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Water Supply and Sanitation Collaborative Council  
Working Group on Sanitation

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Report of the Meeting held in  
Hanoi, Socialist Republic of Viet Nam  
4 - 8 November 1996

20 November 1996  
World Health Organization, Geneva

## Meeting of the Working Group on Sanitation, Hanoi, 4-8 Nov 1996

### Introduction

The Working Group on Promotion of Sanitation (a working group of the Water Supply and Sanitation Collaborative Council) held its fifth meeting 4-8 November 1996 in Hanoi, Vietnam. The meeting was organized by the Working Group coordinator and was hosted by the Ministry of Health of Vietnam. The purpose of the meeting was to review comments on the paradigm paper for sanitation prepared for this meeting and to finalize the contents of the resource kit. In addition, the participants were asked to discuss the possible formation of an Asia/Pacific regional working group on the last day, as requested at the last global meeting of the Collaborative Council in Barbados (Oct. 1995). (See Meeting Agenda in Annex A).

There were 12 participants at the meeting (see List of Participants in Annex B). The Asia-Pacific Region was represented by 7 participants.

This report summarizes the discussions and work accomplished during the meeting.

### November 5

The meeting opened with welcoming remarks from MOH personnel, this was followed by Mayling Simpson-Hebert presenting the group with the objectives for the meeting and past findings of the Working Group. Walter Mason presented a summary of the paper on the new paradigm presented at Quito and a similar one presented by Mayling at Stockholm. He reported that responses from the audiences in both settings were positive, with few detractors. Uno Winblad presented the group a summary of the paper he presented, on behalf of WHO, at the Toyama meeting of the Japan Toilet Association. He reported that responses from his audience were minimal but not negative. Alternative non-water-based systems were seen as good back-ups when others failed, as in the Kobe earthquake.

Following this, the group was asked if it had reached an understanding of the accomplishments of the Working Group to date and, if so, was the new paradigm paper acceptable as is, with revisions, or needed to be fully re-written. The group was also asked to consider how to disseminate the paper. Dennis Warner raised the need to add a section that presented the Collaborative Council with modes of operationalizing the new paradigm.

Discussion turned to the need for multiple options appropriate to different climatic and human settings, and the need for properly conducted scientific and practical research to assess alternative systems.

In the afternoon, the group broke into two sections to examine the written comments on the new paradigm paper sent in by various group members. The reports from both groups essentially agreed on several points. These were: a) the paper needs to stress the importance of flexibility and options, and not prescribe any one system as the solution; b) that readers need to be reassured that the new paradigm is seen as a vision for the future and that existing systems were not to be dismantled as a result; and c) that institutionalization of the new paradigm would require recommendations about training and research, as well as other actions, to be discussed later. Everyone seemed to agree that the paper required editing to a shorter length and re-arrangement, but that its content was essentially that which the group wished to present to the Collaborative Council next year. It was decided that several group members would work on an outline of a revision of the paper.

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### **November 6**

In the morning the group went on a field trip to Ha Bac province in order to examine existing double vault desiccation systems. Many of these had been used for several decades and were well kept by their owners. Nguyen Huy Nga explained to the group that, although users in this region experienced less diarrhoeal diseases, intestinal parasites, such as ascaris, were still present. The vault designs were made several decades ago on the assumption that each could be used for three months and rotated. Unfortunately, it had been found that three months was not a long enough to thoroughly kill off ascaris. There were plans to change this situation to 6 month vaults. In the afternoon, after returning from the field trip, the group discussed its observations.

Further discussion of the new paradigm paper continued with new suggestions. It was decided that several documents could be used as part of a resource kit, such as the paper on Sanitation Myths, presented by Mayling Simpson-Hebert at the Stockholm Water Symposium and the Problem of Sanitation paper. Selected persons were asked to review these while others continued to work on revising the paradigm statement for presentation to the Collaborative Council next year.

### **November 7**

In the morning the group reviewed the draft of the revised paradigm statement. After considerable discussion, a number of sections were re-worded. The group was instructed to review it at its own pace and give corrections to the team working on the statement.

