Albanian institutions in charge of environmental management are the National Environmental Agency, a newly born institution<sup>20</sup>, the Ministry of Health (MH), responsible through its Direction for Primary Health Care for environmental monitoring through the Sanitary District Inspectors (SDI) and the Public Health Institute<sup>21</sup> (PHI), reference centre for research and training. However, in spite of the efforts of these institutions, environmental matters are still of little concern at political and public level, and are not yet considered as priorities. Institutions are also subject to frequent reforms which contribute to create confusion among the staff and to erode the institutional organisation and authority.

### **2.1.2 Albanian public health engineering project**

The "Albanian public health engineering project" had two objectives: on one side building capacity at the Ministry of Health (MH), on the other side providing institutional support to the Public Health Institute (PHI).

The methodology of the project at the Ministry of Health consisted in training a team of Albanian trainers in Switzerland, in preparing a document – "the manual of the sanitary inspector" - in Albanian language<sup>22</sup>, and finally in implementing in Albania an extensive training program for over 100 SDI. This training program was designed, carried out and placed under the leadership of the trainer team. It took place in 3 steps and according to an agenda which was determined by the local project partners: a first one-week step dedicated to the presentation of the manual to the SDI, a second 4- or 5-weeks step during which each newly trained SDI had to establish an environmental survey of his own district, a third one-week step during which each environmental survey that had just been prepared was discussed and eventually improved.

The methodology of the project at the Public Health Institute consisted in providing equipment to 4 laboratories within its Department of Environment and Health, and training to some of its staff.

The project was planned in 1995, started in march 1996 and was supposed to be finished in 1997. However, it suffered several delays and has not yet been completed today.

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<sup>19</sup> oral communication with Albanian project partner

<sup>20</sup> the National Environmental Agency arose out of the division of the former Ministry of Health and Environment, in 1998, into two separate entities, namely the Ministry of Health and the National Environmental Agency. The agency has not been involved in the present project.

<sup>21</sup> the PHI is placed directly under the authority of the Ministry of Health.

<sup>22</sup> the manual was prepared in Switzerland by the team of Albanian trainers.

Reasons for these delays are on one side the social and economical crisis that hit Albania during 1997, and on the other side the war in former Yugoslavia, which brought to Albania a wave of refugees that overcame the local capacities and lead to chaos. Put together, the war and the 1997 crisis caused an 18 months suspension of all project activities.

At the Ministry of Health, the results of the project are: the completed training of 5 Albanian trainers at the Swiss Federal Institute of Technology (EPFL) in Lausanne; the preparation - major output of trainers' training in Switzerland - of the first Albanian manual of the sanitary inspector ever produced for the country; the participatory training of 107 SDI by the Albanian trainers in all 36 Albanian districts. The first output of the SDI's training consists in the environmental surveys. These surveys, first ones of their kind ever produced in Albania, will serve as a base for the preparation of a national environmental Action Plan. The SDI are the key element of the Albanian environmental monitoring system, because they are the only professionals who take samples, of water and food, for instance

At the Institute of Public Health, the results of the project are: the equipment of the chemistry, analytical chemistry, microbiology and air pollution laboratories with state-of-the-art equipment including high pressure liquid chromatography HPLC, gas chromatography GC, AAS spectrophotometer, air pollution measurement unit; the implementation of four studies and the publication of two articles; the training of 4 academic staffs who attended postgraduate programs in European universities, the training of 9 laboratory technicians on new lab techniques and finally the training of 1 computer specialist. These assets will enable the Institute of Public Health to perform studies which are essential for an adequate monitoring of the environmental quality.

Problems faced by the project include: at the MH, the very low salaries and difficult working conditions for the SDI, at the PHI, lack of operational goals and exhaustive actions plans, laboratory equipment subject to some maintenance problems and not being sufficiently used

### **2.1.3 Conclusion and perspectives**

By reinforcing the MH and its pool of sanitary inspectors, the present project is giving a contribution to the identification of environmental health hazards in Albania, and therefore to the better identification of HRC in terms of sanitary risk. By giving support to the PHI, the project encourages data analysis and research on environmental health topics. Within a timeframe of a few years, it is expected that both the MH and the PHI will be able to provide a major contribution to the development of a strategy on sanitation for HRC in Albania.

Possible perspectives of the project are, in terms of training activities, the training of the sanitary inspectors' assistants, the improvement of the sanitary inspector's manual, the organisation of refreshment courses for the SDI.



At the PHI, the perspectives are the support to the definition of working and operational goals, the support to individual research projects and to laboratory maintenance. A partnership between EPFL and PHI could also be envisaged.

In the future and at a more global level, the project could contribute to bring to a dialogue all major environmental actors in Albania.

Strategy on sanitation for high risk  
communities, March 30<sup>th</sup>. 2000

**Albanian public health engineering  
project**

1. Relevance
2. Albania overview
3. Project objectives
4. Methodology
5. Successes
6. Perspectives

Laboratoire d'éco-technique et de génie sanitaire

# 1. Relevance

- 1 Relevance
- 2 Albania overview
- 3 Project objectives
- 4 Methodology
- 5 Successes
- 6 Perspectives

**step 1**

Identify High Risk  
Population

Project

**step 2**

Develop strategies for  
High Risk Population

Laboratoire d'éco-technique et de génie sanitaire

## 2. Albania: overview

- 1 Relevance
- 2 Albania overview
- 3 Project objectives
- 4 Methodology
- 5 Successes
- 6 Perspectives

### Situation

- GDP per capita 700 \$
- lack of state authority, chaos 1997 (war)
- very poor environmental situation
- low priority for environmental matters
- prevention in public health is poor
- poor data collection on sanitary situation

## 3. Objectives

- 1 Relevance
- 2 Albania overview
- 3 Project objectives
- 4 Methodology
- 5 Successes
- 6 Perspectives

**Ministry of health (MH):** environmental surveys by sanitary inspectors

**Public Health Institute (PHI):** research and reference center

➡ capacity building at the MH

➡ institutional support of the PHI

# 4. Methodology

1. Relevance
2. Albania overview
3. Project objectives
4. Methodology
5. Successes
6. Perspectives

## ➔ Capacity building at the ministry of health

- Training of trainers in Switzerland
- preparation of the inspector's **manual**
- Training of sanitary district inspectors (SDI)

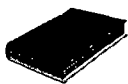
## ➔ Rehabilitation of Public Health Institute

- Equipment of 4 laboratories
- Training of laboratory professionals

# 5. Successes

1. Relevance
2. Albania overview
3. Project objectives
4. Methodology
5. Successes
6. Perspectives

## ➔ Capacity building at the ministry of health



SDI manual



Group of  
5 trainers



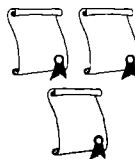
107 SDI  
trained

Environmental surveys

## ➔ Rehabilitation of Public Health Institute



4 labs equipped



3 specialists  
trained abroad



9 lab technicians  
trained in Albania

# Problems

- Loss of two trainers
- 3-years delay in project implementation
  
- technical problems in one lab
- maintenance problems in the labs
- loss of the specialists
- poor organization of labs
- lack of objectives in the labs



Albanian public health engineering project



## 6. Perspectives

- 1 Relevance
- 2 Albania overview
- 3 Project objectives
- 4 Methodology
- 5 Successes
- 6 Perspectives

### ➤ MINISTRY OF HEALTH

- Contribution to the identification of High Risk Communities (SDI)
- Contribution to the development of strategy on sanitation

### ➤ PUBLIC HEALTH INSTITUTE

- Data analysis, research
- Contribution to the development of strategy on sanitation for HRC

## **2.2 Reducing waste water problems in low-income semi-urban communities in Kathmandu Valley**

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*URL: <http://www.oneworld.org/ircwater>*

### **2.2.1 Introduction**

For a large number of communities modern sewerage systems are feasible nor desirable. In particular in communities where large quantities of water for flushing are not available, or where laying sewer pipes is not possible due to congested housing, and the large treatment plants required may be too expensive to build and maintain, alternative solutions need to be found. If they do not want to be left with hazardous and unpleasant situations communities and local authorities will have to look for alternative ways to treat and dispose of waste water in a safe and ecologically sound way.

In Kathmandu valley in Nepal many of such communities exist. A workshop was held with representatives from four of these communities (Kusunti, Siddhipur, Panga and Madhyapur) to map out their particular problems concerning waste water, to discuss a variety of possible solutions to solve these problems taking into account ecological sanitation principles and to assess people's willingness to test these alternative solutions.

### **2.2.2 What is the problem?**

Kathmandu valley is full of high risk communities: small urban semi-agricultural communities. Major water supply and sanitation problems exist and with a population growth of 2,2 per annum, these problems aggravate rapidly. Many households do not have access to the sewerage system and many even lack a well designed septic tank. Defecation fields and alleys are found at short distances from living areas. Drains are blocked and solid waste is found everywhere. The resulting picture is grim; groundwater gets polluted through leaking tanks and once the monsoon starts, overflow from septic tanks as well as faeces lying around on defecation fields cause surface water in ponds and streams to become seriously polluted. Since groundwater as well as water from ponds and streams are used for domestic purposes like drinking, washing, bathing (human beings and cattle) and washing clothes and utensils, people face serious health risks and nuisance. In addition, this uncontrolled disposal of waste water implies an enormous loss of nutrients that could otherwise be used for agricultural production.

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<sup>23</sup> Please also note remarks of the author about HRC identification in chapter 7 Epilogue

These communities do not get the attention they deserve. The congested nature of these communities and increasing water scarcity make them “not easy to deal with” from the conventional engineering perspective. In addition communities with a Hindu majority may not be easily convinced to go for ecological sanitation options, since these ultimately require handling of faeces, which is considered to be extremely “jhuto”.

At the same time local authorities and government departments, often unable to deliver public health services by themselves, are to find ways how they can best support initiatives towards improving environmental sanitation of Community Based Organisations, NGOs and the private sector. Sustainability of facilities and services can only be achieved by involving all stakeholders, including these local authorities and governmental departments. Effective involvement of these stakeholders requires mutual commitment and partnership. Being able to work in sustainable partnership requires the ability to

- diagnose the needs and preferences of end users and plan small scale improvements accordingly,
- agree on sharing management and maintenance responsibilities among the stakeholders and
- effectively share (monitoring) information.

### **2.2.3 About the workshop**

The workshop brought together a mix of people from Kusunti, Maddhipur, Siddhipur and Panga: school teachers, local leaders, social workers and students from the communities, resource persons from Nepal as well as from the Netherlands and representatives of the Nepal Water Supply Corporation.

The Overall Objective of the workshop was: to create the conditions for sustainable improvement of the environmental sanitation and water supply situation, in particular of the surface and groundwater quality, in selected communities in Kathmandu valley.

The more Specific Objectives were.

- to carry out a participatory analysis on needs and demands for small scale waste water treatment and disposal facilities as a means to reduce health risks and to improve the quality of ground- and surface water.
- to provide information on small scale treatment and disposal techniques that are sound (i.e. technically appropriate and manageable by the community) for semi-urban, hilly areas in Nepal
- to develop elements of a proposal for applied research with potential managers of communities involved and potential support organisations.

A first step in the workshop was to work on a participatory field analysis of needs and demands for small scale envi-

ronmental measures such as waste water treatment and disposal systems. Field visits to collect information were prepared, carried out and evaluated by the workshop participants. The field analysis was followed by knowledge exchange on small scale, community manageable disposal facilities and on possible measures for improvement of water quality, which includes simple methods for water quality assessment and monitoring. These two steps led to the development of a proposal for applied research through experimentation with small, community-managed waste water treatment options and disposal facilities and other possible measures and, at a later stage, implementation of the action research, evaluation of the results and scaling up.

#### 2.2.4 Some data resulting from the field analysis

In the context of the workshop the field analysis took some six hours. It can therefore only be considered to be rough and very preliminary. Still, a picture of major environmental sanitation problems emerged:

**Kusunti:** Through the assistance of a local NGO a start was made with laying sewers, but many of the badly constructed septic tanks are not (yet) connected. However, the last part of the pipes could not be connected to a main line, because the neighbouring community doesn't want the sewage coming through this line to be discharged into the river. There are no municipal arrangements for drainage and road construction. The drainage programme started in an unplanned way, has technical weaknesses and open drainage is a big environmental problem. Waste water, including water coming from the local tannery, badly affects agricultural land. Community members, including the women, feel the waste water problem and seem helpful and interested to work with organisations wanting to support them to improve the situation.

**Siddhipur:** This is a more agricultural community, with a high population density. Open defecation, blocked drainage channels and bad drinking water quality from taps and wells, causing a high risk of getting water born diseases, are major problems. Sewers are not in place and some community members purchased a double vault, poor flush latrine through a programme that installed demonstration latrines some eleven years ago. Garbage is poorly managed Villagers are conscious about the drainage problem and consider it a major problem. The Village Development Committee has a proper plan, but no finances. However, people are ready to contribute finances and labour.

**Panga:** A sewerage master plan has been developed, but there no funds are available as yet Part of Panga is not included in the master plan, since it finds itself on the other side of the local watershed In this part of Panga a



network of sewers is in place and discharge is the main problem. Much of it is discharged into agricultural land and in two big, leaking collection tanks. Open defecation is also practised. People lost faith in the government and prefer working with NGO's. There are a number of community based organisations and people seem to be ready to contribute labour.

**Madhyapur:** A densely populated area on a ridge and waste water flows away easily. Within the village it is somehow controlled with a sewer running through the main street, but discharge is in small rivers. An INGO built a treatment plant, but part of the construction works were washed away during the last monsoon and no maintenance is carried out. The plant is not functional and causes a major health hazard. A large part of the community is not connected to a sewer and many households discharge toilet and kitchen waste on open drains. Open defecation is another major problem, causing the outskirts of the community to be very dirty. Water supply is intermittent, leading to long waiting times. People are ready to contribute to improvement of the situation, but they had a bad experience with the INGO leaving the work unfinished.

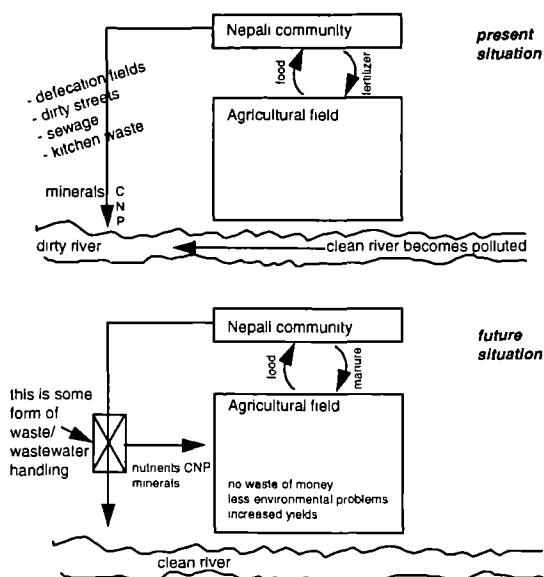


Figure 1. The nutrient cycle of a Nepali community

## 2.2.5 What to do/possible solutions?

Proposed solutions to solve the environmental and nuisance problems are based on the principle that mixing of black waste, grey-, and white water should be prevented as much as possible (figure 1). These three flows should be handled separately. If done properly health hazards will reduce and a good ecological system will emerge and money can be saved or even earned, because:

- less expensive fertiliser is needed;
- less water is needed, because faeces do no longer have to be flushed away,
- expensive treatment can be avoided;
- manure can be sold.

While looking at various options to improve environmental conditions the following general points were raised:

- As much as possible separate collection and composting of dry, black waste,
- Collect and treat grey water;
- Collect urine for mixing with ash as manure or simple treatment of urine with grey water;
- Use white water for recharge of groundwater;
- Take into account maintenance and management of whatever is opted for,
- Work on public awareness and education.

Possible solutions included the use of toilets allowing composting of black waste, improvement of existing gutter systems for stormwater in order to recharge groundwater and the construction of wetlands for treating grey water.

Looking at the situation in the four communities involved, the following points about the different flows of water seemed important to discuss:

#### **White water**

It is important to prevent that (white) rainwater mixes with waste. Rainfall is very unevenly distributed over the year, with high rainfall during the monsoon and no or hardly any rainfall in winter. Many of the semi-urban communities have old discharge systems meant to carry monsoon water, but these are often poorly maintained and therefore less functional. These old systems of gutters and existing pipes can be upgraded for discharge of rainwater, which can be used for recharge of groundwater through ponds or for irrigating agricultural fields.

#### **Black waste**

Flush toilets are comfortable, but expensive in terms of capital costs and costs for water used for flushing. They induce an enormous amount of waste water (15,000 l of water/capita/year is needed to flush away 50 l of faeces and 500 l of urine) that is to be treated if we want to prevent a health hazard through uncontrolled discharge. Adopting a safe system of black waste collection is seems more appropriate, because water is getting scarce and/or expensive. Black waste should be kept as dry as possible (night soil), by using double vault private or public toilets. Mixed with cowdung, ash, straw and agricultural waste it can be composted for use as manure at a later stage. Urine is best collected separately for reuse of nutrients in agriculture. In some communities mixing of urine with ash for use as manure is already practised.

#### **Grey water**

Separate grey water lines can be constructed for washing, bathing and kitchen water. The nutrient in this waste can be used for growing products in constructed wetland systems or (fish) ponds. Management of such treatment plants can be done by organisations or private persons deriving benefits from the products. Should waste water flows become too big or when insufficient space is available, oxidation ditches can be considered. Treated water can be discharged into a river or be used to recharge groundwater or irrigate land.

### **2.2.6 Working towards change**

The workshop provided quite some ammunition for the development of a proposal for applied research. Acknowledging that effective management structures are as important as appropriate technical options, elements for the proposal include starting broad consultation processes, detailed

investigation, participatory selection of the most appropriate technical and managerial solutions and experimenting with these solutions.

The proposal does not only focus on finding the locally most appropriate technical options, but also on finding options for sustainable maintenance and management. In particular with respect to the latter it will look into the interface between local authorities, the private sector and the community. The objectives of the research proposal have been defined as follows:

- to establish mechanisms for and carry out broad based participation processes for further investigation: area consultations, community forums, etc
- to plan and implement micro-projects to
  - i) eliminate hazardous situations brought about by uncontrolled disposal of waste water,
  - ii) help restore the ecological balance and
  - iii) make profitable use of waste water.
- to find effective management models and partnerships between local authorities and community based organisations for sustained service levels (also in case of growing populations) and for ensuring that people continue to make effective use of the facilities.
- to develop monitoring capacity for sustained improvements
- to disseminate experiences within the country.

The communities involved in the workshop are prepared to act as pilot sites for testing the technical and management options.

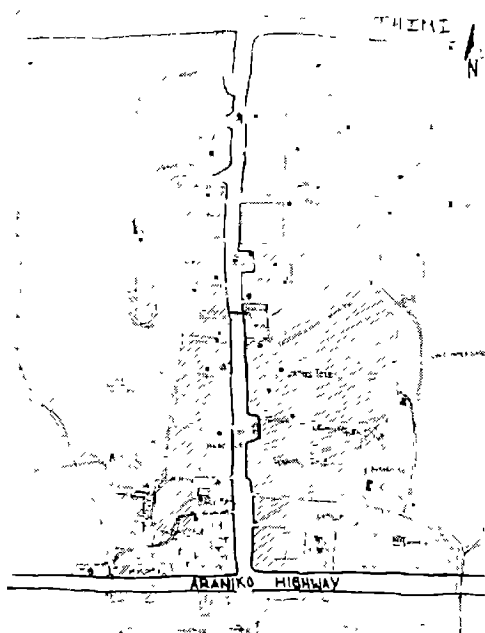


Figure 2: Sketch map of Madhyapur Thimi

2.2.6.1 Annex (as produced by workshop participants)

**About Madhyapur (Thimi) community**

*2.2.6.1.1 Introduction*

Madhyapur Thimi (figure 2), which is one of the oldest communities of the Kathmandu Valley, is situated in the middle of the historical city called Bhaktapur and the capital city Kathmandu. Like other old cities this city is also situated on elevated land and therefore one has to climb up to reach this city. Thimi occupies an area of 2 square kilometers and the area has been divided into 8 wards. This report has been prepared with special consideration to ward no. 11,12,13 and 14.