In the afternoon, discussions proceeded to the contents of the resource kit. It was decided that the kit should include the paradigm statement, the Problem of Sanitation paper, the paper on Sanitation Myths, a checklist/resource sheets, a poster, a checklist for planning hygiene education, a policy and implementation checklist, the cards created for the prototype kit, an advertising flier about the SANRES book, and possibly case-studies. Case studies were seen as valuable but difficult to acquire in time for printing. It was decided that a paper on criteria and indicators will not be included.

### **November 8**

In the morning members attended the government workshop on dry sanitation. Dennis Warner presented viewpoints on how the sector needs to move forward from the perspective of WHO. Mayling Simpson-Hebert described the work of the Working Group and its major findings. She also informed them that the group felt that the double vault Vietnamese toilet came close to fulfilling the criteria of the new paradigm. Uno Winblad presented the concept of ecological sanitation based on the principles of 'Don't mix', 'Don't flush', and 'Don't waste', i.e. don't mix urine and faeces, don't mix these with water, and re-use urine and faeces. Additional concepts were that the easiest way to deal with a waste product was at its source. He shared with the group drawings and photos of toilet designs that meet these principles from around the world.

In the afternoon, remaining participants from Asia and the Pacific met to discuss the possibility of forming a regional working group or network.

## Meeting of the Working Group on Sanitation, Hanoi, 4-8 Nov 1996

As most participants from Asia did not come, only 3 were present and one from the Pacific. Identifying a person who could take on a coordinator role was seen as a problem. Koo Ue stated he would take responsibility to contact suitable persons in other Asian countries and ask them to send information, according to a particular framework, for him to collate. He suggested information on hardware, software, management, training, institutions, administration, policy/planning and resources. If funding could be found, it was suggested that it might be possible to bring some of these people together at the next meeting in 2 years of the Japan Toilet Association. It was decided that a regional working group could not be formed at this time but that a regional network might be feasible. Mr Ue would take the lead in trying to get this started.

Simultaneously, the Core Working Group met to discuss final arrangements for the contents of the resource kit. After considerable discussion, the creation of case studies was considered to require a greater investment of time and money than is available. However, the group will put out an invitation to the mailing list of the working group to contribute articles which show an awareness and openness to the new paradigm. Articles submitted will be reviewed and appropriate ones will be included in the resource kit. Such articles may include some case studies.

It was decided that the following items would be included in the **Resource Kit**:

- ◆ paper: the new paradigm statement (see draft statement in Annex C)
- ◆ paper: The Problem of Sanitation (revised, Mason)
- ◆ paper: Sanitation Myths: Obstacles to Progress? reprint from Proceedings of Stockholm Symposium
- ◆ fliers on relevant published documents, i.e. the SANRES publication, and others to be reviewed and selected
- ◆ the principle cards from the earlier draft promotion kit
- ◆ poster (working group members to supply suggestions)
- ◆ checklist for planning hygiene education components (Kapadia-Kundu)
- ◆ checklist for planning sanitation systems (Simpson-Hebert, derived from earlier working group materials)
- ◆ resource sheets on Wrong Assumptions, Principles of Better Programs and Features of Better Programs
- ◆ articles which show an awareness and openness to the new paradigm

### **Next meeting**

The working group decided that there was no need, at this time, for another meeting. The plan is to send out a draft resource kit to about 10 to 12 members of the working group for review before the contents are finalized. Another meeting will be held if there are difficulties in finalizing the resource kit.

## Meeting of the Working Group on Sanitation, Hanoi, 4-8 Nov 1996

### **Key dates to finalize the Resource Kit**

#### February 1

Deadline for receipt of:

- comments on new paradigm statement,
- checklists,
- poster ideas,
- articles suggested for inclusion.

#### February 15

Sanitation promotion kit will be assembled and sent by courier to selected members of the working group. At the same time, it will be sent by courier to at least 3 publishing companies for their possible interest in publication and cost estimates, if any.

#### March 15

Deadline for receipt of all comments on resource kit.

#### June 30

Report to next meeting of Collaborative Council submitted. New paradigm statement will serve as the main part of the report

#### September

Resource kits mailed to location of next Collaborative Council meeting (Manila, Philippines)

## AGENDA

*5th Meeting of the Collaborative Council Working Group on Sanitation  
Hanoi, November 1996*

*Monday, November 4*

09:00 Meeting of the Core Group

*Tuesday, November 5*

09:00 Opening - Welcome by MOH  
- Welcome by Working Group Coordinator  
- Coffee break

Meeting items

- |  |                |
|--|----------------|
| 1. Meeting objectives and agenda   | Simpson-Hebert |
| 2. Brief review of past discussions and reports of the Working Group   | Simpson-Hebert |
| 3. Participant introductions   |                |
| 4. Introduce paper on New Paradigm for Sanitation and comments;<br>Report on Meeting of the CCW in Quito (16-18 Oct) | Mason          |
| 5. Report on Meeting of Japan Toilet Association (9-10 Oct)  | Winblad, Ue    |

**Expected outcome: Understanding of accomplishments of Working Group to date and reaction of sector to the New Paradigm**

12.00 Lunch

13:30 6. Small group discussions on New Paradigm to the Collaborative Council

15:00 7. Report on small group discussions: is the New Paradigm article acceptable, with revisions, as a group statement?

**Expected outcome: Recommendations on the New Paradigm paper; revise existing paper or prepare new paper during this meeting**

17:30 8. Introduction to field trip Nga

18:00 Traditional folk presentation and dinner organized by MOH

*Wednesday, November 6*

07:30 Half-day sanitation field trip

12:00 Lunch

13:30 9. Discussion of field trip, as it relates to the New Paradigm

**Expected outcome: Further recommendations for the New Paradigm paper, if any, based on field trip experience**

16:30 Close of the day

*Thursday, November 7*

09:00 10. Final plenary review of New Paradigm paper

11. Recommendations to the Core Working Group regarding promotion package contents and modes of dissemination

**Expected outcome: A New Paradigm paper agreed upon by the group and a plan for promotion**

17:30 Close of the day

*Friday, November 8*

09:00 Vietnam SANRES National Conference on Dry Sanitation

12:00 Lunch

14:00 Core Group Meeting and Asia-Pacific Group Meeting

**Expected outcome for Asia-Pacific group: To determine whether it would be useful to form a regional working group or network on sanitation; if so, details of plan**

16:00 Close of the day

## LIST OF PARTICIPANTS

- Mr Nguyen Cong Thanh** World Bank Resident Mission  
53 Tran Phu Street  
Hanoi  
Socialist Republic of Viet Nam  
Tel (84-4) 8432461, 8437569  
Fax (84-4) 8432471
- Dr Carol Jenkins** Institute of Medical Research  
PO Box 60  
Goroka, E.H.P.  
Papua New Guinea  
Tel (675) 712200, 712237  
Fax (675) 721998  
E-mail: 100351.407@compuserve.com
- Dr Nandita Kapadia-Kundu** Institute of Health Management, Pachod  
Plot n° 13, Survey 46/6  
Bombay Sapper Officers Co-operative Housing Society  
Nagar Road, Village Wadgaonsheri  
Pune 411014  
India  
Tel (91-212) 685462, 679549  
Fax (91-212) 685462
- Dr Walter Mason** UAB/US Peace Corp's Master's Internationalist Program  
School of Public Health  
106 Tidwell Hall  
720 South 20th Street  
Birmingham, Alabama 35294-0008  
U.S.A.  
Tel (1-205) 9341732  
Fax (1-205) 9753329  
E-mail: masonw@crl.soph.uab.edu
- Dr Nguyen Huy Nga** Ministry of Health  
138A Giang Vo  
Hanoi  
Socialist Republic of Viet Nam  
Tel (84-4) 8456255  
Fax (84-4) 8464051, 8460507
- Dr Janusz Niemczynowicz** Department of Water Resources Engineering  
University of Lund  
PO Box 118  
22100 Lund  
Sweden  
Tel (46-46) 2228981  
Fax (46-46) 2224435



**Mr Dinesh Chandra Pyakuryal** - Department of Water Supply and Sewerage  
Ministry of Housing and Physical Planning  
Kathmandu  
Nepal  
Tel (977-1) 413744, 414539  
Fax (977-1) 419802