Although the area under consideration occupies an area of 1 sq. km., it has a population of about 1400 and it is a dense community. The community has a lot of problems. These two problems have caused other problems and therefore also these problems are serious. These frightening problems have inflicted negative impact on public health and

environment and one can easily guess the kind of state the people of this community are living in. An effort of one single workshop can not analyse, identify and also solve all problems. Therefore, this report has been prepared with reference to wastewater management.

#### *2.2.6.1.2 Major problems of wastewater management*

In the community, in about 90% of the area sewer have been laid for the collection of wastewater. It can be hoped that remaining 10% area will also have sewers. Therefore, there seems to be no major problem in conveyance and collection. Since there is no separate line for sanitary sewer and stormwater, there is very low flow in the dry season and very high flow in the rainy season in these sewer lines. Sometimes the flow in the sewer lines exceeds the capacity of the pipes and causes serious damage. The wastewater from the sewer lines is released in the open field. From the open field the wastewater joins gutters and small canals which finally merge into the Hanumante river. Because of lack of proper management of wastewater, following problems have been created.

The sewer constructed in Hatimahankal, which collects wastewater from three directions, flows towards Siddhikali. This sewer has made the area polluted and due to low capacity of the pipeline there occurs a lot of overflow. The wastewater is released untreated.

#### *2.2.6.1.3 Problem caused by open toilet drain.*

Wastewater from Chodetol, Dui pokhari, Simatole and Dathutole is collected near Taha dugwell. The wastewater then flows to Lhabaha where also acidic waste mixes and the combined waste has severe adverse impact in the surrounding agricultural field.

Open drains from Bamune area flowing towards Bappa and wastewater from Chode mix in Bappa which has made the whole area polluted.

Wastewater collected from Inalachi passes through Balkumari China Road and merges into Hanumante River which has very much polluted Hanumante.

Wastewater collected from Sunkha and Dadhutole passes through Bishnukundal and mixes into Khucha

A field observation was done in order to know the gravity of the situation. Various types of information was collected by filling up questionnaires in order to find out the potential solutions. Some of the aforesaid things are also based on the information thus collected. After interaction with various groups of the community overall state of the community and possible solutions were identified. The various groups were composed of elder people, women, local authorities, and men. The points identified to be considered after the interaction with these people are following.

#### *2.2.6.1.4 Technical need*

There seems to be no significant problem relate to aspects Due to Thimi's geophysical feature wastewater can be transported via gravity flow. A lot of public land is available. Besides, local authorities have realised the local situation and therefore are committed to solve the problems by providing technical human resources. As has been said before, the main need of the community is to manage the wastewater collected by the drainage pipes already laid in the 90% of the area of the community. On top of that most of the drainage pipes were laid within past few years only. They are still in good condition, but need to be maintained.

Before managing wastewater it is essential to know the nature of the wastewater Local authorities do not seem to be much aware of the nature of wastewater. After field observation it is believed that the wastewater is mostly organic. However, the non-biodegradable component is gradually increasing. Hanumante river receives a lot of industrial wastes. At Lhabaha area the wastewater is acidic due to the acidic effluent from the production of alcohol in households. An appropriate method of treatment should be sought for such wastewater. Besides, analysis of the cause of the failure of the treatment plant constructed by Plan International can provide some insight into the technicalities of wastewater treatment. Although there is a big problem of wastewater management, there is not any significant plan and programme to overcome it and the problem is growing. The problem has been compounded by the lack of sufficient water supply.

#### *2.2.6.1.5 Cost of construction*

A huge amount of funds may be needed to manage the wastewater However, this cost is far outweighed by the benefit that can be reaped from it. Local community is of the opinion that it is possible to contribute partial fund which will be little as compared to the total amount needed. However, the local authorities are willing to contribute some from their side and local people may also contribute some labour These in total may mount up to a significant portion of the total cost. Therefore, it is almost certain that a donor agency is needed to meet the large part of the financial need. Since the sewer drain has been laid only a little cost is needed for maintenance of the lines. Availability of the public lands will also lessen the financial burden of construction.

#### *2.2.6.1.6 Management and operational cost*

Since the wastewater problem has caused a lot of discomfort local people are committed to solve it. People are also aware of the need for proper operation and maintenance of any project after implementation. There are several NGOs and clubs which have shown interest and they can also help in operation and maintenance. Similarly, user groups can be formed in order to make the project sustainable Donation can be collected from the households and also minimum fees

can be collected to meet certain operation and maintenance cost. In a nutshell, the cost of maintenance and operation of a project can be met by the local community.

#### *2.2.6.1.7 Technical capability to operate and maintain*

The community should be technically capable to operate and maintain the projects related to wastewater management. If the community is not capable then all the effort could be wasted. Since the people of Thimri are educated they can understand simple technicalities about wastewater management. Technical human resource is also locally available in order to run a project in a sustainable manner. With some training local people can also operate different equipment if needed. Therefore, this community is technically capable.

#### *2.2.6.1.8 Social Acceptance*

The community has suffered due to lack of wastewater management. Although the community is aware of adverse impact of unmanaged wastewater on health and environment it has not been able to solve the problem due to its complex nature. However, any step taken towards solving the problem will be highly appreciated by the community. The community knows that it is their problem and they are the ones who should take initiative towards managing the wastewater. Somehow this is not happening. In case any external institution can take the initiative the local community is ready to help as much as possible. They are also committed to appropriately manage any project. They strongly believe the projects can be run smoothly without disturbance. However, due to some previous incomplete projects local people sometimes raise doubts about upcoming projects. For example, since the treatment plant constructed by the Plan International was left incomplete, local people have become not only unsatisfactory, but also angry.

#### *2.2.6.1.9 Environmental impact*

It is undisputed that unmanaged wastewater has caused adverse environmental impact. The wastewater has made the canals and Hanumante river highly polluted. Since the wastewater also flows in open canals it has also caused a lot of nuisance. This pollution has imposed harmful effects on public health. All the people suffer from diarrhoeal diseases. All of this has resulted into decreased living standard because a major portion of their income is used for medical treatment. Besides, the wastewater has also been used for irrigation which has imposed negative impact on the health of farmers and the crops as well and this has affected the overall economy of the community. The acidic wastewater has further heightened the problem. Since the water in the canals and creeks are polluted due to wastewater, farmers use stone taps, wells and piped supply for washing their vegetables and therefore drinking water shortage has increased. Besides, the signs of soil erosion and landslides due to rain

have emerged and the overall physical feature may be damaged ultimately.

## 2.3 A strategic response to urban sanitation in a war-torn city (Kabul, Afghanistan)

P. Jansen

Water and construction engineer

International committee of the red cross

### 2.3.1 Introduction

Afghanistan has been in a conflict situation since 1979. Between 1992 and 1995 Kabul, the capital, was the theatre of intense fighting and ended up with more than 40% housing destruction. Consequently, important population movement took place among its estimated 1,300,000 inhabitants. Those who lived in the most affected areas (districts 3, 5 and 8) moved to those which were preserved (in particular to districts 10, 11 and 15), thereby increasing their population density (table 1, figure 1). The sanitary infrastructure and in particular its water and sewerage networks were heavily damaged. Since then the authorities have been more and more reluctant to attribute resources to sanitation services. As a result the provision of such services, especially for those highly populated districts, has been a key challenge both for the afghan authorities and for the aid organisations concerned

	Population	Area (km <sup>2</sup> )	Pop. dens. (pers./km <sup>2</sup> )
District 1	39051	2.43	16070
District 2	76195	3.38	22543
District 3	28390	4.43	6409
District 4	110605	8.76	12626
District 5	75004	19.73	3802
District 6	143030	20.12	7109
District 7	82673	14.3	5781
District 8	91990	14.48	6346
District 9	135728	29.84	4549
District 10	128342	14.83	8519
District 11	66267	2.98	22237
District 15	187652	10.79	17391
District 16	65916	18.9	3488
Total	1228743	164.97	7448

Table 1: Population, area and density of 13 districts in Kabul

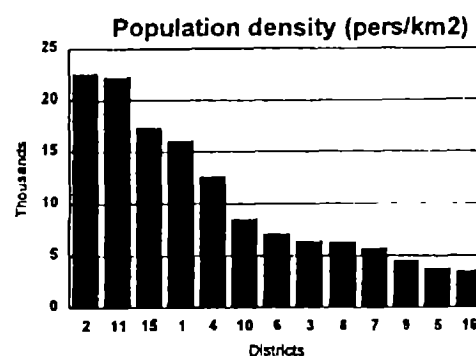


Figure 1 Population according to districts

### 2.3.2 Scope of the survey

In recognition of the problems faced in the highly populated districts in central and northern Kabul the ICRC undertook an assessment in collaboration with the Ministry of Public Health (MOPH) and Municipality of Kabul. Its aim was to find out the options available to overcome the lack of access to adequate sanitation. From mid 1996 ICRC field engineers provided technical support in looking mostly at urban sanitation although other environmental health problems such as water supply and waste disposal were also considered.

The access of the population of Kabul to adequate sanitation is poor. Increased population density observed in certain districts contributed to a high morbidity due to prevent-



able water and sanitation related diseases. The survey focused mostly on these areas and on the most common sanitation system present, the individual dry latrine.

An initial survey was undertaken in 1996 by an ICRC engineer (J P. Dross) in conjunction with professionals from the MOPH. Since then data was completed and updated with inputs taken from "Action Contre la Faim (ACF)" and UNHCS Habitat reports.

### **2.3.3 Problem analysis & survey methodology**

#### **2.3.3.1 Difficulties affecting sanitation in Kabul**

The difficulties affecting sanitation in Kabul are:

1. Un-sewered sanitation:

- serious health hazards exist, due to outflow of night soil in the streets with a risk of groundwater contamination,
- the traditional night soil collection are disorganised and sometimes non-existent.

2. Sewered sanitation:

- sewerage networks are working much below their nominal capacity or not at all, due to the general backlog of maintenance and lack of fuel,
- many septic tanks of collective buildings are not maintained.

3. Public services:

- the public services are severely disrupted due to war and displacement,
- they are lacking skills and means.

4. Health education.

- urban sanitation issues are not a high priority,
- traditional health education is difficult to implement due to the current religious and political constraints prevailing under the Taliban regime

5. Monitoring:

- no proper inventories of existing wastewater and un-sewered systems exist,
- no information management systems are in place,

6. Institutional framework:

- little or no capacity from the Central Authority for Water Supply and Sewerage (CAWSS) for operation and maintenance of sewerage networks,
- the policy and investment priorities are not defined by the regime.
- budget and resources requirement are not clearly defined (for sewerage and un-sewered systems)

### 2.3.3.2 Methodology

The sanitation study was part of a broader public health survey carried out by the ICRC. Six key areas to be evaluated during the study were defined (Box 1).

The study combined a number of methods:

- household surveys: allowing the potential interventions to meet community needs and preferences,
- discussion with sector staff (Municipality and CAWSS),
- analysis of data from CAWSS,
- data collection from NGO published reports and analysis with NGO sector specialists, field visits of sewage networks, collective and individual septic tanks and latrines
- Hygiene education issues were discussed with professionals throughout the survey.

### 2.3.4 Survey results

A situation analysis for the urban sanitation sector and other related sectors (water supply, solid waste, rain water) could be made on the basis of the results of the study. We will outline in this section the main results of the study in urban sanitation, and try to highlight the weakness and strengths of each sanitation method

The survey identified a number of sanitation methods in the respective districts, ranging from simple traditional latrines to individual or collective septic tanks and sewerage networks (table 2).

#### 2.3.4.1 Traditional and improved latrines

Almost every home surveyed and generally most of the 179,300 houses registered in the 16 districts of Kabul have traditional latrines. Kabul latrines are elevated and constructed in such a way that the chamber receiving the night soil has a hole opening onto the street. The night soil is either be emptied through this hole or simply flows outside and dries, or is washed away by the rain.

The exact number of operational household latrines was not known by the Municipality, and was estimated to be about 40,000 to 60,000 units (numerous structures were collapsed at the time of the survey, due to the lack of maintenance or war damage). Only a few Improved Latrines were seen in the districts surveyed. Some private dwellers did invest some money in improving the structure of their latrines without modifying the chamber.

#### 2.3.4.2 Composting and night soil collection:

Before the war, night soil collection was performed by the Municipality. During the war period, especially since the early nineties, it was simply not collected and the night soil was left to flow in the channels or down the slopes of the hilly areas. From 1995, when cultivation restarted after the fighting, there was a need for fertilisers, the night soil col-

#### Key factors evaluated during the study

- *Population density per district (based on data from the municipality of Kabul)*
- *Sanitation: technologies, type of sanitation systems, sewerage networks, collective and individual septic tanks, traditional home latrines, other systems of dry household sanitation*
- *Capacity of the public services.*
- *Water resources: hydrology, public wells, private wells, pump stations, networks, coverage levels per district, water quality (bacteriological)*
- *Rain water drainage*
- *Solid waste disposal*

Box 1

Type	% total population
Sewerage system	5
Collective septic tanks	3
Individual septic tanks	9
Improved latrines	30
Traditional latrines	53

Table 2: Sanitation methods related to percentage of population

lection therefore resumed. About 400 carts and 50 trucks again operated throughout the city (mainly in the early morning hours, from spring to autumn). The main problems observed were that these private operators can work without hygienic considerations often leaving the doors of the chambers wide open (creating odours and health hazards)

#### 2.3.4.3 Collective and individual septic tanks

The survey indicated that about 35,000 people living in 9 separate blocks (total of 3,200 apartments) do benefit from collective septic tanks. These tanks used to be emptied on a regular basis by the Municipality. As this stopped in 1985, the NGO "Solidarites" has constructed a number of drainage systems to evacuate the liquid effluent after sedimentation to the Wazir Abad canal.

About 15,500 individual septic tanks were counted in the 16 districts, accounting for about 9% of the households. The emptying of these private tanks has become a serious problem as vacuum tankers are rare and expensive, therefore type of system has become an expensive means of household sanitation leading many owners to build dry latrines in their home compounds and abandon the flush toilet.

#### 2.3.4.4 Sewerage networks:

The main existing network serves "Microrayon" apartment blocks (built from the sixties by Eastern Germany) and its extension is very limited (see Box) It is connected to a treatment plant located in Qalari Wazir. Its present pumping capacity is about  $??^{24}$  m<sup>3</sup>/day which is only 10% of what it was in 1978. Most of the pumps suffered from a general lack of maintenance although the system was supported for an extended period by the NGO "Solidarités".

#### 2.3.4.5 Capacity of the public services

Two administrations were involved in the study. Both are involved in service provision, including urban sanitation:

- the CAWSS is dealing in the operation and maintenance of the water and sewerage networks,
- the Municipality of Kabul is responsible for the septic tanks, rain water drainage and solid waste management Both administrations used to be efficient and well organised but are now rather impoverished. Many of their key personnel (engineers, managers) have left the country, a few others are employed by international NGOs involved in the water and sanitation sectors.

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<sup>24</sup> figure not available at date of publication

### 2.3.5 Strategy development

#### 2.3.5.1 Key principles

A workable strategy for urban sanitation was defined in collaboration with the MOPH and the Municipality who reviewed the findings of the ICRC survey, and helped to identify the key principles that could pave the way for a strategic development of the sector

#### 2.3.5.2 Possible areas for investment

The possible areas for investment are:

- reconstruction or construction of Improved Latrines, support the traditional night soil collection for farming and economical purposes,
- rehabilitation of sewers and pumping stations; technical and financial support to the CAWSS for operation and maintenance of the sewerage systems,
- maintenance and emptying of individual and collective latrines; support the private sector for maintenance of septic tanks.

The ICRC decided to focus on option 1. Other organisations such as CARE, International Assistance Mission and German Agro Action worked in the same area. Other organisations such as "Solidarité" and UNCHS Habitat tackled option 2 and 3

#### 2.3.5.3 Working area

It was felt important, in addition to identifying the key areas which should be addressed, to prioritise particular settlements or districts i.e. zones with very low coverage in terms of access to adequate sanitation, high population density areas, presence of a high number of displaced people,... ICRC environmental programme was settle according to these considerations Its working zone include the districts 2, 4, 10, 11 and 15 (figure 2).

#### 2.3.5.4 Programme planning

The ICRC decided in conjunction with its partners to fund and implement an Environmental Programme including a large latrine reconstruction component. It consists of the following activities:

- construction of 10,000 Improved Latrines in the selected working area during a 5 years period (1997 to 2001), on the basis of the design of a unit
- support and training of night soil collectors in the respective districts
- assistance to the municipality in sanitation related issues
- develop hygiene related educational material and organise regular visits to schools and public places

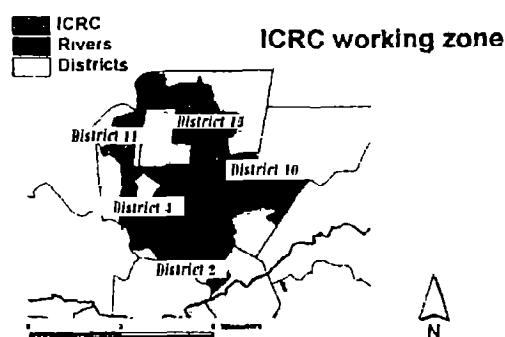


Figure 2: Key working areas for ICRC environmental programme

## 2.3.6 Programme outputs

### 2.3.6.1 Improved Latrine design

ICRC latrines (figure 3) are an improvement on the existing Kabul latrines. Their design is a variation on the traditional style, therefore assuring the participation of a larger proportion of the population since it disturbs fewer of their habits. The capacity of the chamber is increased to reach 1 m<sup>3</sup> with a minimum floor elevation of 1.2 m, urine is separated and directed to a soak pit in order to achieve a consistency of the night soil, which eases the evacuation; ventilation is assured through a pipe topped with a screen for fly reduction; the chamber is covered with a concrete slab and the night soil is therefore confined. These improvements can sometimes be achieved for less than 25 US dollars without destroying the existing latrine (rehabilitation) but in about 80 % of the cases, reconstruction has to be done, and then the cost is 80 US dollars. It is very important to get the participation of the beneficiaries in terms of materials and manpower. Every household contributes about one third of the price of the improved latrine.

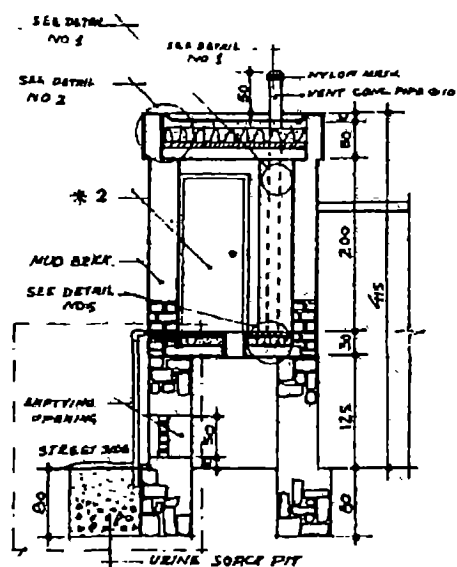


Figure 3: Design of ICRC improved latrines

### 2.3.6.2 Outputs from 1996 to date

Based on the above strategy, the various proposals and activities were implemented starting in August 1996. Globally, a total of about 48,300 Improved Latrines have been constructed in the 16 districts of Kabul (table 3)

	Number of improved latrines	% total houses	Agency involved
District 1	0	0	
District 2	3621	41	ICRC
District 3	3377	59	CARE
District 4	10678	52	ICRC
District 5	1294	10	IAM
District 6	3850	17	CARE
District 7	767	5	ACTED, GAA
District 8	1592	8	CARE
District 9	175	1	ACTED
District 10	7577	43	ICRC
District 11	2903	48	GAA, ICRC
District 15	12201	70	GAA, ICRC
District 16	263	2	ACTED
<b>Total</b>	<b>48298</b>	<b>27</b>	

Table 3: Number of improved latrines according to districts

ICRC environmental programme had achieved at the end of 1999 about 34,000 latrines (10,000 in 1999) out of which 73% were new latrines and 27 % rehabilitated latrines. As shown here above, the highest coverage at the end of 1999 was in district 4 with close to 70% of household equipped with an improved latrine. The lowest coverage is 37 % in the districts 11 and 15.