**Mr Ron Sawyer** SARAR Transformación SC  
A.P. 8, Tepoztlán  
Morelos 62520  
Mexico  
Tel/fax (52-739) 50364  
E-mail: rsawyer@laneta.apc.org

**Mr Roland Schertenleib** Department of Water and Sanitation in Developing Countries  
EAWAG  
Ueberlandstrasse 133  
8600 Dübendorf  
Switzerland  
Tel (41-1) 8235018  
Fax (41-1) 8235399  
E-mail: scherten@eawag.ch

**Dr Mayling Simpson-Hebert** Rural Environmental Health Unit  
World Health Organization  
20 avenue Appia  
1211 Geneva 27  
Switzerland  
Tel (41-22) 7913531, 7913540  
Fax (41-22) 7914159  
E-mail: simpsonhebertm@who.ch

**Mr Koo Ue** Japan Toilet Association  
3F Go-Bldg  
2-11-5 Nishi-Shinbashi  
Minato-Ku  
Tokyo 105  
Japan  
Fax (81-3) 35931374

**Ms Ida W.M. van Hoof** IRC International Water and Sanitation Centre  
PO Box 93190  
2509 AD The Hague  
The Netherlands  
Tel (31-70) 3068930  
Fax (31-70) 3589964

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**A NEW PARADIGM FOR SANITATION IN THE 21ST CENTURY**  
**Collaborative Council Working Group on Sanitation**

**PREFACE**

The Sanitation Working Group was established by the Water Supply and Sanitation Collaborative Council in 1993. Its mandate was to find ways 'to raise the profile of sanitation, not just among the beneficiaries and politicians, but, critically, also among sector professionals, who need to see the provision of effective and sustainable sanitation services as a satisfying and rewarding activity'. (Rabat Meeting). The Working Group recognizes that sanitation, in its broader sense, encompasses solid waste, drainage, and other factors of environmental hygiene, in addition to the management of excreta. Because of the magnitude of the problem and its importance to human health and the environment, the group focused on the safe management of human excreta. However, its conclusions are applicable to the entire field. The following statement summarizes the findings of the Working Group.

**PROBLEM STATEMENT**

As the 21st century approaches, diarrhoeal and other sanitation-related diseases are highly endemic despite enormous efforts to control them over the past few decades. The situation is even worse than the picture depicted by sanitation coverage statistics. In addition to open defecation, human excreta is spread through the environment by faulty latrine design and improper use. Vast amounts of untreated sewage contaminates water bodies and soils. Available systems and resources do not adequately deal with the associated social and behavioural factors. The inadequacy of existing sanitation systems to manage massive volumes of human excreta greatly contribute to the global environmental crisis. With the inevitable population increase, the situation can only worsen. (See Problem Statement in resource kit for further information).

**CONSTRAINTS**Myths

An important constraint to improved sanitation coverage has been a series of myths (see Appendix A) that directly link water with sanitation and health. The first myth is that safe water alone will ensure better health. But, in fact, the single most effective intervention for diarrhoeal and other sanitation-related diseases is safe excreta disposal (Esrey et al. 1990).

The second myth is that large quantities of water are needed for sanitation. While it is necessary to have water for personal and domestic hygiene, improvements in the management of human excreta need not wait first for improvements in water supply. There are many good sanitation systems that require little or no water, including pit latrines, various composting and desiccation systems.

The third myth is the assumption that the only good sanitation system for urban areas is water-borne sewage. This system is an expensive one because of the infrastructure required, the cost of water treatment and cost of treating the resulting sewage. In addition, it also creates competition for water in urban areas, which result in inequities in distribution of water and quantity. As 60% of the world's population are expected to live in urban areas

within the next 20 years, this myth has profound consequences. (See Myths of Sanitation in resource kit).

### The status of the sanitation sector

An important constraint to improving world sanitation has been the low status of the sanitation sector. The profession of sanitarian, once solidly grounded in a public health perspective, has increasingly become eclipsed by a technological approach, which has ignored the social and behavioural elements of improved public health. This approach narrowly concerns humans and their needs to remove excrement from the immediate environment. It lacks a sense of responsibility for the larger issues of human health, other living beings and the planet. Negative associations of sanitation with human faeces and, in the modern era, with low-cost services for the poor, has contributed to the dismal image of the profession.