### 2.3.6.3 Balance for full coverage

It is estimated that 80% of the households not yet equipped with an improved latrines have however access to a traditional pit latrine. The balance of latrines to be constructed per district to obtain a 100% coverage is indicated (figure 4).

Considering a total of about 180,000 houses (48,300 units already with improved latrines and 15,500 with individual tanks), the total outstanding figure to reach a global coverage is 115,000 units. Such construction programme may last about 10 years. In the ICRC operational area (districts 2,4,10, 11 ) it will take about 3 years.

### 2.3.7 Future Developments:

A number of issues still have to be addressed in the coming years in order to maximise health and economic benefits of the programme.

#### 2.3.7.1 Health Education and messages

Health Education in Afghanistan has always been a challenge because of cultural barriers such as the difficulty to communicate with the women ("gender issue"). This situation has worsened since the Taliban took power, making increasingly difficult the communication with women and illegal the representation of "living creatures". ICRC Environmental programme has nevertheless tried to implement this type of activity in particular by doing door to door visits. In order to overcome such difficulties, it appeared essential to assure the collaboration of traditional leaders respected by the population as intermediaries to try to modify certain behaviours. The involvement of the Municipality has proved to be essential as they co-ordinate the action of these leaders. They were also helping to get authorisation to perform health education in school, to distribute leaflets and posters and to health messages through the radio.

The effect of such activities is difficult to evaluate, but it is likely that the proper use of the latrines must be as important as the coverage for the prevention of diarrhoeal diseases and efforts will continue in this matter.

#### 2.3.7.2 Night soil collection and use of compost

Another important aspect of the project was to involve the Municipality in the night soil collection. As mentioned above, night soil collection is performed by private collectors in a very disorganised way, leaving a large number of emptying holes open. Helping the municipality to co-ordinate the night-soil collection imposing schedules, working areas and hygiene patterns to the collectors would certainly help to reduce the number of emptying holes left open.

Human night soil is traditionally collected for composting and sold to farmers around Kabul as fertiliser. This activity is an essential part of a sanitation system based on individual latrines. The problem is that afghan farmers have a tendency to prefer use "semi-fresh" compost which is poi-

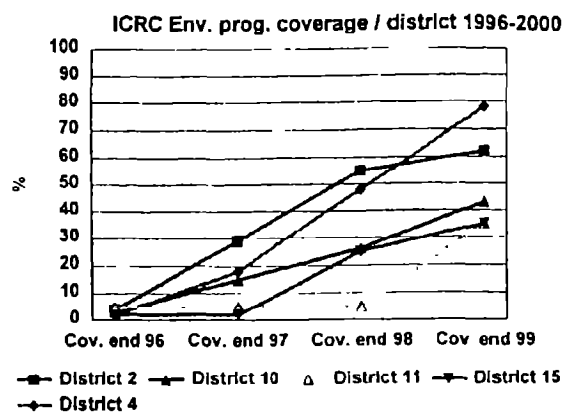


Figure 4: Balance of latrines to be constructed per district

sonous for the crops and potentially dangerous for the health. A training is under way in order to teach the farmers how to produce of safe compost both from an agricultural and sanitary point of view.

### **2.3.7.3 Monitoring and data base**

A geographical information system has been set up in conjunction with the Municipality for resources inventories in the water and sanitation sector. Efforts were initiated mid of 1999 to include data of all the improved latrines into this system for further planning purposes and monitoring of the level of coverage in each district

### **2.3.8 Effectiveness: Effects on health**

The main purpose of ICRC Environmental Programme is to prevent diarrheal diseases. In order to assess its effectiveness in terms of reducing diarrheal disease in children, a case-control study was carried out.

Data was gathered from 4,054 children aged 0 to 11 years old presenting to dispensaries in Kabul over 6 weeks. Of these, 1,238 were presenting for diarrheal disease, and had 3 or more stools per day. These subjects were classified as cases. An additional 625 children who presented for respiratory illnesses were classified as controls. Data gathered at the time of dispensary visit established whether the child lived in a house where the latrine had been revised or not, along with demographic data and the project area of residence.

Linkage was made to the GIS database for water and sanitation activities through the project area information for each child, enabling the analysis to incorporate a number of ecological variables at the project level, such as population density, degree of maintenance of revised latrines, etc. Multivariate modelling using conditional logistic regression revealed a significant reduction in the likelihood of living in a home where the latrine had been revised amongst cases, with an odds ratio of 0.53 (95% CI 0.41, 0.67)

Because of the finding of significant protective effect, a stratified cluster sample was carried out to estimate the rate of diarrheal-related deaths amongst children in the project areas. This sample consisted of 8,017 individuals in 790 households. Data was gathered on deaths occurring in 437 deaths in children, and the circumstances around these deaths were probed using a modified verbal autopsy method. Data from this sample enabled an estimate of 608 deaths due to diarrheal disease in children aged 0-11 (95% CI 264, 952) during a one year period centred around the date of case control data collection. Using an attributable risk calculation derived from the multivariate model, we estimate that 234 deaths in children were averted over the same period (95% CI 102, 367). These results provide support for the latrine revision programme being an effective intervention with a substantial impact on the primary cause of child mortality in Kabul.

### **2.3.9 Conclusion**

A strategic approach to service provision was developed by the ICRC engineers starting from 1996, in 3 phases:

- initially a detailed study of the sanitation sector was performed in the framework of a larger public health surveyed carried out by the ICRC (1996), in collaboration with the concerned public services
- based on findings, a household latrine construction programme was initiated in five priority districts and local efforts encouraged to restart the high soil collection for farming purposes (1997-2000)
- a case control study was launched in 1999 to evaluate the efficiency of the programme and decide its further extension for the years 2000-2002

The originality of the programme lays on its magnitude. 36,000 latrines re-constructed or rehabilitated, 80% coverage in many areas. Kabul Improved Latrines are directly inspired on the traditional design: it is the key of their success. Furthermore, the preventive effect of the programme on diarrhoea has been proved. Any other sanitation method (septic tank, sewerage network. .) wouldn't be appropriate at that scale because too expensive to run and therefore impossible to sustain. This shows the necessity for such programme to keep in mind the traditional ways to assure success



## **2.4 Potential Health Risk Assessment as a Possible Approach for Planning Remedial Actions in HRC - The Case of Niono, Mali**

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### **2.4.1 Context and Scope**

A consultancy project aiming at assessing the potential health risk of treated excreta reuse in agriculture as it is practiced in Niono and at proposing an improved excreta treatment method was conducted by SANDEC in collaboration with Alphalog, a local NGO, in 1999 (Montangero and Strauss, 1999). As part of this assessment, the relative health risk of excreta reuse in Niono was compared with the relative risk of other existing transmission routes for excreta and water-related infections based on information collected during a one week field trip. This paper presents a case in which the prioritization of the existing transmission paths has been used to draft a prioritized list of sanitation measures on the basis of information and impression gathered during a very short field trip. The paper aims at activating a discussion on the potential of this rapid assessment method to be used for the planning of remedial actions in high risk communities.

### **2.4.2 Water, Sanitation and Health in Niono**

Niono is located 350 km northeast of Bamako at the border of the Sahel zone. The region's main activity is intensive, irrigated rice culture. Besides rice, onions, tomatoes, yams, salads and other vegetables are cultivated but in a much smaller scale. As there is no possibility for the town to expand – it is bordered by irrigation canals and fields – population density, 28,000 inhabitants on 3 km<sup>2</sup>, is high. Moreover, the town's altitude is slightly lower than the surrounding environment, making drainage – especially during the rainy season – a challenging task!

The resources serving for household water supply comprise the irrigation canals, water from shallow wells, some of them uncovered, found in almost every compound, and from a few deep wells which were constructed recently. Most of the daily activities take place in the irrigation canals. Women wash clothes and dishes, men clean animals and vehicles. The canal is the place where people bath and sometimes also defecate. As almost every compound has its own well, water is not scarce in Niono. Nevertheless, as

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<sup>25</sup> Please also note remarks of authors about HRC identification in chapter 7 Epilogue

latrines and wells are close to each other and the water table high (0.5-1m), there is a risk of groundwater contamination.

Three kinds of on-site sanitation systems can be found in Niono: traditional pit latrines, improved pit latrines (pit walls consist of bricks covered with cement and reduce therefore the risk of groundwater contamination in comparison to traditional pit latrines) and septic tanks (owned by only a small minority of the population) The most common faecal sludge<sup>26</sup> disposal practice consists in transferring the latrine content to a hole just in front of the house. Otherwise, the sludge is disposed of in the drainage system or transported to the outskirts of the town. The owner of a pit emptying vehicle mixes the collected sludge with organic solid waste, processes the “compost” in a granulation/heating machine in order to produce a fertilizer. This fertilizer is used on an experimental basis by a dozen of rice farmers. A few farmers also use the content of their own latrines or collect the dried sludge which has been transported out of town to produce their own fertilizer which is mostly used for vegetable production.

There is no solid waste collection system in Niono and the drainage system as mentioned above is inadequate; the town is “under water” during the entire rainy season. Malaria is the most widespread disease and several excreta-related diseases, among them diarrhea, ascariasis, hookworm and schistosomiasis are endemic in Niono.

### 2.4.2.1 Transmission routes

An attempt was made to determine for Niono the relative importance of the various transmission routes for excreta-related infections. The potential routes are depicted in Figure 1.

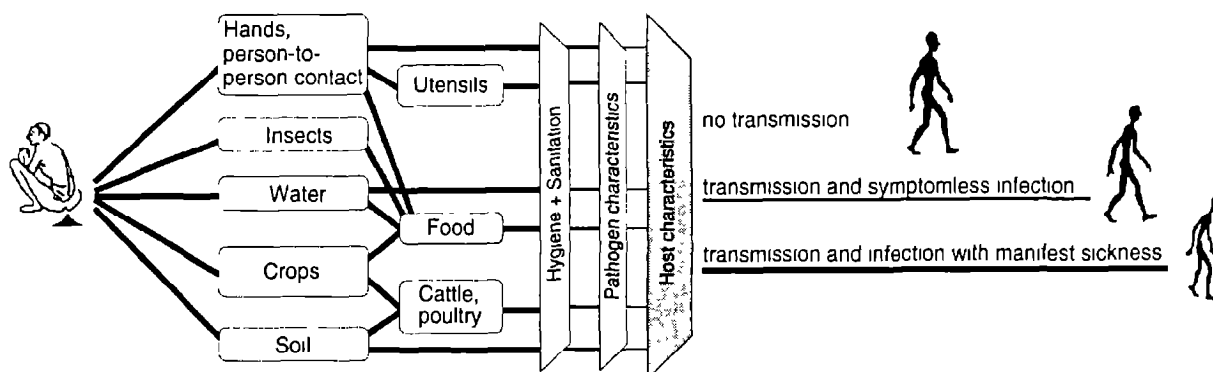


Figure 1: Excreta-related transmission routes (Strauss, 1985)

According to the field observations, the person-to-person contact was judged as being the predominant transmission route. Anal cleansing is part of the hygiene behavior, however hand washing following defecation is not a common practice. This favors contact between pathogens excreted by infected hosts and mouth or skin of new hosts or food and

<sup>26</sup> faecal sludge describes the content of on-site sanitation systems

results in high infection transmission risks. Besides, population density is high. The irrigation canals appear to be an important transmission focus as well: the snails (intermediate hosts of schistosomiasis) can be found in the canals where many activities take place. Using water from dug wells as drinking water may also lead to transmission as groundwater contamination is likely to occur due to the proximity of dug wells and latrines. The population, especially children are at risk when heaps of excreta are lying in the street. The results of the consultancy project showed that the “compost” production method as it is practiced in Niono does not allow to obtain a hygienically safe product. Mainly farmers and their families but also vegetable consumers are at risk. However, excreta reuse is not yet a common practice in the area and the relative health risk emanating from it may be considered fairly low.

### 2.4.3 Reducing Health Risks

Based on the knowledge of the predominant diseases in Niono and the prioritization of the transmission routes, the following measures are suggested (figure 2):

	Prioritized Transmission Routes	Measures
Water related diseases	1. Irrigation canal	<ul style="list-style-type: none"> <li>◆ Integrated management combining e.g.                             <ul style="list-style-type: none"> <li>◆ Physical/Environmental management</li> <li>◆ Improved canals</li> <li>◆ Filling, grading and drainage</li> <li>◆ Intermittent irrigation(?)</li> </ul> </li> <li>◆ <i>Biological control measures</i></li> <li>◆ Introduction of natural enemies</li> <li>◆ <i>And medical treatment</i></li> </ul>
Excreta related diseases	2. Person-to-person contact	<ul style="list-style-type: none"> <li>◆ Behavioral change, personal hygiene awareness raising</li> </ul>
	3. Irrigation canal	<ul style="list-style-type: none"> <li>◆ Integrated management combining e.g.                             <ul style="list-style-type: none"> <li>◆ <i>Snail control (env. management measures)</i></li> <li>◆ <i>Chemotherapy parallel to and after snail control</i></li> <li>◆ <i>Awareness raising, information related to hygiene and schistosomiasis</i></li> </ul> </li> </ul>
	4. Groundwater	<ul style="list-style-type: none"> <li>◆ Improved latrines</li> <li>◆ Use of deep wells for drinking water</li> </ul>
	5. Direct contact with faecal matter on soil	<ul style="list-style-type: none"> <li>◆ Safe excreta disposal sites</li> <li>◆ Improved drainage system</li> </ul>
	6. Excreta-fertilized crops	<ul style="list-style-type: none"> <li>◆ Improved excreta treatment method</li> </ul>

Figure 2: Suggested measures to reduce the transmission and incidence of water and excreta-related infections in Niono

Because of the high cost of medical treatment and the spread of drug resistance an integrated approach combining physical/environmental management, chemical and biological control measures and involving all stakeholders should be chosen in order to reduce the risk of **malaria** transmission. Physical/Environmental management control measures could consist in introducing the use of impregnated bed nets. Physical control measures such as grading and filling and improving the drainage system could eliminate numerous breeding sources. But even if mosquito breeding sources were considerably reduced within the city, the irrigation system surrounding the city would still represent an important mosquito breeding site. Different control measures have been tried in irrigation systems such as intermittent irrigation. Intermittent irrigation requires the periodic drainage of irrigation water to dry the soil surface. Dry periods should correspond to the time required for larval development. That prevents mosquito immature stages to complete their development. However, this method is only practicable if percolation occurs fast enough (which is not the case in clay soils, for example) Moreover, pools will always remain due to the unevenness of the soil surface. Different biological control measures, such as the introduction of larvivorous fish or of free-floating aquatic plant which grows rapidly under favorable conditions and can cover a given water surface completely within a short period of time (e.g. azolla, an aquatic fern) have been tested (IRRI, 1998).

Chemotherapy alone cannot stop **schistosomiasis**. A more interdisciplinary approach – integrating chemical, biological and environmental control and involving the population at risk – should be chosen. To interrupt the life cycle of schistosomiasis, it is essential to eliminate infected snails or eliminate contamination of the water by infected fecal and urine excretions. Snail control measures undertaken immediately preceding or concurrently with large-scale use of chemotherapy may cause an important reduction in transmission as well as the expected reduction in prevalence and number of parasites in the population. Limiting the chemical control of snails (use of molluscicides) are the high cost of this method and the potential toxicity to other fauna and plants. Different biological control measures (e.g. competitors such as the snail *Marisa*, infectious agents or predators such as certain species of ducks and fish) have been tested so far but no practical method has been evaluated sufficiently to be recommended or to be in active use today (FAO, 1984). Environmental management control measures consist in modifying the environment in such a way as to create a less suitable habitat for snail. A positive snail control effect has been achieved by flushing the river regularly by using a flushing weir (Fritsch, 1993). Besides snail control measures, human contact with cercariae<sup>27</sup>-infested water must be prevented. The public should be aware of the danger of defecating or urinating in or near water. Theoretically, the

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<sup>27</sup> larval stage of schistosome

provision of protected facilities for bathing, water recreation and laundering would reduce human contact with cercariae-infested water (FAO, 1984). However, due to the habits of Niono's inhabitants such a concept appears to be extremely difficult to implement. Besides, rice farmers – an important part of the population – would still be in contact with cercariae during the work in the fields.

Awareness with regards to the role of hygiene in the interruption of the different transmission routes should be promoted. On-site sanitation systems should be improved to avoid groundwater contamination. Safe excreta disposal should be promoted and an improved excreta treatment method should be introduced.

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## **2.5 IDENTIFICATION OF DIARRHOEA HIGH RISK AREAS IN OUAGADOUGOU (BURKINA FASO)**

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### **KEY WORDS:**

Urban health, diarrhoea, high risk areas, health risk factors, children, periurban areas, GIS

### **2.5.1 Introduction**

The study presented here has been undertaken in 1995 in Ouagadougou by a research project titled "Health Impact of Wastewater Reuse in Agriculture in Sahelian Context", funded by the Swiss National Foundation for Scientific Research (1994-99), under the partnership between the Swiss Tropical Institute in Basel (STI), the Federal Institute of Technology in Lausanne (EPFL), and the Inter State Engineering School of Rural Equipment in Ouagadougou (EIER).

Ouagadougou is the capital city of Burkina Faso. The main data about the city are: 20.000 ha size, 16 km large, 800.000 habitants, 6,4% demographic growth. Burkina counts 11 millions people, with 10% of urban population and 350 US\$ as GNP (UNDP, 1995). The official statistics used to present overall incidence rate of diarrhoea as follow: rural 32.3%; urban 26 2% (MSASP, 1993).

This study highlights the hypothesis that the usual presentation of global incidence for diarrhea hides a big heterogeneity in the city.

### **2.5.2 Aims of the study**

The aims of the study were: a)- to identify, for diarrhoea among children under 5, high risk areas in Ouagadougou; b)- to give useful indications to all actors for focused interventions against diarrhea; c)- to prepare community based actions in areas of most need.

As these groups and areas need more attention from the decision makers, the desegregation of urban health and environmental data will allow the definition of more appropriate and more targeted interventions.

### **2.5.3 Methods**

The Geographical Information Systems (GIS) offered the opportunity to evaluate the spatial distribution of diarrhoea among children under five in the city. The data have been collected through households survey, undertaken at the end

of the rainy season in 1995, with a sample size of 3,040 children aged between 0 and 4 and who have been weaned.

#### **2.5.4 Results**

The epidemiological results for diarrhoea showed that there are very important differences between administrative sectors in the city (30 official areas). The 2 weeks incidence rates of diarrhoea (between 21.4% and 59.0%) are higher in the periurban areas than in central areas, whereas the average for the city as a whole is  $35.60 \pm 1.71\%$ . This trend (in disfavour of periurban areas) appears clearly on the thematic maps drawn for the incidence rate and also for the main risk factors associated with diarrhoea.

#### **2.5.5 Conclusions**

At the level of identification, the results give useful indications to all actors dealing with programmes or activities against diarrhoea in Ouagadougou (government institutions, international organisations, NGOs, community associations, ..). With such kind of methodology, the interventions against diarrhoea diseases could be more targeted

At the level of planning, the challenge remains on how to mobilise funds for action in identified high risk areas, by creating strong partnerships between several stakeholders.