Further, sanitation has a poor institutional foundation, with many organizations having responsibilities for different aspects of sanitation. For example, the social and educational aspects are often located in a different ministry from the hardware components of the project. Rarely does a single institution have a clearly defined lead role with sufficient authority to implement programmes. As a result, resources are often inadequate for sanitation development or are poorly used because of institutional weaknesses.

Meagre investment in scientific research and development has contributed to sanitation's poor profile. As a multi-sectoral field, it suffers from a lack of clear definition and is unrepresented in academic structures.

### **A NEW SANITATION PARADIGM**

A new sanitation paradigm is emerging that is not only human centred, but earth centred. It is concerned with equity, the protection of the environment, in addition to the health of others as well as oneself. Its goal is to create sustainable systems. In order to reach this goal, three key principles have been identified that are viewed as critical to the design of successful sanitation systems for the future.

**Equity**, within the sanitation sector, means that all segments of society have access to safe and appropriate sanitation systems. Currently, inequities are found at many levels, between rich and poor, men and women, urban and rural. Under the New Paradigm, equity implies that:

- access to appropriate sanitation systems is ensured to all communities. If ecological sustainability is to be realized, well-off communities in developed countries must be equally involved in behavioural and technological change
- genuine community involvement takes place in both planning and management of systems
- political will is mobilized to assure the rights of all in sharing needed resources for improved sanitation
- the information required for decision-making is available to all segments of user communities

**Health promotion and disease prevention**, within the sanitation sector, means that systems are capable both of protecting people from acquiring sanitation-related diseases as well as interrupting the cycle of disease transmission. Under the New Paradigm, health promotion and disease prevention implies that:

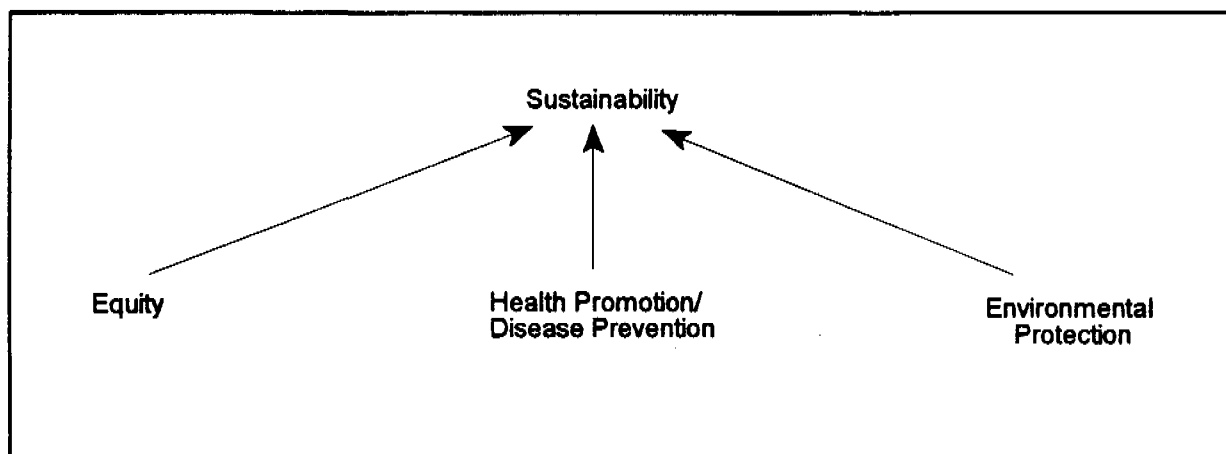
- the role of social and behavioural components in realizing health benefits are prioritized

- future sanitation technologies have the scientifically-tested capacity to prevent the transmission of pathogens

**Protection of environment**, within the sanitation sector, means that future sanitation systems must not contribute to the pollution of the earth nor deplete scarce resources. Under the New Paradigm, environmental protection implies that:

- systems do not lead to the degradation of water or land, and, where possible, ameliorate existing problems caused by pollution
- systems are designed to recycle to the maximum extent both renewable resources, such as water and those present in human excreta, and non-renewable resources

Programmes that fulfill these principles should lead to long-term social, economic and ecological sustainability.



## OPERATIONALIZING THE NEW SANITATION PARADIGM

The New Sanitation Paradigm is the application of strategies and methods to improve sanitation in order to ensure equitable access for all people, the protection of human health, and the protection and conservation of environmental resources, while moving towards the goal of achieving sustainability.

The paradigm has two operational strategies:

- flexibility in the development and application of sanitation systems, incorporating respect for community values, perceptions and practices

*Flexibility is a sine qua non in this sector, as cultural, climatic, environmental, economic and political conditions differ enormously around the world. Rigid adherence to belief in any one approach often acts as a major constraint against the advancement of the sector's accomplishments.*

- consideration of sanitation on its own merits and not as a sub-set of another sector

The time has come that sanitation can no longer be considered an afterthought of water systems. In order to handle the magnitude of existing and future sanitation requirements, the sector must be re-structured and independent.

## **RECOMMENDATIONS FOR SANITATION PROGRAMMES**

In order to implement the New Paradigm on Sanitation the following recommendations are made:

1. Develop mechanisms to ensure the prevention of environmental pollution and degradation through sanitation systems.
2. Provide impetus for innovative research and development for a range of systems applicable to differing cultural and environmental conditions.
3. Sanitation should be treated as a major field of endeavour on its own with sufficient levels of investment in order to revitalize training programmes and professional standing according to the New Sanitation Paradigm.
4. Create a demand for systems that move increasingly toward reuse and recycling of human excreta.
5. Encourage a review of sanitation policy within government, non-government, private and sector donors.
6. Implement and advocate the use of the New Paradigm checklist for programme planners and managers.

## SANITATION MYTHS: OBSTACLES TO PROGRESS?

*M. Simpson-Hebert, Technical Officer, World Health Organization, 1211, Geneva 27, Switzerland.*

### The sanitation problem

Over half of the people in developing countries today, nearly two thousand million, lack even the most basic sanitation (WHO 1995a). In both rural and urban areas, large numbers of people have no access to toilets, drainage is open and highly contaminated with disease-causing organisms, and solid waste is becoming an increasingly difficult problem which contributes significantly to vector-borne diseases in urban areas.

The largest part of this problem is the contamination of the environment by human faeces which contain many disease-causing organisms and which are dispersed into the environment by open defecation, contaminated water supplies and untreated sewage outfalls.

The consequences of this situation for human health and for the planet in general are profound. Every year 3.3 million people die of diarrhea, of which about 2.5 million are infants and young children, and about 1.5 thousand million people are currently infected with intestinal worms, all of which are from faecal-oral contamination (WHO 1995a). Growing problems of solid waste contribute to diseases carried by mosquitoes, especially dengue fever (WHO 1995b), and diseases carried by rodents, notably plague, resulting in hundreds of thousands of illness episodes and tens of thousands of deaths.

Sanitation coverage can barely keep up with population growth, and so the problem is predicted to remain at the same or higher magnitude for the next thirty years unless some drastic changes in the way the sanitation sector approaches the problem are made (World Bank 1992). While both rural and urban populations suffer serious health effects from poor sanitation, demographic shifts toward increasing urbanization put urban dwellers at higher risk of sanitation-related epidemics. About 45 percent of the world's total population in 1996 is living in cities, and approximately 37 percent of these urban dwellers are without sanitation (WHO 1996). These are mainly poor people living in crowded conditions. Under such conditions, the risk of epidemics from poor sanitation is high (Black 1994).

There are a number of opinions on the reasons for low sanitation coverage. The Water Supply and Sanitation Collaborative Council Working Group on Sanitation in 1994 identified 11 major reasons, all of which are plausible and no doubt each plays some constraining role (Collaborative Council 1994). In addition to these, the unfeasibility of conventional sanitation options for the urban poor, a lack of recognition of the disease time-bomb, and a complete absence of systems thinking in the water and sanitation sector contribute to the problem.