### **3 ASPECTS OF IDENTIFICATION AND EVALUATION**

#### **3.1 Urban aerial sanitary diagnostics for HRC**

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vestigation & Risk Assessment*

##### **3.1.1 Screening of High Risk Communities by means of Remote sensing**

*(K. Heinrich)*

Remote sensing comprises all scientific methods of observation, mapping and interpretation of surface entities of the earth from the distance. People commonly associate Remote sensing with aerial photography and satellite imagery. Remote sensing has become an excellent tool for assessing public health since the beginning of the 1970's. Nowadays, high resolution images are readily available at competitive prices. Increase in efficiency results also from progresses in comprehension of biological pathogens, their reservoirs, hosts and vectors, permitting better assessments of environmental and sanitary risk factors. It is possible to derive information on disease prevalence, disease vector creation, and the appearance and continuation of disease foci.



Geographical information systems (GIS) facilitate the integration of environmental, medical, statistical and remote sensing data, resulting in predictive models useful for disease surveillance, environmental health and sanitary assessment, control activities and health service allocations.

The principle of remote sensing -assessment is simple. The identified objects in photos, such as dwellings, wells, waste dumps, stagnant water, etc., are associated with background knowledge, e.g., habits of people, average family size, poverty, structural design of houses, habitats of insects, climate, etc.. A skilful interpretation of remote sensing imagery results in information about potential health risks including invisible items such as mosquitoes or tsetse flies (Brady, 1991). For assessing invisible items, visible image-elements (such as ponds) serve as a registration base for invisible features (such as mosquito larvae), because they are causally related. A possible spatial vicinity of a settlement to the pond, or women getting water from the pond daily would face a possible exposure to vectors and hence, a potential risk community, e.g., women at risk of malaria (background knowledge: traditionally women are getting water; remote sensing : no wells identified, visible track settlement/pond).

Remote sensing combined with GIS is a powerful tool not only to support identification of High Risk Communities (HRC) but also for the derivation of locally adapted improvement strategies. For instance, the rapid urban sprawl of mega-cities in many developing countries, characterised by spontaneous, uncontrolled and poor settlements lacking adequate sanitation can best be monitored by remote sensing. Any city map, as base for strategic planning, is out-of-date at the day of publication. Remote sensing is accurate, fast and up-to-date in monitoring urban changes. Estimates of population density, quality of life (structural design of houses), sanitary risks (waste dump and well) are readily assessable (Figure 1). Next to the vector 'groundwater' in this example Briod (2000) showed also the potential of Remote sensing for the identification of a HRC based upon an open air sewer.

Areas and communities affected by natural disaster or war can also be monitored by satellites providing most recent images and information about people, their whereabouts and quantity, access ways and potential environmental sanitary risks. High resolution satellite imagery enables to address health sanitary topics formerly considered to be beyond the possibilities of remote sensing. These satellites bring significant improvement in global coverage, spatial and temporal resolution (e.g., IKONOS: 1m resolution = recognition of objects of 1m x 1m surface, covers same location every 3<sup>rd</sup> day) Strategically, in the context of risk communities, RS could serve as a small scale screening method (systematic nation wide assessment of HRC) with a zoom-in potential (status quo of target areas - priority ranking) Any subsequent planning of action and improvement measures can be based upon a remote sensing /GIS approach.

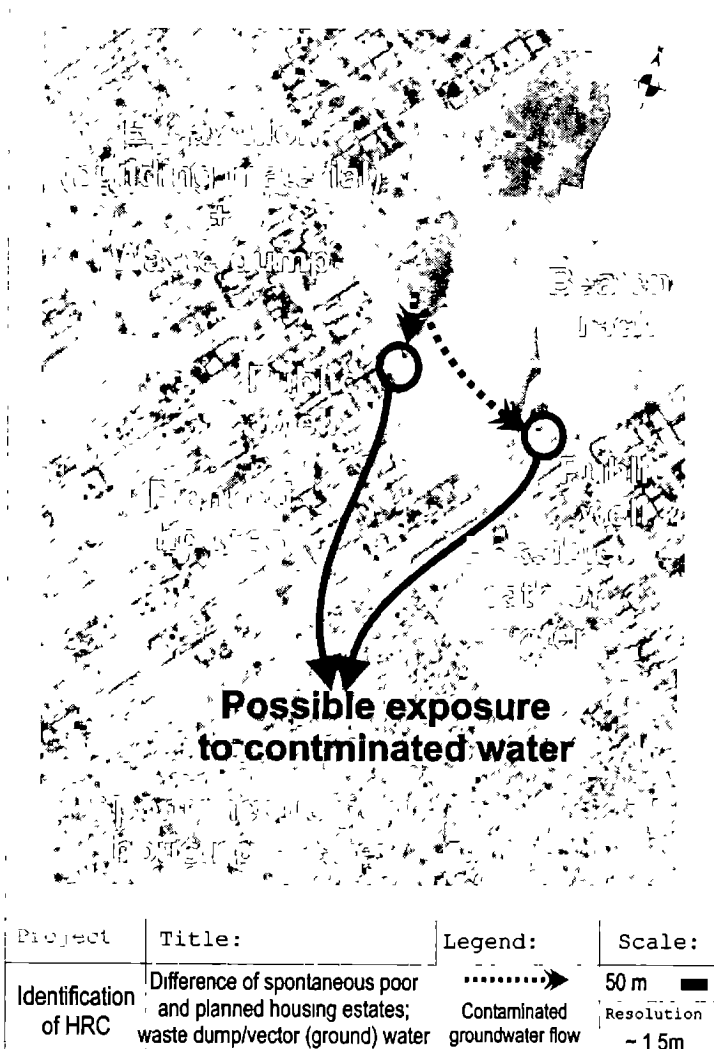


Figure 1: Identification of HRC by means of aerial photos

### 3.1.1.1 Costs

The most popular images for civil engineering, land surveying, urban planning, GIS base-layers (cadastral, infrastructure etc.) and related applications are Ikonos 1-meter resolution and IRS 5-meter resolution data

Initial screening of larger areas such as peri-urban fringes can be conducted with the help of IRS-Satellite with 5 meter resolution, where imagery is not available Spot 10m and/or Russian 2m imagery may bridge the gap.

The images of the IRS panchromatic (black & white) system, i.e. corrected 5m imagery of 23km x 23km costs 900 US\$ (all prices according to <http://www.intecamercas.com/>).

IKONOS 1-meter resolution is of great value to fields requiring high resolution and spatial precision IKONOS images supply world-wide coverage as they are also able to record data when they are out of the range of a ground control station. IKONOS 1 meter resolution, panchromatic (black & white) without ortho-rectification, mosaicing or tonal bal-

ancing, cost per km<sup>2</sup> 12 US\$ in North America and 28 \$ internationally

IKONOS stereographic photos, 1 meter resolution, panchromatic (black & white) suitable for creating digital elevation models cost per km<sup>2</sup> 27 US\$ in North America and \$55 internationally. A stereo pair of aerial/satellite photos provides the corresponding rational functions, e.g. three dimensional views.

However there are some further conditions on the pricing and ordering of the satellite imagery. Details are available at <http://www.intecamericas.com/>.

### **3.1.2 Urban aerial Sanitary diagnostics for HRC: Remote hazard mapping in Ouagadougou**

*(C. Briod)*

Le manque de coordination et, avant tout, de moyens financiers du continent africain incitent les responsables de la santé à chercher de nouveaux outils de mise en œuvre des systèmes de santé.

La faute de moyens financiers exige une orientation précise des priorités. L'exemple de la persistance du paludisme en région tropicale en témoigne de façon dramatique : la malaria est la première cause de mortalité dans le monde et frappe essentiellement dans la ceinture sub-saharienne. L'OMS préconise d'ailleurs l'établissement rapide d'une clé d'identification des communautés à haut risque sanitaire dans le monde, dans l'optique de cibler ses actions. En parallèle, la création d'un atlas de la malaria sur le continent africain est également un pas dans ce sens.

La cartographie est l'un des éléments d'un système qui permettrait de mieux définir les priorités d'action au niveau spatial. La composante géographique est par ailleurs depuis fort longtemps prise en compte en épidémiologie.

La télédétection est une manière de pratiquer la cartographie. Elle crée de l'information à caractère spatial par observation indirecte des éléments physiques au sol et est appliquée dans de nombreux domaines avec succès.

Le but de cette recherche a été d'évaluer l'utilité de cette technique en matière de santé publique à une échelle locale et en milieu urbain. Bien que dans ce domaine, l'utilisation de photos satellites à petites échelles ait déjà été explorée depuis quelques dizaines d'années, cela reste à un niveau expérimental. En outre, la télédétection appliquée à une échelle locale à partir de photos aériennes reste un domaine de recherche encore inexploré. Afin d'optimiser les priorités d'action en matière de santé publique au niveau de la gestion urbaine, l'idée de l'exploitation de l'information contenue dans des photos aériennes est donc survenue. L'interprétation des photos aériennes couvrant la ville de Ouagadougou a montré qu'elle pouvait mettre en évidence des poches à haut risque sanitaire à une échelle relativement importante. Elle a pu d'une part identifier différents objets physiques pertinents et, d'autre part établir des relations

spatio-fonctionnelles entre ceux-ci et engendrant des risques de contamination. L'intérêt essentiel de la technique réside en ce dernier point

Bien que la population ou les services administratifs d'une ville aient souvent connaissance de certains éléments isolés à risque, l'information reste dispersée et n'accorde en aucun cas une évaluation du risque de transmission d'une maladie. La photo aérienne établit la relation spatiale qui existe entre ces éléments et leur risque de contamination potentielle.

La photo aérienne identifie les objets spatiaux appropriés, établit la relation spatio-fonctionnelle qui existe entre ceux-ci, et produit ainsi une vision synthétique des risques de transmission potentielle au niveau spatial. Elle contient en elle-même, à la limite de sa résolution, toute l'information sur les facteurs environnementaux physiques causant un risque de transmission de certaines maladies.

Il est évident que l'interprétation de photos aériennes ne se borne qu'à identifier les facteurs physiques environnementaux de la prévalence de quelques maladies et n'autorise en aucun cas une évaluation de risque globale, les facteurs de morbidité étant plus larges et fortement interdépendants

Elle est donc préconisée comme outil d'appui à la cartographie des risques de prévalence d'une maladie en soulignant les facteurs physiques environnementaux propices à la transmission. Elle est à intégrer avec d'autres données relatives à la santé. Dans la dimension spatiale de l'organisation de la santé, cette agrégation de données de différentes sources conduit à avancer l'idée de l'utilisation de système d'information à référence spatiale (SIRS). Cet outil analyse et présente de manière synthétique des données positionnées spatialement provenant de différentes sources. C'est donc un outil d'analyse et de communication. Son utilisation irait dans le sens d'une meilleure coordination des systèmes de santé, deuxième grande lacune des pays africains.

L'intégration de photos aériennes dans un tel système serait une nouvelle source de données fournissant une information spécifique et renforçant l'analyse.

### 3.1.3 Reference:

- Brady, J. 1991. Seeing flies from space. *Nature* 351 695.  
Briod, C. 2000 *Urban aerial sanitary diagnostic. Remote hazard mapping of diseases in Ouagadougou*. Graduation thesis. EPF Lausanne

### **3.2 HRC's evaluation and qualification (priority ranking) and sanitation strategy comparison using Multiple Criteria Decision Aid (MCDA).**

*Dominique Bollinger  
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#### **3.2.1 What is the “Bureau d'aide à la décision”**

The Bureau AD is a private engineer company that works as consultant in all decision processes. Its aim is to help decision makers to make their choices grounded on a structured basis, knowing all the causes and consequences of their specific situation and decisions. Bureau AD's experience is based on many practical cases using robust and efficient techniques of Decision Aid.

The Bureau AD does not replace experts, its role is to work with them and with the decision makers to help them comparing different strategies (for example).

The different steps in Bureau AD's consulting tasks can often be schemed by three main phases:

- Problem and model structuring,
- Evaluation of alternatives,
- Comparison or classification.

For more information on Bureau AD, please visit the following website:

[http://www.fastnet.ch/aide\\_decision](http://www.fastnet.ch/aide_decision) (“aide” underline “decision”)

or send an Email to [aide\\_decision@fastnet.ch](mailto:aide_decision@fastnet.ch)

#### **3.2.2 A participatory approach is the key of success**

In HRC and sanitation problems, the decisions to determine which services should be provided are taken at different levels. The key of success for sanitation strategies is to adopt in every situation and at each level of decision a participatory approach.

Any kind of “wonderful solution” can be proposed, it won't work if there hasn't been local, regional or national actors involved themselves in the decision process.

#### **3.2.3 What can we offer as a standardisation or as a framework ?**

The first thing to highlight is to be careful with the term “standardisation”. This should not mean “uniformity”. The framework should consist not in a scoring method, but in a

scheme of different steps that has to be lead by a neutral actor and should involve every person concerned by the issues of the decision.

However, in sanitation strategies for HRC, it's possible to bring out two main steps:

1. Identifying High Risk Communities based upon a set of different criteria;
2. Develop strategies, compare them and set priorities for all steps of these strategies.

These two main steps must be analysed and realised through a Multiple criteria approach to insure that every aspects has been considered before taking any important decision.

### **3.2.4 Identifying HRC: the multiple criteria approach**

#### **3.2.4.1 Which criteria should be chosen?**

The first main step is a problem of classification: We have to determine different clusters of communities (or group of people that have the same characteristics) that respond to different level of risks. Instead of thinking of "who are HRC", a more rational and efficient approach is to think of "what criteria are relevant to decide whether a community is in a High Risk situation or not". The communities can be defined and clustered by the evaluation of these criteria.

Because of local or regional conditions, it's neither possible nor objective to give a fixed set of criteria and evaluation scales that will fit every case. Identifying HRC can be done through two kind of criteria.

- A common set of criteria (population density, infant mortality, etc. .) that are regarded as universal HRC indicators.
- A specific set of criteria considering local conditions that are not less important than the previous one to determine HRC.

The importance of the relevance of the criteria is crucial because it will influence the work of collecting data. Bureau AD's approach tends to limit data collection to what is useful and available for the decision to be taken.

#### **3.2.4.2 How to evaluate these criteria?**

With Bureau AD's multiple criteria approach, all these criteria can be assessed regarding their own logic, for example: contaminated water in number of Escherichia Coli per cubic meter of water, level of alphabetisation in %, etc...

Some of them could even be evaluated by an ordinal scale: for example the level of cleanness could be just ordered or defined as "very bad, bad, average, good or very good"

With Multiple criteria methods that the Bureau AD is used to apply, these evaluations are sufficient and should not be transformed in common numerical values, but still can give a clear result on which operational decisions can be taken.

### 3.2.4.3 Commitment

Then, to insure an acceptable and applicable result – by acceptable we mean accepted by the people concerned by the consequences of the decision – these criteria must be identified by these people and not only the so called “international experts”. These criteria should also be operational, that means they should offer an evaluating scale for each of them in order to assess them.

The task of choosing and constructing these criteria can be roughly worked before to give a first work basis but, like all other elements of the decision, must be validated by regional or local actors. This can be done with Multiple Criteria Decision Aid.

At this stage, it’s possible to gather the evaluations in a matrix (table 1) (criteria are fictive, but taken from our discussion):

Criteria	Evaluation scale	Community 1	Community 2	Community 3
Population density	Person per m <sup>2</sup>	0 8	0 2	0 1
Infant mortality	% of births	65	20	30
Mean value of income	\$ per year	350	500	150
Access to support organisation	ordinal	good	bad	very bad

Table 1: Criteria in evaluation matrix

### 3.2.4.4 Analysing the data to decide better

It’s very important not to give a global score to rank the different communities. Multiple Criteria Decision Aid proposes to give an ordinal classification. So the different alternatives (in this case the communities) should not be absolutely comparable on a mathematical sense. The different evaluations are analysed as they are mentioned in the matrix without any mathematical transformation, to avoid subjective hypotheses on score scaling. Many Multiple criteria methods give an ordinal order of preference as a result, and not a scored performance, because this score doesn’t mean anything when we work with elements so different in their nature. For example, talking of environmental criteria, these do not compensate each other: Contaminated soil and clean air is not equal to clean soil and polluted air

Some working hypotheses have to be made, then it will be useful to test them in the variation of evaluation, for example.

The relative importance of the different criteria should then be set with great precaution, because this will have a great influence on the result. This weight set should also be tested for validating the robustness of the result.

### 3.2.4.5 Choosing an multiple criteria method

The choice of the method is always depending on the decision problem. In our case, identifying HRC (the first main step) is a sorting problem. We will then choose a multiple criteria method that does not compensate the criteria and that sorts the different communities in two or three categories. These categories will determine the level of risk or the priority for the community to get sanitation services.

### 3.2.4.6 Sorting the communities

Many different multiple criteria methods are available. The Bureau AD is used to them and can choose which one is the best in a specific situation and then apply it. The scheme in figure 1 shows the principle of a sorting method. The result consists not in an artificial score but only in clustering the communities in three categories. Note that the step from the matrix to the categories, shown by the arrows, is a crucial step. A simple additive method (like mean values) is not suitable in a case where the criteria are so different.

The values in figure 1 are fictive and shown just as an example, this can be done with many more criteria and communities.

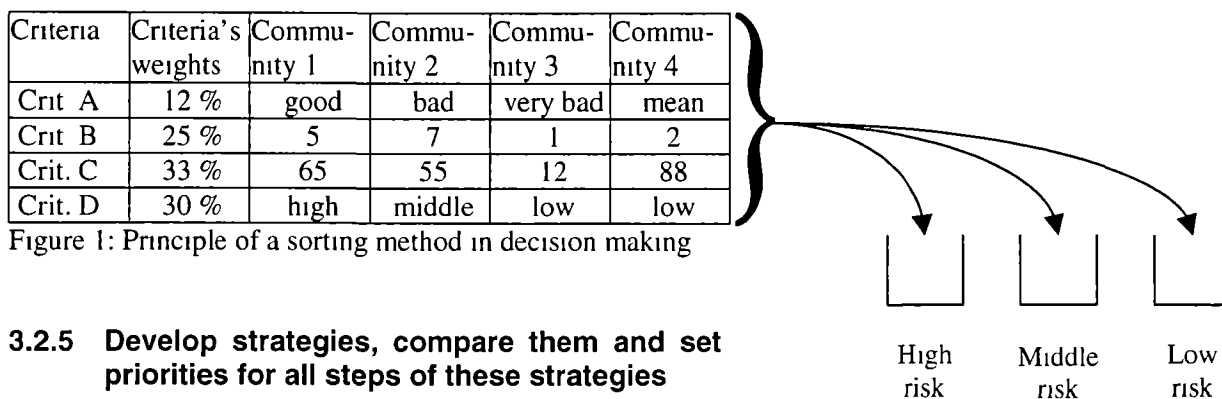


Figure 1: Principle of a sorting method in decision making

## 3.2.5 Develop strategies, compare them and set priorities for all steps of these strategies

### 3.2.5.1 Building the strategies

The development of strategies should be done by experts in sanitation but not only WHO or international experts, it should be done with the regional experts. A participatory approach is necessary to be sure that these strategies will be accepted by people and will be long-term realistic and applicable solutions. They have to be put, maintained and completely mastered by local or regional people.

Many Decision Aid techniques can help experts to build these strategies in a well-structured and efficient way. The Bureau AD will work in co-operation with the experts, to give the best value of all their competencies in structuring all elements of decision in a synergetic way understandable by decision makers and operational to take decisions.



### 3.2.5.2 Comparison, prioritisation

To rank the priority of these strategies or compare them, the same approach as explained for identifying HRC can be applied. It can consist in two different problems:

- Comparing different strategies to choose the best one, based upon a set of criteria (for example, it's possible to take some of the criteria used to identify HRC, but assess their improvement compared to the actual situation). In this case, a ranking multiple criteria method will be used.
- Ranking priorities in the different steps of a complete strategy (different actions put together form a strategy, but these actions are not led in the same time. It depends on their priorities that should be determined by a set of different criteria). In this case, a sorting multiple criteria method will be adequate to determine, for example, different level of priority. A ranking method would be used only if one action can be done at a time.