### The sanitation and water connection

The problem of poor sanitation coverage is indeed complex and many researchers and agencies are searching for understanding and solutions. One huge part of the complexity is that sanitation and water are intimately connected, within the ecosystem, for the promotion of public health practices and by cultural traditions.

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Reasons identified by the Working Group on Promotion of Sanitation as to why sanitation coverage does not effectively move forward are: lack of political will, low prestige and recognition of the sanitation field, poor policy at all levels, poor institutional frameworks, inadequate and poorly used resources, inappropriate approaches, neglect of consumer preferences, ineffective promotion and low public awareness, neglect of women and children's needs, little effective demand from communities and deep-seated cultural taboos and beliefs about human excreta.

*First there is the pollution connection.* Put very simply, for human beings, human excreta is a poison. Poor management of human excreta poisons our fresh water and salt water and spreads diseases of faecal origin.

*Second there is the cleaning connection.* Good sanitation includes not only good management of human excreta but also hands washing after defecation and general bathing and cleaning of the domestic environment. People need water in the home in order to have a clean and healthy environment. Furthermore, in many cultures, water is mandatory for anal cleansing and for washing the face and hands before prayer.

*Third there is the flushing connection.* Western culture, at least from the time of the Greeks and Romans, has considered water-borne sewerage to be the most preferable and hygienic means of waste disposal. Almost without question flushing with water for removal of human excreta has been and continues to be promoted in cities and towns around the world, even in arid areas. Various on-site dry latrine options are considered appropriate only when population density is too low to make sewers economically efficient. In denser populated areas, sewers are considered automatically to be the preferred system.

There is a hierarchy of flushing systems. At the top of this hierarchy is the urban sewer networks. The next alternative is the septic tank and following that is the pour-flush latrine. At the very bottom of the flush hierarchy is any non-flush system, such as pit latrines, composting systems, and dry latrine systems. The prestige value of water-borne sewerage is so high that, as demonstrated by the Orangi Project in Karachi, Pakistan, even the poor are willing to pay for it (World Bank 1992).

Water-borne sewerage maintains its high prestige value, not only because it is high-tech, expensive, convenient for users and clean at the domestic end, but also because the development community has failed to support research into potential alternatives. As it stands, sewers provide the ultimate service and the existing alternatives, which may be much cheaper and more ecologically sound, provide a very less than satisfactory service.

Because of this connection, sanitation is often viewed as a subset of water, so much so that it does not even merit mention. This is a subtle psychological problem within the sector. For example, at the recent meeting of the Water Supply and Sanitation Collaborative Council in Barbados (1995), the theme was 'People and Water: Partners for Life'. The IRC Water and Sanitation Centre in the Hague produces a 'Water Newsletter'. The Water and Environmental Sanitation Section of UNICEF produces a newsletter called 'Waterfront'. Intermediate Technology Publications in the UK publishes 'Waterlines', which they describe as 'the world's only magazine devoted entirely to low-cost water and sanitation' (Waterlines 1996). When queried as to why sanitation is not mentioned in titles and themes, the usual answer is that 'sanitation is assumed to be a part of water'.

The 'creed' of the International Drinking Water Supply and Sanitation Decade (1981-1990) was the promotion of water and sanitation *together* in order to obtain maximal health benefits. Recognizing that the perceived demand for water was higher than that for sanitation, it was hoped that water would pull along sanitation. While this may be correct from a public health point of view, it is correct from an implementation point of view?

## **The three great sanitation myths**

The three important connections between sanitation and water, pollution, cleaning and flushing are not wrong, but they have led to the evolution of three great sanitation myths that stand as obstacles to progress in sanitation coverage. These myths are:

- 1) that people mostly need safe water supply to be healthy; safe water will bring the greatest health benefits;

- 2) - that water is needed for sanitation, and
- 3) that the only good sanitation system for urban areas is water-borne sewerage.

These myths or beliefs form the 'water paradigm of sanitation'. Water is what you need for health, sanitation needs water and water-borne sewerage is what to reach for.