### 3.2.6 Advantages of Multiple Criteria Decision Aid for Sanitation strategies for HRC

Besides all what has been exposed here, the main advantage of Multiple Criteria Decision Aid is to work in a participatory way to screen the largest set of criteria and elements of decision (figure 2). This is the only way to be sure that not only the solution is good but that it's applicable, accepted and that it will be implemented, mastered and sustained by local or regional people themselves.

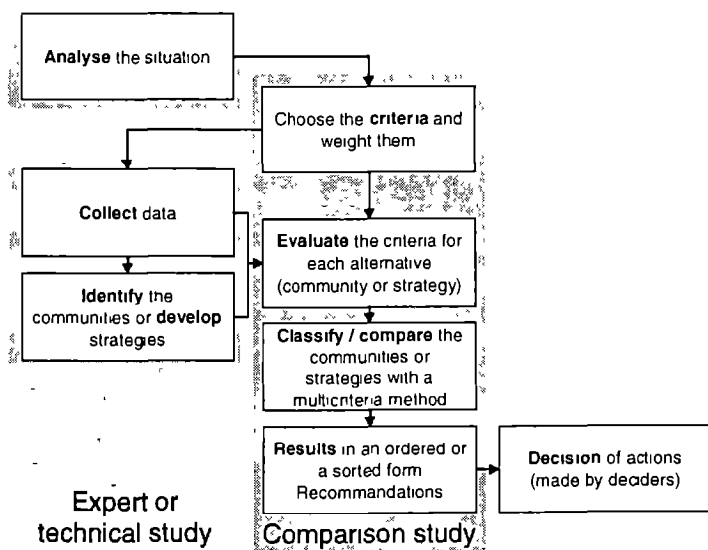


Figure 2: Multiple Criteria Decision Aid process at a glance

Many other features can be highlighted, for example the possibility to deal with uncertainties, the transparency of the whole procedure, the possibility to compare different points of view, etc. . but this is more proved by our successful experiences than with long papers

But since we are focused on action, let's not forget that a good action is good only because it comes from a good decision

## 4 ASPECTS OF ENGINEERING

### 4.1 Humanitarian Charter and Minimum Standards in Disaster Response (Minimum Standards in Water Supply and Sanitation)

*The Sphere Project*<sup>28</sup>:

<http://www.sphereproject.org/handbook/index.htm>

The minimum standards for Water Supply and Sanitation are a practical expression of the principles and rights embodied in the Humanitarian Charter. The Charter is concerned with the most basic requirements for sustaining the lives and dignity of those affected by calamity or conflict, as reflected in the body of international human rights, humanitarian, and refugee law. It is on this basis that agencies offer their services. They undertake to act in accordance with the principles

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<sup>28</sup> © The Sphere Project. A programme of The Steering Committee for Humanitarian Response & InterAction with VOICE, ICRC, ICVA. Oxfam Publishing distributes the handbook. Contact Oxfam Publishing at [publish@oxfam.org.uk](mailto:publish@oxfam.org.uk) or fax +44 1865 313713 or by post to Oxfam Publishing 274 Banbury Road, Oxford OX2 7DZ, UK.

of humanity and impartiality, and with the other principles set out in the Code of Conduct for the International Red Cross and Red Crescent Movement and NGOs in Disaster Relief. The Humanitarian Charter reaffirms the fundamental importance of three key principles:

- the right to life with dignity
- the distinction between combatants and non-combatants
- the principle of non-refoulement

The minimum standards fall into two broad categories: those that relate directly to people's rights; and those that relate to agency processes which help ensure people acquire these rights. Some of the minimum standards combine both of these categories.

1. Analysis
  2. Water Supply
  3. Excreta Disposal
  4. Vector Control
  5. Solid Waste Management
  6. Drainage
  7. Hygiene Promotion
  8. Human Resource Capacity and Training
- Appendix 1: Initial Needs Assessment Questions, Water Supply and Sanitation
- Appendix 2: Water Quantities in Addition to the Minimum Standard for Basic Domestic Consumption
- Appendix 3: Good Practice in Water Supply and Sanitation Programmes
- Appendix 4. Select Bibliography

*For the full text please refer to*  
<http://www.sphereproject.org/handbook/index.htm>

## 5 ASPECTS OF COMMUNICATION

### 5.1 Water talk - Intercultural development communication<sup>29</sup>

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Sanitaire*

*Ernest W.B Hess-Luttich, University of Bern*

*Alles ist aus dem Wasser entsprungen,  
alles wird durch das Wasser erhalten.*

*Johann Wolfgang von Goethe*

#### 5.1.1 The challenge

This is a short report on a new research project based on a joint initiative of the recently installed chair for génie sanitaire at the Institut du Génie de l'Environnement (IGE/GS) of the École Polytechnique Fédérale de Lausanne (EPFL) and the chair for Textwissenschaft at the Department of Ger-

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<sup>29</sup> Also published in Medienwissenschaften Schweiz/Science de mass média Suisse 2/1999

manic Studies of the University of Berne. It aims at bringing together at least six different perspectives of research hitherto operating in entirely separate fields: media studies, intercultural communication, conversation analysis, environmental studies, sanitary engineering, and development communication. The focal meeting point of these perspectives is discourse (Ehlich ed. 1994). It opens a dialogue on an issue of vital importance to ecology world wide: water. This serves as an example for key questions such as the communication of environmental conflicts in the mass media: can environmental awareness be awakened by the media? Can they alter everyday behavioural routines with respect to sustainable development? Can they be used to improve intercultural instruction?

One of the major ecological problems of the near future will be the global water shortage, which is already today responsible for many political conflicts all over the world: this was well illustrated by a recent German television series on the issue ("Wasser", ZDF July-August 1998, focusing especially on the situation in Africa, Mexico, Turkey, Syria, Israel, etc.). Our main research interest, therefore, is to examine the increasingly important rôle of the media in communicating ecological problems caused by the shortage of water and find sustainable solutions to fight their consequences. If such solutions for sustainable management of water resources cannot be communicated effectively, water problems may not only deteriorate into environmental crises but also political conflicts and even regional catastrophes which, in the last resort, will affect our First World societies in one way or another (e.g., migration, international relations, developmental policies, crisis intervention, etc.. cf. Hess-Lüttich 1997).

To date, sanitary engineering has proposed a number of solutions, even if predominantly technical ones, i.e., solutions dealing with preserving water quality and reducing water consumption. The communicators involved in the complex dialogue process – from finding the solution and inventing the necessary technology to its local implementation and effective application – are institutions and organisations on the one hand, local project workers and their addressees on the other. Thus, the attempt of analysing this complex dialogue process means taking systematically into account aspects of (i) *institutional communication* (mass media, aid organisations, local communication networks), (ii) *interpersonal communication* (face-to-face conversation, instructional discourse, behaviour routines), and (iii), owing to the manifold cultural differences involved, *intercultural communication* (cross-cultural dialogue, cultural stereotypes, international relations).

The research project, sketched out as follows, aims at designing a theoretical framework for transdisciplinary analysis of the interface between the three main communication axes (institutional, intercultural, interpersonal), and establishing a model derived from that analysis for application "in the field", permitting implementation, harmonisa-

tion, and optimisation of communication patterns in local cross-cultural instruction processes, as well as in campaigning for environmental issues through critical media reports, public relations concepts, and the like (cf. Hess-Luttich ed. 1992). The findings could, and should, be applied, for instance, to the field of sanitary engineering where the IGE/GS has established close co-operation with the École Inter-Etats d'Ingénieurs de l'Équipement Rural (EIER) and the Centre Régional pour l'Eau Potable et l'Assainissement (CREPA) in Burkina Faso, for francophone West Africa. This co-operation, among other activities, has already led to a recent PhD-Thesis on communicating sanitary issues in deprived regions (Guène, 1998) Another important field of application would be the one of communication studies and public health where the Berne Institute has to established contacts with the Centre for Cultural and Media Studies (CCMS) at the University of Natal, Durban, for anglophone eastern and southern Africa. Other projects deal with problems of sanitary engineering in Marco. Taking all these together should provide a broader picture of the issue in Africa and a very good starting point for further field studies

### 5.1.2 Risk research and communication conflict

In modern "risk society" (Beck 1996), everybody is obliged to deal with uncertainties and their consequences. Facing risks has become part of everyday life nowadays (Blanke 1990. 135). The term *risk society* refers to social institutionalisation of accepting risks within contemporary societies (Beck 1996). Special interest groups conducting their initiatives no matter whether they contradict the interests of other groups, typically run the risk of *conflict*. If the conflict cannot be resolved through negotiation, this may lead to a *crisis*. A crisis marks the turning point at which the balance of power is re-considered, re-discussed, re-evaluated by all parties involved. If all negotiations fail, i.e., if the conflicting parties insist on questioning and re-defining the existing equilibrium, the crisis may escalate into a *catastrophe* in the sociological sense of conflict research (Apitz 1987: 13).

What would the scenario for a global catastrophe look like in a post-war age? What would its crucial issues be? When would it occur? Meadows et al. recently revised their famous 1972 report to the Club of Rome, entitled *The limits of growth*, which gave a prognosis on the increase in resource consumption with a growing world population. In their second report 20 years later, *Beyond the limits*, it is clearly stated that within a few decades many natural resources will be exhausted, the first being *water* (figure 1).

One has to bear in mind that while 71 % of our world's surface is water, less than 1 % is accessible fresh-water. People need it for drinking, cooking, washing, producing products, agriculture, etc. Thereby, they not only consume water; they also contaminate it, thus causing remarkably high passive water consumption. This, in turn, affects both surface and sub-surface fresh-water resources (Genske

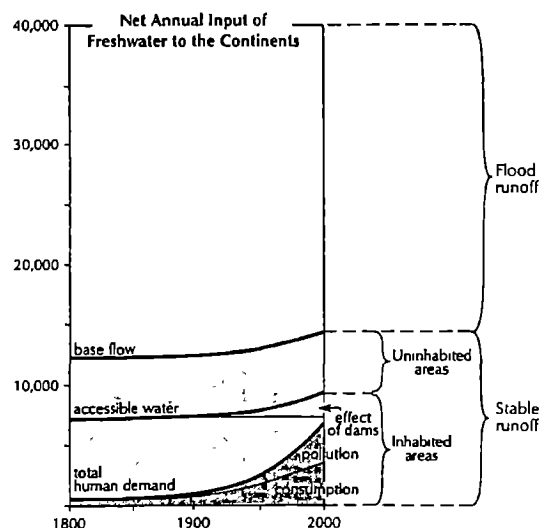


Figure 1: According to the prognosis published in Meadows et al 1992, water will be the first primary resource to become exhausted



Figure 2: Liquid waste from a hospital enters an open canal. About 100 meters downstream water is collected from wells adjacent to the canal for watering vegetables to be sold on the local market. When water wells have run dry, water has been taken directly from the canal (Burkina Faso, photo by Karin Linxweiler, 1998).

1996) To reclaim or remediate contaminated groundwater resources is such a complex and costly problem that only highly developed countries can afford it if there is a clearly defined need (cf. Genske & Noll eds. 1995). While Europeans today enjoy an average water consumption of some 250 litres per person per day, and Americans of more than 600 litres, the peri-urban population in cities like, say, Ouagadougou, Burkina Faso, has to manage with some 20 litres per person per day, way below the absolute minimum defined by the WHO for developing countries. Critical water shortage and pollution is already a reality and part of everyday life in many countries today (figure 2). Two million people have no access to drinking-water; more than five million die every year because of diseases transmitted by contaminated water. By the year 2025 up to 40 % of the world's population will have no access to sufficient clean water, by 2050 this figure will be 60 %. There are many conflicts on water rights; many areas are frequently plagued by crises in water supply; some are on the verge of being exposed to regional catastrophes caused by water shortage (cf. Meyer & Wellmann eds. 1992)

But why on earth should we in central Europe think about these problems? Take Switzerland, for instance, a country as rich in water as it could be, where it is abundantly available. That is exactly the point forcing us to think about a global water crisis and its possible consequences. According to Brand (ed. 1997), the number of migrating people seeking space, resources, and water, will increase considerably as compared to those fleeing from civil wars and political suppression or religious persecution. Any ecological crisis will have a negative impact on the economy, on the social structure, probably even on the internal social peace the rich countries have been enjoying for such a long period (cf. Joas 1992: 325 et passim; Scharping & Gorg 1994).

Management and resolution of crises normally commences with preventative measures before the crisis breaks out, i.e., in the phase of conflict (when crisis management comes too late – as described, e.g., in UNESCO Courier 10 (1997) – it may slide into the phase of catastrophe). Although there are numerous international organisations dealing with the exploitation of water resources in regions in need of water, the demand has increased. Although an International Water Decade (1980-1990) was proclaimed by the UN, the number of military conflicts over water resources is growing. Although the technology is available for resolving water shortages, global water management has deteriorated. And finally (although the Rio de Janeiro World Summit in 1992 passed the well-known Agenda 21 including the now almost proverbial notion of sustainable development) the concept of careful resource consumption for the benefit of future generations – as clear and simple as it sounds – has yet not been sufficiently implemented. Could it be that it has not found the right communication path through administrations, organisations, and institutions down to those affected by these resource shortages? It is this very question we want

to raise in this multidisciplinary dialogue (cf. Welford 1995; Breitmeier 1996. 132-145; Joussem & Hessler eds. 1995; Brand ed. 1997).

One of the key aspects of understanding and explaining conflicts with respect to primary resources such as water seems to be a failure in communication due to mismanagement of down-to-consumer information and control. Socio-cultural, political, and economical characteristics of the population targeted must already be taken into consideration in the planning phase of a crisis communication project. This has been common ground in all disciplines dealing with communicating technical information between cultures since the 1950s (Clyne 1996; Scollon & Scollon 1995) In the late 1980s, however, when an integrated theory of intercultural technology transfer had still not been achieved, Kievelitz (1988) outlined a theory of development ethnology ("Entwicklungsethnologie"). From a pragmatic viewpoint, he pointed at weaknesses and contradictions in communication models to date and called for combined ethnological theory and practice in order to improve communication strategies in projects of technical co-operation across cultures (Kievelitz 1988. 99):

*Technische Zusammenarbeit spielt sich stets in einem fremden Kulturraum ab. Dabei macht die Kooperation und Interaktion zwischen Einzelpersonen, Gruppen und Vertretern von Institutionen den überwiegenden Teil jeglicher Projektarbeit aus. Die Zusammenarbeit zwischen Menschen ist die wichtigste aller Aufgaben im Projekt; über Personen wird jeglicher Erfolg in der Arbeit erreicht, ganz unabhängig davon, ob ein Projekt auf Regierungsebene angesiedelt ist oder unmittelbar bevölkerungsnah, und gleichgültig, ob es sich dabei um landliche Regionalentwicklung, Institutionenaufbau oder Regierungsberatung handelt.*

*[Technical co-operation always takes place in a foreign culture. The co-operation and interaction between individuals, groups or representatives of institutions represents the main part of any project work. Co-operation between people is the most important of all tasks of a project; via people every success of the work is achieved, regardless if the project is launched at the governmental level or directly close to the population, and despite the type of development project, be it regional, institutional, or governmental ]*

Recent studies agree that these findings remain to be tested empirically and applied in field work (cf., e.g., Prochnow 1996: 63). Although traditional intervention philosophy has meanwhile shifted towards a participative concept of *empowerment*, many reports show that, in practice, inefficiency and cost-ineffectiveness prevail in intercultural com-



munication (Weiland 1984; IEZ 1994), and that misunderstanding and even social conflicts are quite often provoked (Gnägli 1995: 361-368)

Facing the existing trends towards globalisation, the empirical investigation of intercultural communication should not be restricted to what has been dealt with so far within the framework of *cultural studies*, and it should be linked to the expanding research field of *international communication*. Meckel & Kriener (eds. 1996) propose a systematic division of the research on international communication into four segments: (i) technical and infrastructural development on a global scale, (ii) the institutional dimension of internationalisation, (iii) the institutional context of media products (including journalism, instruction), (iv) the textual dimensions of media products (including content analysis, media semiotics). Against the background of newly emerging structures for global communication and new technical developments in the media system, the authors take a close look at the recent political, economical, social, and journalistic implications of international communication, thereby not only introducing aspects of journalism and communication theory into the discussion on international communication, but also strongly suggesting a change in the clearly eurocentric direction of traditional analysis of mass media impact in developing countries – especially those with resource shortages (cf Grossenbacher 1988, Grossenbacher & Saxer 1987)

All this is of direct relevance to analysis of crisis communication. For companies and organisations, crisis communication has primarily economic dimensions, a crisis interferes with the standard routine, it disturbs normal processes and affects the economy of an organisation negatively. Many examples of attempts at ecological crisis management, some of them not very successful, are still in the public conscience, for better or worse linked with catchwords such as Bophal, Seveso, Tschernobyl, Brent Spar, and Schweizerhalle, to name but a few. Instances such as these have been analysed from various perspectives: from a primarily economic viewpoint by, e.g., Weber (1980), from a strictly communicative perspective by Aplitz (1987) or Heintzel, Kunzlik & Zipfel (eds. 1995), and, most recently, by Scherler (1996) from an integrated standpoint combining the economic analysis of ecological crisis management with its communication theoretical implications.

The overall communication structure of a typical reaction by organisations (companies) having caused a severe ecological accident is characterised by the initial phase of internal discussion of the social and thus economic impact of this accident on the organisation or company. At the next stage, press releases are prepared by the organisation's *public relations* department (for a more detailed discussion of the term public relations and its research tradition, cf. Barthenheier, Haedrich & Kleinert eds. 1982, Flieger 1986; Böckelmann 1991; Becher 1996). At this stage, the functioning of internal communication is crucial for a

successful positive presentation of the organisation to the public. Board members must know the complex structure of their organisation and their communication pathways, allowing them to communicate efficiently within their infrastructure and through all levels of the company hierarchy as a prerequisite for a full feedback to staff members working out a public relations strategy (cf. Kalmus 1994; Armbrecht 1992). Internal business communication ("Unternehmenskommunikation", cf. Bungarten ed. 1994 a, b) is a vital factor in the organisation's attempt to socialise its staff members and make them identify with their company and its corporate identity – today a well-established field of *applied semiotics* (cf. Borbé & Krampen eds. 1978) However, to date there are still only few attempts at analysing the underlying relationship between communication, technology, organisation, and development (cf. Mansell & Wehn eds. 1998; Harré, Brockmeier & Mülhausler 1999). Only if all the systems involved work together, complex decision strategies for (changing of) daily routines and for the adjustment and/or optimisation of development communication can be successful

Public relations training is considered to play an important part in this process. So far, however, a unifying concept of the functions of public relations does not exist (Ronneberger & Ruhl 1992: 11). Since the late 1980s, public relations has also been recognised as an ample field of research in communication science and its neighbouring disciplines in the German-speaking countries. Whereas research on public relations carried out in the United States remained more or less empirical with a strong focus on application (Armbrecht & Avenarius eds. 1992), European studies clearly emphasised the inclusion of theoretical desiderata. Having diagnosed a "defizitäre wissenschaftliche PR-Lehre und -Forschung" [an insufficiency in academic teaching and research into public relations] in Germany, Ronneberger & Ruhl (1992: 10) called for a theory of public relations and submitted "a first draft" of such a theory. It gives an outline of the few existing theoretical approaches and of recent developments. But it also indicates certain contradictions in the fundamental concepts and methodology of these approaches. Alternatively, it offers a new approach based on communication science, bridging the gap between the theory and practice of public relations.

The gap is still wide. Interest in practical public relations tools is still dominant, reflecting the prevailing underestimation of PR's external relevance for the organisation's image in the media. The same applies to internal business communication: its structure is hardly influenced at all by public relations concepts relating communication, decision, organisation, and marketing (cf. Broghs 1994; Armbrecht 1992; Theis 1994). The management function is only one among many other public relations functions (Ronneberger & Ruhl 1992) These also include scrutinising the demands of the organisation, the rules of external markets, and the social environment of an organisation; they especially include pro-

vision of complex decision-making strategies for changing daily routines and for adjustment and/or optimisation of communication. Following the lines of system theory, the authors distinguish three levels of public relations: (i) at the *macro*-level the functional relationship between public relations and society as a whole, (ii) at the *meso*-level the performance of public relations in relation to other functional systems in society (such as the mass media, pressure groups, lobbys, etc.), and (iii) at the *micro*-level the public relations tasks and internal as well as external communication structures of an organisation, including, e.g., face-to-face interaction in project work (Ronneberger & Rühl 1992: 183-193 and 249-280). In this sense, public relations theory can be understood as one possible starting point to provide the supporting pillars for a bridge between mass communication and individual communication, between institutional and interpersonal communication, as the most relevant frameworks for crisis communication. As far as we can see, the interface of these two frames of conflict communication has not been investigated in a synoptic approach so far (cf. new proposals in Fiehler ed. 1998). A concept for an integrated theoretical model remains a desideratum (an early exception is Richter 1979). However, empirical case studies in various fields seem to indicate the necessity for a more complex approach and an in-depth analysis of this relationship with regard to what has now been named *development communication* (cf. Anderson 1997; Mansell & Wehn eds. 1998).

To cite a case in point: in a field study dealing with installation of a municipal waste incineration plant, Wiedemann, Schutz & Peters (1991) conclude that an open information policy might trigger interactive participation by the target groups concerned. Hence, public relations could well serve as a key issue in fostering *empowerment* of groups facing conflict situations.

Modern societies call for new ecological quality of life. It is increasingly regarded a core dimension of freedom. For many years, conservation or restoration of an intact environment was believed to be a task of solid engineering. This exclusively technical approach has been shattered considerably in recent years (cf. Joussen & Hessler eds. 1995): modern ecology favours transdisciplinary co-operation between the engineering sciences, social and political sciences, psychology and semiotics, natural science and the humanities. Only such a dialogue between all the disciplines involved can provide the basis for fruitful discussion on how to respond to environmental degradation in an effective manner, i.e., one publicly acceptable. However, the manifold facets involved make it difficult to develop an integrated theoretical strategy for communicating ecological concepts through the media and across cultures. The core function of communication in this process is still scarcely acknowledged (cf. Aurand, Hazard & Tretter eds. 1993). It remains widely ignored by communication science, which seems absorbed by investigating headline journalism and media scandals, text design, and media ethics.

One rare exception is a recent study by Meier & Schanne (eds. 1996) sponsored by the Swiss National Science Foundation Devoted to the "Rolle des Journalismus bei der Wahrnehmung und Bewältigung gesellschaftlicher Risiken" [rôle of journalism in realising and mastering social risks], it presents an in-depth survey of media performance on ecological issues in general and on environmental risks in particular. According to these findings, it appears that the mass media often serve as a mouth-piece for promoting the interests of industries, companies, and business organisations. The key rôle of public relations plays in this process is therefore an important object of research (cf. Grossenbacher 1989). Astonishingly, the water crisis – as one of the most urgent environmental problems to be dealt with globally – was not even mentioned, let alone defined as an object for further case studies.

However, an aspect investigated thoroughly in communication sciences is the mutual dependency and resulting rôle conflict between journalists and public relations agents, the mass media, and business organisations (cf. Baerns 1985). Business organisations, institutions, and companies, facing an increasingly critical and ecologically aware public, are more than ever confronted with problems of legitimising and justifying procedures. This again holds a strong potential for further rôle conflicts (Becher 1996). But topical studies applying this to the water crisis are still lacking to date, just as systematic investigation into instruments and types of public relations such as open-house and information days, poster campaigns (as launched by the pharmaceutical industry), TV commercials (e.g., combat AIDS-campaigns), cultural events (e.g., the August 1 floating candle campaigns for Swiss-Aid), or cross-cultural campaigns of aid organisations (e.g., Red Cross).

In applied discourse analysis we have one possible starting point for providing the supporting pillars for a bridge between mass communication and individual communication, between institutional and interpersonal communication, as the most relevant frameworks for development communication to avoid ecological crisis and subsequent conflicts.

### **5.1.3 Water talk – an African field study**

Water is a case in point: International experts and environmental organisations do not hesitate to speak of a global water *crisis*. This indicates that the very complex implications of such a crisis will not only affect arid areas of the world but also in one way or other the so-called water-rich countries in the northern hemisphere. The problem can only be tackled with a combination of international and interdisciplinary approaches extending across traditional academic boundaries. In the light of this understanding, the EPFL has allocated a seed budget to the IGE/GS to finance preparation of a research project focusing on communication problems with respect to the water crisis (7/98 - 12/98: Karin Linxweiler helped with preparing relevant data) This is why two

research groups, which normally would be protected against any contact with each other by the high barriers of scientific cultures, have decided to co-operate: namely the chair for génie sanitaire at the Institut Génie de l'Environnement of the EPFL and the chair for Textwissenschaft at the University of Berne (see above), both strongly motivated by an unconventional understanding of the social responsibility of scientific endeavours.

The prerequisites were optimal for a pilot field study. The IGE/GS has been co-operating for many years with the École Inter-États d'Ingénieurs de l'Équipement Rural (EIER) and the Centre Régional pour l'Eau Potable et l'Assainissement (CREPA) in francophone Africa. The CREPA was founded as an international organisation based in Ouagadougou, Burkina Faso, dealing with problems of water supply and sanitary engineering. Branches ("antennes nationales") of the CREPA are located in more than 15 French-speaking countries in western and central Africa.

Ecological problems dominate daily life all along the sub-sahelian zone. Of special interest here are peri-urban areas, since these are the fastest growing in population, but have, at the same time, the weakest infrastructure. The UN Summit Habitat II in Istanbul 1996 published an assessment projecting that two out of three inhabitants of our planet will be living in cities in less than one generation (quoting a prognosis of the World Resource Institute in Washington carried out in collaboration with the World Bank). Neither water nor electricity is available in the fast-growing peri-urban areas of poorer countries. Clean water has to be collected at water points which have been installed with the help of international organisations in co-operation with local institutions and authorities. The health situation is hazardous in the peri-urban zone. Inadequate waste management causes numerous diseases connected with the lack of sanitary installations (and, as we said in the beginning, five million people die every year from these diseases transmitted by contaminated water).

Our pilot field study was devoted primarily to the peri-urban areas of Ouagadougou, the capital of Burkina Faso, during an intensive two-week survey in June 1998. But for comparison, the much smaller city of Ouahigouya in the north – a so-called "ville secondaire" – and the rural village of Roumtenga were also included in this survey. Its main interest was to analyse attempts of international aid organisations, such as CREPA, to communicate concepts of water supply and sanitation to the local population.

On-site discussions with delegates of CREPA, municipal officers and administrators, local water point committees, 'water masters' and traders, and target groups of the local population yielded an insight into the most complex communication pattern developed in a pragmatic way by those sharing a common interest in obtaining and providing water. These communication efforts – which include not only the transfer of technical and social issues but aim at the same

time to change traditional behaviour patterns for the vital reason of sheer survival – have not been analysed so far.

The instructional concept of CREPA concentrates on how the quality of clean water collected at the well point can be maintained until the moment of consumption. The quality of water may already degrade during transport to the huts if not carried in closed containers, and later in the huts if not stored in especially designed jars. If the water quality degrades due to inadequate sanitary precautions, water-related diseases are the inevitable consequence. In the poor quarters of the towns – which are mainly located in the peri-urban zone – the mortality rate of infants exceeds 30%.

CREPA decided some time ago – probably somewhat intuitively – to start with sanitary education efforts at the water points since these are the locations the local women visit every day to satisfy their families' water demands (figure 3). It was certainly a wise decision, by the way, to designate water points as optimal locations for implementing educational campaigns: utilising the *water distribution path* as a *communication path* is a strategy with a long tradition. It has been used for ages by magicians, churches, and mosques, especially in the more arid regions of the world

The CREPA task, however, was complicated by the fact that an educational programme dealing with issues of sanitation has to address delicate questions into the private sphere of individuals and maybe even intrude into intimate behaviour patterns. In order to communicate these issues, CREPA has adopted the SARAR-concept developed by the Indian ministry of Education in the 1970s. SARAR is an acronym for the concept's five basic principles: **S**elf-esteem – **A**ssociative strength – **R**esourcefulness – **A**ction planning – **R**esponsibility. An important aspect of the SARAR approach adopted is that local representatives from the area at which the water point was installed are recruited and trained to communicate sanitary concepts. They are referred to locally as 'animateurs' and 'animatrices'. The locals have confidence in them since they live in the same quarter and are familiar with their local culture and their particular problems. The 'animateurs' and 'animatrices' are based at the water points to contact the locals on their daily walk for water. They talk with the women in their language and go with them to their huts to discuss problems of sanitation *face-to-face*.

Guided by Lyra Srinivasan, SARAR was further developed by United Nations Development Programme (UNDP) in the 1980s. UNDP started the so-called PROWESS Project, focusing on the **P**romotion of **W**omen in **W**ater **S**upply and **E**nvironmental **S**anitation **S**ervices. In 1992, the World Bank Water and Sanitation Programme, and the WHO further refined the SARAR approach to promote sanitation and hygiene behaviour changes by launching the PHAST initiative, emphasizing **P**articipatory **H**ygienic and **S**anitation **T**ransformation – an “innovative approach designed to promote hygiene behaviour, sanitation improvements and community management of water and sanitation



Figure 3 Women gather at the local water distribution points: the starting points of the water communication path (Burkina Faso, photo D. Genske 1998).

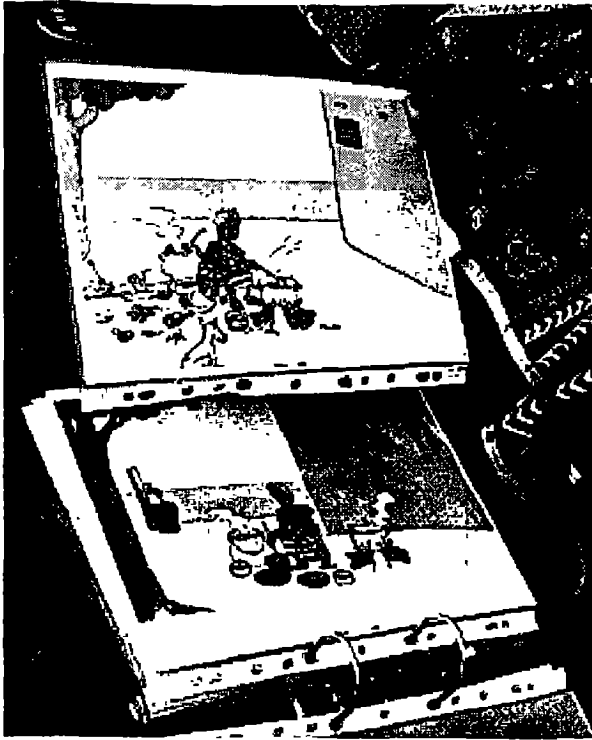


Figure 4: The SARAR method works with images depicting undesirable behaviour patterns juxtaposed with the improved situation  
(Burkina Faso, photo by Karin Linxweiler 1998)

facilities using specially developed participatory techniques” (Simpson-Herbert et al. 1996).

This personal procedure has proven far more successful than any other approaches such as public slide shows or videos or hypertext computer instruction. These are consumed passively, if at all, without triggering any change of behaviour, besides the fact that these methods of instruction are more expensive and demand a certain technical infrastructure which normally cannot be provided in underdeveloped peri-urban zones (figure 4).

Another specific complication is that, as a rule the locals in peri-urban zones migrated there from rural areas. Many of them cannot read or write, and they often speak different dialects. This is not a problem for sociolinguistics or language policy but one of cultural semiotics. To overcome the communication barrier, CREPA adopted the strategy of the “boîte d’images” first introduced in connection with projects financed by the World Bank. This approach works with pairs of iconic illustrations in the form of cartoon sequences representing the *before* and *after* status as traditional everyday routines vs. new behaviour patterns. The former are interpreted as dangerous to one’s health and, therefore, marked as undesirable while the latter – indicating an improved sanitary standard – are explained as to how people will benefit from them.

All illustrations are semiotically adapted to the local culture and to situations of the people’s everyday experience, depicting typical huts of the quarter inhabited by local people wearing typical clothes. For this reason, the target person can easily identify herself (or himself) with the situation depicted and recognises certain behavioural patterns, realises their consequences, and understands how to improve the situation. The “boîte d’images” is repeatedly discussed with the locals and commented upon in order to ensure success in individual education during this instructional discourse.

Benefitting from this experience, CREPA has realised that communicating water related problems cannot be left to the engineers who develop technologies to ensure minimal sanitary standards such as special water jars or transport equipment. Any technical innovation which makes it necessary to change traditional behaviour patterns in situations of intercultural contact calls for a contribution by sociologists, ethnographers, and communication experts, turning this educational task into a transdisciplinary challenge.

The water and sanitation project visited in Burkina Faso offers a textbook example for the specific intercultural communication problem that we are interested in: a message developed within an organisation (such as CREPA) has to be communicated – by means of public relations procedures and based on cultural semiotics – to a target group, in a triangular intercultural dialogue (expert – animateur – local) and face-to-face conversation (animateur – local, animateur – expert for feedback and re-evaluation), supported by culture-specific and locally adapted instructional material that

requires no technical infrastructure, in order to initiate the changing of behaviour patterns detrimental to those exercising them.

Our focus is the very interface between these two axes of communication. We aim at giving it a theoretically integrated basis for empirical analysis which in turn may be of interest for the conceptual advancement of both discourse analysis and theory of intercultural communication. Another long-term perspective for further research may be to try and transfer those communication strategies observed to be successful in getting people to practically change the way they deal with water and to apply them in carefully adapted ways to other educational issues of equally vital importance. For instance, the Agence Canadienne de Développement International (ACDI), which we contacted during our field study and which conducts a \$ 14 million (Can) project to fight the AIDS crisis in the French-speaking countries of Africa (Projet d'appui à la lutte contre le SIDA en Afrique de l'Ouest), was not aware of the communication strategies utilised by CREPA, let alone of its proven efficiency. Ironically, the head office of ACDI in Ouagadougou is located just some 100 meters away from the CREPA and EIER offices. This, we believe, illustrates more than anything else the need for further research and mutual co-operation across academic boundaries in this scientific endeavour.

#### 5.1.4 Objectives

In a world with ever-increasing international communication links and simultaneously degrading primary resources, ecological crisis communication is a challenge for all parties involved, be they natural scientists offering technical solutions, public relations agents of organisations prompting concepts, or project workers *in situ* initiating changes in behaviour, face-to-face. The danger of misunderstanding is high since language differences and cultural contrasts complicate the approach. Differences in forms of communication as well as the locally varying interpretation of standards and status add fundamental problems to the analysis of communication processes in this particular context. When dealing with issues of water quality and sanitation, diverging ethnical traditions, moral beliefs, and magical rituals open up further dimensions of the problem. There is not much use in developing sustainable technological solutions to fight the water shortage if they cannot be communicated. Communication failures with regard to essential primary resources easily lead from conflict to crisis, and from there to catastrophe.

For reasons of reducing the complexity of the problem, we suggest focusing on the two main frames of development communication which we associated with a multiplicity of perspectives in the first section:

- the institutional perspective: internal business communication, media communication, networks;
- the interpersonal perspective: face-to-face interaction, instructional discourse, behaviour routines;



- the intercultural perspective: cross-cultural conflicts, cultural stereotypes, international relations.

The first frame raises questions as to the codes of cross-cultural media campaigns of First World organisations with the objective of alerting people to ecological issues; the second to the codes of cross-cultural instructional discourse with the objective of initialising changes in individual everyday behaviour routines in Third World areas of ecological crisis (or even catastrophe, if you think, e.g., of Sudan); the third to the causes of cross-cultural conflicts and to the structures of their negotiation in settings of both sub-cultural and international relations.

Our research project will follow both perspectives in designing a systemic model for an integrated analysis of heterogeneous facets of semiosis or communication processes involved, paradigmatically illustrated by those concerning the water crisis. The already established co-operation of IGE/GS with CREPA/EIER offers a real world reference case. It could, and indeed should, be complemented by a similar constellation of problems (African culture, peri-urban zones, water crisis) in a different (i.e., anglophone) area of the continent. For this purpose, contacts were also established with the Durban Centre for Cultural and Media Studies (CCMS, University of Natal), where similar lines of transdisciplinary research on crisis communication have been followed (sponsored, e.g., by state departments of education and of health, cf. Tomaselli 1992; Parker 1994; Tomaselli 1996).

Objectives of the project include

- information on conflicts or crises due to water shortage
- participants in the dialogue on water shortage conflicts
- a role model of these participants according to the perspectives given above
- content analysis of technical information communicated in the dialogue
- content analysis of social, cultural, and organisational information
- dialogue analysis of fallacies and misunderstandings
- a model of the interface between institutional and interpersonal communication
- public relations strategies to prevent conflict leading to crisis and catastrophe
- application of the model to case studies in African peri-urban zones

With these objectives in mind, we hope to bridge the gap between not only cultures in the empirical analysis of cross-cultural communication on issues concerning us all but also scientific cultures (in the sense of C P Snow) in co-operation of disciplines which normally take no notice of each

other, the methodological hinge joint being discourse analysis of conflict communication in intercultural settings (Fiehler ed. 1998).

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## 6 ASPECTS OF GENDER

### 6.1 Gender and sanitation

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Paper prepared for the South Asian WHO-conference on sanitation in high risk communities, Pokhara, 1998

#### 6.1.1 Introduction

Discussing sanitation for high risk communities rightfully includes a session on gender. In its report *Environmental Matters*, the Director General of WHO describes high risk communities as 'crowded urban and peri-urban settlements and rural communities where polluted surface water and unprotected wells and springs prone to contamination are used for drinking-water'. In the same report the DG states that high risk areas should be given priority in national and local planning, as they are to benefit most from sector investments.

If these communities are indeed to fully benefit from investments made in water supply and sanitation, a gender approach is indispensable. This paper tries to explain the need

for a gender approach and hopes to offer assistance in operationalising such an approach.

For various fields in the water and sanitation sector illustrative examples are used to explore why and how a gender approach is to be applied. However, before doing so it is tried to create a common understanding about gender and to explain why a shift has been made from women's involvement to a gender approach.

### **6.1.2 Women's involvement and gender, what is the difference?**

Before and at the beginning of the eighties planning and construction of community water supply and environmental sanitation were not expected to involve women, since it concerned public domain. Also the construction of household latrines, though private facilities, was considered to be discussed with men. Women were educated about hygienic practices within the household. It was assumed that the sum of these activities with women and men would result in effective projects having a positive impact on people's quality of life, i.e. on women's workload and the incidence of water and sanitation related diseases.

However, it is a mis-conception to think that men are in charge of sanitation in the public domain and women only have roles related to domestic hygiene. Research has shown that women manage use and protection of wells and springs, that they are successful in raising funds and that a sanitation programme collapsed when unpaid women sanitation workers were replaced by paid male staff.

It was realised that the effectiveness of water and sanitation projects was limited, since many of the newly installed facilities were not used and maintained and that the limited effectiveness resulted among others from the fact that a large part of the users of the new facilities, in particular women, were left out of related decision-making and management.

In response to this the need to involve women was stressed. Individual projects, but also organisations like PROWESS/UNDP and INSTRAW developed methodologies aiming at enhancing the involvement of women in all stages of project planning and implementation. At IRC Ms Christine van Wijk wrote the book *Participation of women in water supply and sanitation; roles and realities*.

Looking back at what was developed and published at that time, we see that in (sanitation) projects applying women's involvement approaches, attention is sometimes exclusively given to women's needs, responsibilities and authority, without addressing the redistribution of work and authority between women and men. A major consequence is that such projects do not bring about a better balance in physical work, decisions, functions and benefits. They may, of course unwillingly, even worsen the position of women because their workload increases, for instance when women are given the task of taking care of financing and maintenance, or when they are providing the required voluntary labour, allowing men to continue or even take up paid jobs.

Hence, addressing women or undertaking special efforts to have women participate in a programme does not necessarily lead to situations in which women and men are partners who share the work, the decisions, responsibilities and the benefits.

In response to this the gender concept found its way in the water supply and sanitation sector. The gender concept, being the concept that gender is the social and therefore changeable difference between women and men in a particular social situation, was translated into gender approaches. These approaches take into account attitudes, roles and responsibilities of women and men and recognise that both sexes do not necessarily have the same access to resources and that work, benefits and impacts may be different for both groups. These social differences and social interaction between men and women are considered to be flexible and changeable and projects will therefore have an influence on them

Existing cultural varieties and hence varieties in gender relations, also among different classes, account for the differences in how gender approaches are operationalised. In general it can be said that a class-sensitive gender approach ensures that control, outputs and benefits are not limited to a small (male) elite, but are widely shared.

Sign of the need for a gender approach being taken seriously are that many publications appeared, often combining theoretic insights and practical information and that under the Collaborative Council a working group on gender was created. Above mentioned IRC-publication was recently updated and given the title *Gender in water resources management, water supply and sanitation; roles and realities revisited*.

### **6.1.3 Where things can go wrong**

Like water supply programmes, sanitation programmes (or for that matter sanitation components of integrated programmes) also suffer from limited effectiveness. Many reasons can be furnished, one of them being that gender is not taken into account. While a gender approach is becoming accepted in theory, many programmes still have women's involvement as an add-on activity.

Below a selected number of problems is described that may occur if a gender approach is not applied. The examples touch upon the consequences of not taking into account the differences in need for sanitary facilities, of not realising that men and women do not have the same access to resources and of overlooking legal arrangements that have an impact on how women and men can act. One of the examples describes the negative impact on a group of women of a programme that was excellent from the public health point of view.



#### **6.1.4 Health impact**

If sanitation is to have a positive impact on health an adoption rate of at least 75% is needed. However, field studies have shown that latrine use by men lags behind, because they are less inconvenienced by the lack of latrines. Women have more problems with lack of privacy, distance and safety, in particular in densely populated low income areas, and generally have a higher demand for latrines than men.

##### **6.1.4.1 Remedial action**

Hygiene promotion related to demand creation, use and maintenance of latrines should equally focus on men. Also because men are role models for children, are usually owners of the land to be allocated for latrine building and are to decide on financial investments.

#### **6.1.5 Reaching women**

In large parts of Asia reaching women through regular project means and activities has proven to be difficult. Male field staff not being in the position to talk to village women, female staff not allowed to travel alone and meeting places being outside the action radius of women are among the constraints.

Also meeting times and places may be inconvenient for women because do not take into account their daily routine or the fact that women's access to public places is limited

##### **6.1.5.1 Remedial action**

Projects have to be flexible when organising the composition of field teams and have themselves guided by what will be encountered in the communities to be visited. For example in Western Pakistan field teams consisting of a male and at least two female staff travelled around the project area. Whereas male staff, not allowed inside the walls of the family compound, discussed sanitation issues with village men outside the compound, female staff could enter the compound to talk to women. In certain parts of Pakistan's Northern Areas male and female water and sanitation groups were formed. After a long period of rapport building between field staff and community members, joint meetings became possible, allowing for a better exchange and understanding among men and women of the communities.

Next to taking into account agricultural labour and general working hours women's requirements with regard to meeting place and meeting hours is the most obvious action to take.

#### **6.1.6 Financing and credit**

Women are generally prepared to spend a larger percentage of their income on sanitation improvements than men. At the same time women may not have sufficient income to be able to apply for a loan, because the down-payment is too high. Single, female headed households are mostly affected by

this, since women heading these households can not pool financial resources with their husbands.

Also opening hours of a registration office may be inconvenient and elaborate forms may require a literacy level that, in particular women, may not have.

#### **6.1.6.1 Remedial action**

When putting in place a credit scheme for the purchase and installation of sanitary facilities, gender issues have to be addressed. Lowering down-payments, allowing co-laterals among women, as is the case in a nation wide programme in Nepal, or providing targeted subsidies may be ways out. Opening hours will have to be adapted to people's availability and rather than circumventing women by addressing it-self to men, a project should provide assistance to women not able to read and fill in the forms.

#### **6.1.7 Legal issues**

Married women may not be allowed to sign the legal document going with the application of a loan. In cases where men are not prepared to take a loan for latrine building or where men migrate in search of jobs, like in many countries in Asia, this may cause considerable delay in project implementation.

Women may also not have control over land for the construction of a latrine, since the land is owned by the husband.

#### **6.1.7.1 Remedial action**

In cases where men do not consider a sanitary facility a useful investment for a loan or where they are not prepared to allocate a few square meters for its construction, promotional activities have to be targeted to them. Should seasonal migration of men cause the delay project planning should take this into account.

#### **6.1.8 Employment**

In urban areas in India, the impact of improved sanitation on the employment and resources of poor women was considerable. Low-caste women earned an income in the public as well as in the informal private sector as night soil collectors emptying bucket latrines. The programme to improve sanitary conditions by installing a sewage system, though excellent from a public health perspective, led to these women becoming job-less.

(Temporarily) female headed households may also suffer from labour constraints. Projects requiring households to contribute through labour may negatively affect these households, simply because time is lacking.

#### **6.1.8.1 Remedial action**

Those expected to loose their job should be offered training for marketable skills. When calculating the people effected,

a project should also take a look at the informal sector, since many women are employed here.

A project may even decide to upgrade existing facilities and making those less harmful by improving labour conditions, rather than going for a new, less-labour intensive technology.

### **6.1.9 The learning and changing organisation**

Organisations learn and can change. Should a programme want to learn by assessing its performance with relation to gender, an analysis may be based on the following six questions (van Wijk, 1998):

- How are men and women using water resources and for what purpose?
- How are contributions (labour, time, payments, and contributions in kind) to the development and management of water resources divided between men and women?
- Who makes the decisions and controls their implementation at the various levels?
- Who gets the project or programme resources, such as jobs and training?
- To whom go the benefits and the control over these benefits, such as status, water, products produced with this water, income resulting from products and functions and decisions and how is this income used?
- How is the division of these attributes among women and among men of different wealth, age, and religious and ethnic divisions?
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Such an analysis provides insight in the current gender divisions. and where change is required. It helps to determine where to strive for a more balanced division between men and women of different ages, marital and socio-economic status in terms of the access to information, the amount of physical work, the division of contributions in time and cash, the degree of decision making, the access to resources and benefits such as water, training, jobs, income, the control over these resources and benefits.

Gender awareness and skills do not come about automatically. If a gender approach is to be applied an agency will have to make sure that its staff is well aware of the underlying principles and has the skills to determine and address gender inequalities it encounters. When training staff it has to be prevented that gender is only looked at from the perspective of project efficiency without considering division of work, access to and control over resources

Agencies will also have to make sure that it has male as well as female staff and that it assigns equal importance to technical and social aspects of project planning and implementation. Projects should stop taking things for granted, for example that men are to be approached for matters concern-

ing construction or asking women to do the voluntary work and men to carry out the paid jobs.

Given the fact that gender relations are not the same for and within each (ethnic) community, projects need to allow a certain level of flexibility during implementation.

#### **6.1.10 Conclusion**

An effective sanitation programme does not single out women or men. A gender sensitive approach is to ensure that work, responsibilities and benefits of sanitation are more equally balanced between men and women in partnership. Projects and staff working in those projects can learn to determine gender inequalities and how to address those.

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## **7 EPILOGUE**

### **7.1 Des conditions sanitaires décentes pourraient changer la face du monde**

*Barbara Fournie  
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Le 30 mars dernier, un atelier international s'est déroulé sur le thème "Stratégie sanitaire pour les communautés à hauts risques: identification et planning" sous la houlette de l'Organisation mondiale de la santé et de la Chaire d'écotechnique et de génie sanitaire (EGS). Le point avec le professeur Dieter Genske sur un sujet qui concerne trois milliards et demi d'individus sur la planète...

Les chiffres font froid dans le dos: toutes les 8 secondes un enfant meurt pour une raison directement liée à l'eau, 80% des maladies qui se manifestent dans les pays en développement sont elles aussi en relation avec des conditions sanitaires désastreuses, une personne sur cinq n'a toujours pas accès à l'eau potable et... 7% du budget militaire mondial suffirait pour venir à bout de cette plaie planétaire. Ces chiffres, Mme Gro Harlem Brundtland, directeur général de l'Organisation mondiale de la santé, entend bien les brandir pour convaincre. Dans un rapport établi par ses soins, elle

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<sup>30</sup> *This article was published in Polvrama, No 113, Jun, 2000 and FLASH, EPLF, Lausanne, No 6/2000*

attire l'attention des états membres, des organisations internationales liées au développement ainsi que des ONG pour qu'ils réveillent les consciences des politiciens et puissent mettre en œuvre des programmes essentiels à la santé publique à l'échelle mondiale. L'atelier qui s'est déroulé fin mars à l'Institut du génie de l'environnement et qui a réuni des représentants de l'EPFL, l'OMS, le CICR, Médecins sans frontières et l'EA Wag, avait pour objectif de faire le point et de rassembler les forces en vue de la préparation du Collaborative Council Meeting qui aura lieu sur ce thème à Rio, au mois de novembre de cette année.

Le directeur de l'EGS, le professeur Dieter Genske, souligne d'emblée qu'à l'heure actuelle, si l'approvisionnement en eau potable s'est très nettement amélioré dans le monde en 10 ans, le nombre des personnes dépourvues d'accès à des installations sanitaires de base (toilettes, lavabos, évacuation des eaux usées) a encore augmenté, au vu de la croissance démographique. "C'est là, explique le professeur, qu'il faut agir en priorité pour enrayer à la fois une pollution de l'environnement et des épidémies qui ne font que s'accroître. Pour mémoire, rappelons-nous que dans un pays comme la Guinée-Bissau, 1 enfant sur 5 meurt avant l'âge de 5 ans alors que plus de la moitié de la population a accès à l'eau potable, mais seulement 20% à des infrastructures sanitaires adéquates"

Pour mettre en place des approches efficaces, les participants à l'atelier ont évolué sur trois paliers.

- définir ce que sont les "communautés à hauts risques", habitants des zones urbaines et périurbaines, victimes de catastrophes naturelles mais aussi de conflits armés, de guerres économiques et écologiques (en 1995, on comptait 30 millions de personnes réfugiées ou déplacées)
- les identifier géographiquement et socialement - aux critères peuvent aussi répondre des communautés du Nord industrialisé, pensons au Bronx à New York -
- établir une stratégie d'actions possibles sur le terrain.



La séance du pot... sans pot, dans l'espace restreint qui fait aussi office de cuisine, toute la problématique soulevée par l'atelier est contenue dans cette image. Dans certains pays, l'absence totale d'infrastructures sanitaires provoque la mort d'un enfant sur cinq avant l'âge de 5 ans (Photo. Alain Herzog).

Pour le Prof. Genske, le problème crucial est d'abord lié à la sensibilisation et à la communication. "Il faut bien sûr convaincre les responsables sur place que les investissements en infrastructures sanitaires ne représentent pas des "dépenses", mais vont dans l'intérêt général de leur pays. Mais, pour arriver à des résultats concrets, le dialogue doit s'instaurer à tous les échelons. international, interinstitutionnel et interpersonnel. C'est aussi ce que vise un atelier tel que celui que nous avons mis sur pied et qui va poursuivre la réflexion sur Internet et l'ouvrir ainsi à tous ceux qui se sentent concernés." Mais Dieter Genske, qui revient de trois semaines passées au Brésil dans la réalité crue des favelles, sait que rien ne se fera sans une communication "à la source", soit en prise directe avec les populations, en particulier avec les femmes et les jeunes filles "porteuses d'eau" de ces communautés fragiles "Installer des infrastructures sanitaires

dans ces zones défavorisées donnera aux femmes une chance d'accéder à l'éducation au lieu de passer la moitié de leur journée à assurer un approvisionnement en eau pour leur famille. Nous devons donc profiter des trajectoires qu'elles suivent pour les informer et promouvoir, sur des panneaux colorés par exemple, une hygiène meilleure et quelques gestes quotidiens indispensables qui contribueront, dans une certaine mesure tout au moins, à sauver la vie de leurs enfants."

## **7.2 Discussion/Afterword**

As mentioned earlier, the publication at hand is meant as an invitation to the reader to discuss and to put forward her or his personal experience concerning HRC, their identification, the deduction of proper remedial strategies and plans. As a result of the workshop the creation and ranking of indicators for HRC was broadly considered to be important. Some critical remarks on this are mentioned below.

The provisional indicator list that follows in the appendix 8.1 is meant as a kick off for further discussion. It is obvious that the list has to be condensed to certain general key indicators in order to make it manageable during field surveys. Moreover, the list is open for the introduction of new, perhaps more adequate ones. The interested readers are referred to the following contact addresses enabling her or him to participate in the discussion:

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As stated before there are still some remarks about the identification and indicators for HRC.

Agnès Montangero and Martin Strauss (EAWAG/SANDEC chapter 2.4) bring up that the majority of the contributions in this publication refer to the identification problem of HRCs. The two authors believe that Niono in Mali is representing a HRC. Consequently, the identification process has already been finished (according to them the entire town of Niono might indeed be designated a HRC). In this case, i.e. of having identified a HRC, a decision has to be reached as to what should constitute priority health improvement measures. In other words remedial action has to be deduced from the identified hazards.

Concerning the indicator approach, Eveline Bolt (IRC W&S Centre) mentioned that many indicators will need further specification (quantification/ qualification). Words such as sanitary, poverty, community representation, are multi-interpretable and if used by different people may give different results. A definition of some items has been tried in the first chapter of this proceedings. However, also these definitions are not necessarily indisputable nor are they covering all possible key terms in environmental sanitation and related fields. However, they show a possible manner of tackling some problems in particular and others in general. Again, the reader is invited to participate in the discussion.

Furthermore, Eveline Bolt points out that it would be important to map out processes for the specification of indicators, the collection of information and the use of this information for action planning

The future discussion will also take place in the internet. However, until now we did not establish a newsgroup. This is planned for the near future. Again, interested readers may ask, for instance via e-mail, about the state of development or consult the Web Page of *Laboratory of Environmental Engineering* (<http://dgrwww.epfl.ch/GS/index.fr.html>).

The discussion on HRC during the workshop and afterwards shows the vivid interest of the scientific community and practitioners in problems related to environmental sanitation. The concern is stimulated by an urgent necessity for improvement for 40% of humankind<sup>30</sup> that remain afflicted by improper sanitation. So far the need of change culminates in the quest for definitions, mechanisms, criteria and specifications of indicators for HRC. This report on the workshop reflects already some essential aspects of the subject. However, with the inclusion of further experts from

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<sup>30</sup> According table 1 in appendix 8 3

all over the world I see a good chance to develop a broadly acknowledged method of identification of HRC. The identification of hazards and risks will provide automatically starting points for remediation planning. Ideally the identification and the remedial planning should be conducted on a regional, even on a local scale. Therefore, it is important that anybody who is involved in environmental sanitation such as planners and fieldworkers will participate in this discussion. I am convinced that it will be possible to crystallise out of the infinite set of possible indicators for HRC a key group that is valid for many parts of the world and that will help to solve one of the most urgent problems on this spacecraft we refer to as 'earth'.

Lausanne, September 2000

Klemens Heinrich

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## 8 APPENDIX

### 8.1 Indicator list (proposal)

#### INDICATORS ON ECONOMICAL DEVELOPMENT AND ECONOMICAL STRUCTURE

*(second column in list will receive weights after expert discussion, i.e. list is not finished yet and open to discussion)*

Business	
Number of sanitary environmental services available in the community/ in the greater vicinity	
Companies busy explicitly in sanitation	
Diversity and adaptability of sanitary technology.	
Government engagement/subsidies as percent of gross in come in support of healthy sanitation,	
Government engagement/subsidies as percent of gross in come in support of health/hygiene education	
Government engagement/subsidies as percent of gross in come in support of public sanitary facilities (latrines, maintenance, purification)	
Government engagement/subsidies as percent of gross in come in support of water supply	
Inflation rate	
Children & Economy	
Percent of companies employing children	
Children living in poverty	
Children working	
Employment	
Average age of formal/informal workers	
Unemployment rate by ethnicity/ gender	
Number of commercially available crops/ vegetables	
Employment by sector (including informal sector)	

Main activity in informal sector	
Long term unemployment rate	
Members of family in % that must contribute to livelihood	
Real unemployment rate (estimation)	
Unemployment rate	
Number of jobs in environmental sanitation	
Increase/decrease of jobs in environmental sanitation over a reference period	
Finance	
Per capita debt	
% of GDP spent on education, research and development	
% of GDP spent on environmental sanitation	
% of GDP spent on water supply	
% of GDP spent on health	
State/city/community expenditure on sanitation, health, hygien	
Income	
Distribution of wealth	
% of jobs that pay a liveable wage for a family	
% of Jobs that do not pay a self –sufficient wage	
Income distribution	
% of disposal personal income that is being saved	
Average income of the upper and lower incomes	
Hours of labour to meet basic needs	
Population areas with poverty below the poverty line	
% of people in community below poverty line	
Personal income per capita	
Average earning per job	
Median family income as per cent of national average / global standard	
Per capita income in non metropolitan areas	
Use of resources	
Degree of subsistence of families (m2 kitchen garden per person)	
Square meter kitchen garden per family	
Type of energy used	
Quantity of energy used	
Water / person	

#### EDUCATION INDICATORS

General	
Percentage of persons educable with existing funds	
Percentage of persons educable in health education with existing funds	
Percentage of people being aware of relation sanitation, hygiene and health	
% of people graduated at primary school	
% of students entering post secondary education	
% of people graduated at secondary school	
% of people graduated at university	
% of all students in health education enrolment	

Illiteracy rate	
Technical school graduates working in their jobs (in the country)	
% of (secondary) school graduates finding adequate employment (in their fields)	
School and university graduates leaving their community (country, city, etc – brain drain)	
Abundance of information (billboards, etc.) about health, hygiene, sanitation (count per community, square km, etc. )	
TV's/radios per 1000 people	
Hours of TV/radio information campaigns health, hygiene, sanitation seen by target group	
Children	
% of children in basic education	
Children education enrolment	
% Women/girls education enrolment	
Ratio girls/boys in education enrolment	
School drop out rate	
Teachers	
Ratio female teachers/ male teachers	
% teacher with didactic background in health, hygiene, sanitation	
Student/teacher ratio	
Average teacher salary	
Teaching hours/week in health, hygiene, sanitation	
Awareness/Participation	
Number of official programs on health, hygiene, sanitation in (state, city, community)	
Number of programs in health, hygiene, sanitation at primary schools	
Number of community residents (or especially women) in health, hygiene, sanitation training programs	
% of population perceiving bad sanitation /hygienic conditions as a priority	
Volunteer involvement in health, hygiene, sanitation issues in the community	
Community representation on health boards	
Number of people who can name 2 doctors or health workers, etc.	
Presence of help organisations	

INDICATORS ON ENVIRONMENT (pollution)

Numbers of days/ month year with visible smog	
Air pollutants from stationary sources	
Exposure to air pollution (smell, visible smog) per month/year	
Monitored well showing groundwater contamination	
Distance waste disposal site domestic area	
No of septic tanks	
Regular cleaning of septic tanks	
Quality of receiving waters (creek, river) entering /leaving community	

% of wells with fresh water according to standards	
Faecal coliform count in wells	
Faecal coliform count in receiving waters (creek, river) entering /leaving community	
Faecal coliform count in surface waters (next to flowing waters also stagnant waters such as ponds)	
Km or km2 of surface waters not suitable for fishing	
No of people per Km of embankments using surface water for laundry, washing, hygiene activities	
% of people living as scavengers	
Solid Waste generation per person	
Type of waste disposal and location	
Distance waste disposal site houses	
Quantity of rubbish 200m along an average road/path	

#### INDICATORS ON HEALTH & SANITATION

Doctor / 1000 inhabitant	
Hospital beds / 1000 inhabitants	
Nurses/ 1000 inhabitant	
Health centre / 1000 inhabitants	
Defecation fields Area (m2) per inhabitant	
Defecation fields Area in % of community area	
Inhabitant per latrines	
Service personnel / latrine	
Latrine maintenance frequency (x times / week)	
Acceptance of public latrines (ratio latrine users/ inhabitants (of patch of users)	
Days of malfunctioning of latrines per week/month	
% of (Public) latrines with sinks and soap for hand washing	
% of latrine users washing hands	
% of latrine/toilet users satisfied with services	
Ratio Water treated/untreated	
% untreated waste water discharge into receiving surface water	
Quantity (l) of fresh water use per person / day	
Quantity (l) of waste water per person / day	
Waste water (l) purified per person / day	
Total water consumption	
Water consumption versus total annual precipitation	
Average distance between water collection point and houses	
Time consumption for organising fresh water	
Exposure (time in minutes) towards mosquitoes during water fetching	
Size and distribution of wetlands	
Ratio of protected wells/ unprotected wells	
% of people identifying obstacles to obtain health care	
Diarrhoea rate for children	
Infant mortality	
Disease xy rate	
Death from disease xy / 1000 population	
Malnutrition (children/adults) / 1000 population	

Health care as % of income	
Frequency of visit to health centre (month, year)	
Total health care expenditure of family / month	
Density of alcohol outlets in certain reference area	
Capacity of alcohol outlets in certain reference area (e.g. big beer halls)	
% of (male) population consuming regularly and excessively alcohol	
Litre alcohol consumption per capita (in certain reference area, e.g. community)	
Percentage of population using Alcohol and/or drugs	
Incidents (police or other reports) related to alcohol & other drugs	
Life expectancy	
Composition of diets (for children, adults)	
Perceived quality of life	
% of people who eat regularly a balanced diet	
% of people who eat regularly only once a day / or less	
Death per 100000 population age < 5, 20, 40 years	
% of women receiving adequate prenatal care	
Low birth weight infants	
Number of infants being born to unwed women under the age of (e.g. 18) who have no school education	
% Families with satisfactory child care arrangements	
Average distance house/toilet	
Average distance house/ public toilet	
Building of new sanitary facilities (e.g. latrines) per year/and per capita	
Building of new sewers (km) and purification facilities (capacity)	

#### INDICATORS ON POLITICS

Government	
Racial/gender diversity of national government/ city council etc.	
% of women in leading positions (legislator, officer)	
Community member satisfaction with governmental services	
Percentage of community member believing that (local) governmental will take remedial action	
Percent of legislation dealing with sanitation related issues	

#### INDICATORS ON LAND USE/POPULATION

Change in urban area vs. change in population (carrying capacity)	
Population density	
Population distribution	
Population growth	
Total population	
Net migration gain and loss	
Age trends	



% population under 20	
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#### INDICATORS ON MARGINALITY/CENTRALITY

Portion of household expenses spent on transportation, commuting	
Ability of people to reach education and health care centres (centrality, safety)	
% of people identify distance as obstacles to obtain health care and education	
% of people identify crime rate as obstacles to obtain health care and education	
Distance (in km or time) to next central location	
Number of intersections with change over on the way to central location	
Waiting time at intersection with change over	
Condition of roads	
Condition of transport means	
Distance (in km or time) to next health centre	

#### INDICATORS ON SOCIETY/ CULTURE AND PUBLIC SAFETY

Number of street children	
Abuse and neglect of children	
Number of reported abuse cases	
Crime victims as % of community population	
Prostitution	
Individual perception of safety when leaving home	
Crime rate (juvenile/ adult)	
Police officers / 1000 inhabitants	
Homicide per 10000 inhabitants	
Violent crime rate	
Rapes per 10000 population	
% of people	
% single women responsible for a family	
% of people being satisfied with prevailing living conditions	

#### INDICATORS ON HOUSING

Floor area (square meter) per person in housing	
Houses with proper sanitary facilities	
Houses with proper water supply facilities.	
Number of homeless people	
Number of people using homeless shelter or sleeping in the streets	
Number of houses vs. population	
Square meter of shelter per person in community	
Houses with sever physical problems	
Percent of dwellings in need of major improvement/repair	
Inadequate, overcrowded housing that cost over (30% ?) of income	
% of poor people paying more than 30% on rent	

## 8.2 Appendix: Environmental matters (provisional agenda 12.3)



**World Health Organization**  
**Organisation mondiale de la Santé**

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EXECUTIVE BOARD  
101st Session

Provisional agenda item 12.3

**EB101/19**  
12 November 1997

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# Environmental matters

## Strategy on sanitation for high-risk communities

Report by the Director-General

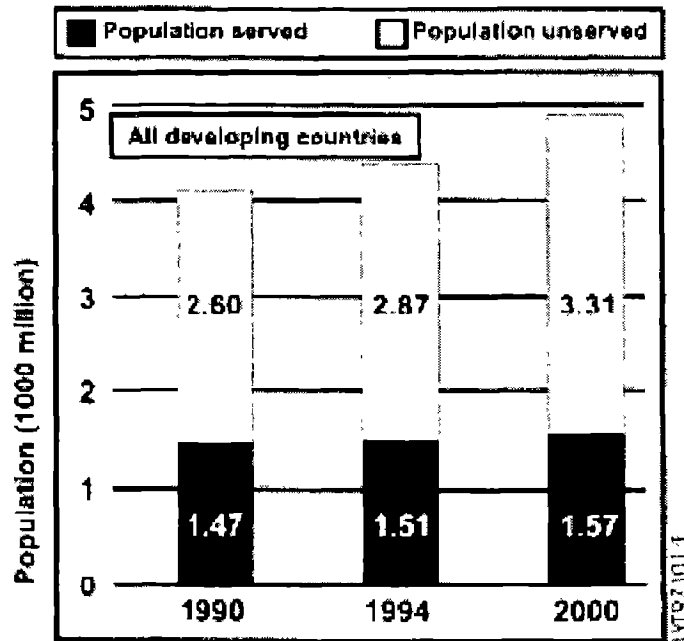
Poor household and community sanitation is a major risk to human health. Nearly two-thirds of all people in developing countries do not have sanitary excreta disposal, and the number without adequate services is growing. Current efforts to deal with the deficiencies are grossly inadequate and change is urgently needed, with a new strategy, particularly for those communities where the conditions are worst and the risk of contracting diseases related to insanitary conditions is highest, and where health would therefore benefit most from investments in water supply and sanitation. This document outlines action to be taken by WHO and other international organizations concerned.

The Executive Board is invited to consider a draft resolution.

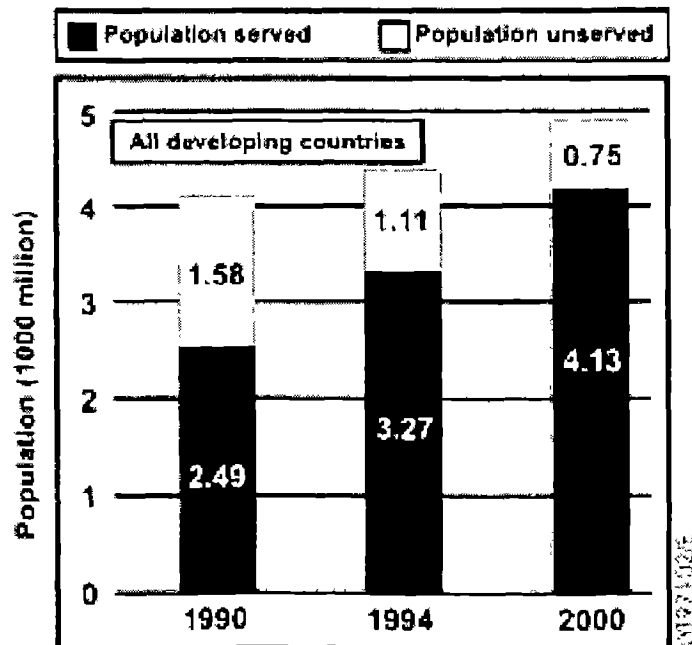
### INTRODUCTION

1. The poorest 1000 million people on Earth are seven times more likely to die from infectious diseases and maternal and perinatal conditions - most of which are directly related to bad sanitation - than are the least poor 1000 million.
2. Since 1970 sanitation coverage in developing countries has remained constant at about one-third. Projections to the year 2000 show no change in this pattern (see Figure 1). In essence, the increase in world population leads to an almost equivalent increase in people not served by adequate sanitation. The dramatic proportions of the sanitation deficit become most evident when compared with the progress achieved in water supply.
3. A new sanitation strategy focusing on high-risk communities should guide WHO's activities in the future.

FIGURE 1  
SANITATION



WATER SUPPLY



## SITUATION ANALYSIS

4 Environmental sanitation seeks to control or change the physical environment and related human behaviour in order to prevent the transmission of disease, including safe disposal of human excreta and other household waste to prevent infections, and domestic water supply for drinking, cooking, personal hygiene and general household and community cleanliness.

5. Sanitation is universally accepted as a foundation for good health, and total coverage thus remains a vital aim. However, epidemics of cholera and plague in recent years and continued high endemic rates of diarrhoeal diseases and intestinal helminthic infestations have increased the awareness that certain communities are living in conditions of very high risk and are suffering disproportionately. Generally such communities are crowded urban and periurban settlements, often without recognized legal status, and rural communities where polluted surface water and unprotected wells and springs prone to contamination are used for drinking-water. Such environments, both urban and rural, lack hygienic toilets, proper drainage, solid waste disposal and water for good personal and domestic hygiene. The recognition of the very high risk in these areas and the need for appropriate action should be given priority in national and local planning, as they stand to benefit by far the most from investments in water supply and sanitation.

6 The number of people at high risk is difficult to estimate. It will be the responsibility of each Member State to determine who should have priority for sanitation services according to environmental sanitation conditions and - where data are available and relevant - disease patterns. In most developing countries half of all urban residents and a large proportion of rural communities may fall into the high-risk category.

## ENDURING VALUE OF INVESTMENTS IN SANITATION

7 Poor sanitation is largely responsible for many diseases, such as schistosomiasis (with an estimated current global prevalence of 200 million cases), typhoid fever (16-17 million cases), intestinal helminthic infections (1500 million people infested) and various diarrhoeal diseases (over two million infant and child deaths annually). Although these diseases can be treated using good case management and effective medicine, the existing needs far exceed the capacity to deliver such services.

8. A strictly medical approach with case detection and treatment will not result in complete interruption of transmission and would represent a continual burden on resources for health. If all people suffering from these diseases could be cured, in the absence of sanitation infection would still recur in an endless cycle. Countless days of productive work and, for children, days at school are lost and each disease episode brings a setback in child growth and development. Even if ideal conditions of treatment and cure could be achieved for all (which is far from true today), repeated cycles of treatment corresponding to outbreaks are not the answer. A more permanent solution needs to be found for the elimination of the root causes.

9 Those who suffer most are children and women of child-bearing age, as these diseases also result in anaemia and malnutrition. Governments which have taken the decision to invest in environmental sanitation have already cut high rates of infant and child mortality to minimal levels, while people in countries where such a decision has not been taken still suffer (see Table 1).

10. Rapid population growth, urbanization, and over-crowding, in the absence of sanitation services, results in increasingly polluted environments and increasingly high risk of disease epidemics. Through good sanitation services, together with safe and ample water supply, hygienic behaviour and safe food, this risk can be reduced to nearly zero. The investment in sanitation breaks the cycle of disease transmission and lasts for generations as demonstrated by many countries and cities with high population densities.

**TABLE 1. INFANT MORTALITY, CHILD MORTALITY, WATER SUPPLY AND SANITATION COVERAGE, AND GNP PER CAPITA IN SIX COUNTRIES, 1994 AND 1995**

Country	Infant mortality rate (1995) (0-1 year) per 1000 live births	Child mortality rate (1995) (0-5 years, cumulative) per 1000 live births	Access to safe water (1994) (percentage of population)	Access to adequate sanitation (1994) (percentage of population)	GNP per capita (1995) (US\$)
Afghanistan	159	251	10	8	<765
Chile	15	17	96	71	4 160
Ghana	77	113	56	42	390
Guinea-Bissau	135	207	57	20	250
Philippines	39	48	84	75	1 050
Sweden	5	6	100	100	23 750

Source: WHO, 1996

11 For decades sanitation has been given extremely low priority in comparison with other general development needs. With the development of treatment of diseases associated with poor sanitary conditions, preventive measures have unfortunately been relegated to a minor role. There is a lack of political will for - and investment in - sanitation, and those in need of such services cannot exert sufficient public pressure to bring about change; they are also less willing to pay for sanitation than for water supply.

12 Other constraints are a lack of appropriate technology for difficult situations (such as crowded urban settlements and areas where pit latrines cannot be dug) and the difficulty of legislating for improvement in sanitation in illegal settlements.

## NEW STRATEGY

13 Given the persisting low sanitation coverage, the high prevalence of diseases due to poor environmental conditions, the low investment in sanitation, and population growth and urbanization, a new approach to sanitation is considered to be the best course of action.

14. Consequently it is proposed that Member States of WHO and all other organizations concerned focus sanitation efforts on high-risk communities, with renewed emphasis on sanitation as a whole, in terms both of overall investment and of integration with related development activities. Of great importance to the success of this effort will be the involvement of communities in planning, implementing and maintaining their services and the development of sanitation technology suitable for difficult geographical and residential conditions taking into account cultural beliefs and habits as well as long-term ecological and financial sustainability.

15. No illusions should be nourished, however, that sanitation for the rural and urban poor could be provided on a full-cost-recovery or even on a self-financing basis, as is increasingly the case in the urban water supply sector with its current trend towards privatization. In the case of sanitation, gains for public health more than justify public expenditure. To offset costs and ensure greater sustainability of sanitation systems, considerable community involvement and self-help will be needed.

16 The high-risk approach must be both ethical and promotional (see paragraph 17(2) below). Public health principles demand that those at highest risk should be given priority. Lack of social equity in supporting communities' efforts for sanitation is a main reason for the heavy disease burden and many epidemics observed today.

17. The main elements of the new strategy are:

(1) **focus on communities at high risk from diseases related to insanitary conditions:** Member States should identify and give high priority to high-risk communities and subgroups in urban and rural areas according to existing conditions, taking into account health statistics (including intraurban health differentials) and other systematic data from screening, where available and relevant, in order to meet the needs of communities having difficult geographical and social conditions (e.g., rocky soil, high water-table, extreme crowding, no legal status, extreme poverty), Member States should support and participate in research on sanitation methods and technology specially suited to those conditions and should analyse successful cases and establish models of "good practice": they should ensure the suitability and sustainability of sanitation services through programmes of meaningful community involvement, stimulating community action and self-help, and remaining sensitive to cultural and ecological needs. The competent authorities and agencies could greatly benefit from collaboration with nongovernmental organizations and other groups with successful experience in community participation,

(2) **higher priority to sanitation in national planning for health and investment in infrastructure:** Member States, international development organizations and nongovernmental organizations should begin a sanitation promotion programme to increase political will at every level, priorities should be established in the preparation of national action plans for health and environment, and should be firmly integrated into programmes for implementation, sanitation should be integrated with as many other aspects of development as possible, such as programmes on child survival, maternal and child health, essential drugs and agricultural development (with recycling of waste where feasible and appropriate)

## WHO'S ROLE

18. WHO has a responsibility to provide leadership in sanitation as a major determinant of health, bearing in mind that most of the public works and other measures are undertaken by authorities other than health agencies, such as municipal services and local government

19. WHO's mandate includes support to such programmes initiated by authorities in other sectors than the health sector (see the corresponding provisions in subparagraphs 4(1)-(8) of the draft resolution suggested in paragraph 21 below)

20. Thus WHO, in cooperation with other appropriate organizations in the health sector will play an effective and dynamic role in changing attitudes and establishing priority for sanitation

## ACTION BY THE EXECUTIVE BOARD

21. The Board is invited to consider the following draft resolution:

The Executive Board,

Having considered the report of the Director-General on strategy for sanitation in high-risk communities,

RECOMMENDS to the Fifty-first World Health Assembly the adoption of the following resolution.

The Fifty-first World Health Assembly,

Having considered the report of the Director-General on strategy for sanitation in high-risk communities;

Aware of the plight of rural and urban communities with highly insanitary conditions, the importance of sanitation for health, and the responsibility that WHO has to provide appropriate leadership;

Concerned about the vast and increasing number of people in the world who lack sanitation, living in communities that should receive the highest priority for sanitation because of the particularly high risk of disease related to insanitary conditions;

Recognizing that while full coverage by water supply and sanitation services as proclaimed by the 1990 World Summit for Children and in other forums remains the ultimate goal, higher priority should be given to these high-risk communities without delay;

Recalling resolutions WHA39.20, WHA42.25, WHA44.27, WHA44.28, WHA45.31 and WHA46.20 which *inter alia* have guided WHO's programme on community water supply and sanitation.

Recalling that the Executive Board established environmental health, particularly water supply and sanitation, as one of the priority areas for WHO;

Noting that a joint water supply and environmental sanitation strategy was approved by the UNICEF/WHO Joint Committee on Health Policy in May 1997;

Noting that the topic of water, including community water supply and sanitation, is to be considered by the United Nations Commission on Sustainable Development in 1998, which will determine future priorities, action and roles in this area.

1. ENDORSES the strategy for sanitation in high-risk communities,
2. URGES Member States:
  - (1) to reorient and strengthen their sanitation programmes to ensure that priority is given to communities at high risk from insanitary conditions, with the following aims:
    - (i) identifying high-risk communities and subgroups in rural and urban areas and setting priorities accordingly, through observation using health statistics and other systematic data from screening;
    - (ii) overcoming obstacles to sanitation such as difficult geological, social, economic and legal conditions;
    - (iii) mobilizing communities and involving them in the planning and implementation of their sanitation systems through collaboration with nongovernmental organizations and others with successful experience in community participation,
  - (2) to give higher priority to sanitation in national planning for health and investment in infrastructure, with the following aims:

- (i) integrating sanitation with related programmes for development such as child survival, maternal and child health, essential drugs and agricultural development;
- (ii) advocating sanitation in order to increase political will and commitment at every level;
- (iii) including sanitation in the preparation of national action plans on health and environment;

3. CALLS UPON the United Nations and other international organizations to give high-risk communities priority for sanitation, and invites donors to provide adequate funding for the necessary measures;

4. REQUESTS the Director-General:

- (1) to support Member States in implementing sanitation programmes, ensuring that sanitation is being assured by appropriate programmes in a coordinated and coherent way;
- (2) to undertake advocacy for the recognition of high-risk groups and their needs as a priority;
- (3) to support efforts by Member States to identify high-risk communities and give them priority, suggest appropriate methodology and assist in gathering information;
- (4) to support applied research on appropriate sanitation technology and community involvement for high-risk areas, including the review of cases and establishment of models of "good practice";
- (5) to support training of extension workers in methodology for involving communities in their sanitation development;
- (6) to integrate sanitation with action such as "Healthy cities/islands/villages/marketplaces" projects and the "School health initiative";
- (7) to convene an expert consultation on the financial, cultural and legal obstacles to reaching high-risk communities, and to advise Member States on measures to overcome them;
- (8) to strengthen cooperation with other United Nations organizations in the promotion of sanitation with particular emphasis on high-risk communities, and especially with UNICEF in the UNICEF/WHO joint water supply and environmental sanitation strategy.

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