I propose that this 'water paradigm of sanitation' actually impedes progress in the sector. These myths need to be dispelled so that we can search for new solutions to the problem of poor sanitation coverage. Water and sanitation are linked but the water paradigm should no longer control the way we do business in the sanitation sector.

## Debunking the myths

*Myth 1: People first need safe water supply to be healthy; safe water will bring the greatest health benefits.*

It is difficult to know exactly when and where this myth originated but certainly it can be traced in part to the landmark work by White, Bradley and White, *Drawers of Water* (1972) in which the authors try to put some order into the classification of diseases related to water. It does not appear from their text that they were proposing that this be THE classification of diseases or that water supply alone would solve these disease problems. They were simply trying to look at health improvements that might come about through improvements in water supply alone. One could equally do the same for sanitation alone. However, this classification seems to have taken on a life of its own and have given the impression to the entire sector that the diseases listed under their classifications of waterborne, water-washed, water-based and water-related would be washed away by improved water supplies. The role of the faecal pathogens and open defecation in the original contamination of the water supplies is not emphasized by the authors. However, they do emphasize that some pathogens have many routes, with water being only one.

This classification had a tremendous impact on the sector. It was quoted in numerous documents and served as a main justification for promoting safe water supplies to all people. Cairncross and Feachem in 1983 corrected this situation by publishing an equally easy to understand classification of excreta-related infections and refuse-related infections. A similar but less memorable classification was also published by Feachem et al in 1983. Neither classification of sanitation-related diseases caught the attention of policy makers and development specialists as did the water classification, which tends to be referenced widely up to today.

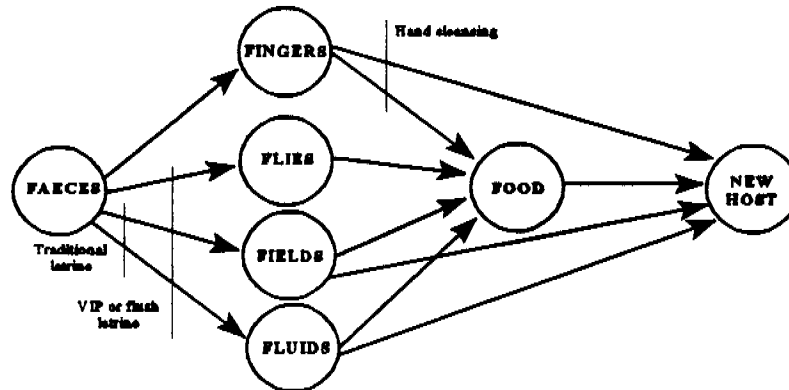
In a review of 144 studies on the relation between water, sanitation and health, Esrey et al. (1990) conclude that there are four basic mechanisms through which water and sanitation protect people. The first is related to sanitation, the second and third to water quantity and the fourth to water quality. As for reducing the incidence and severity of the six major diseases reviewed (diarrhea, ascariasis, guinea worm, hookworm, schistosomiasis and trachoma), the most effective intervention was safe excreta disposal (WASH, no date). A second major conclusion of this review is that 'in areas where environmental faecal contamination is high, little health impact from water improvement alone can be expected' (WASH, no date). This study shows that most of the 'water-related' diseases are actually sanitation or human excreta-related and the safe disposal or reuse of human excreta should be the focus of control, not improved water supplies.

In support of this argument, it is useful to review the F-diagram first printed in Wagner and Lanox (1958). The diagram refers to diseases which originate from human faeces and represents in very simple form the primary routes that human faeces travel to the mouth. It is clear that water is only one route. Other very important routes are the hands, through food crops where open defecation takes place in fields, and possibly via certain insects, notably flies and cockroaches. Some of these



routes lead directly to food eaten, where bacteria may further grow, or by-pass food and go directly into the mouth. Latrines block all routes but the hands, which can only be made hygienic by washing with soap or ash and water. Thus the main barrier is safe disposal or safe reuse of human excreta, a second important barrier is hands washing and a third barrier would be safe drinking water supply. The diagram is thus consistent with the findings of Esrey et al. (1990).

**F-DIAGRAM: TRANSMISSION OF DISEASES FROM EXCRETA**



Source: Wagner & Lanoie 1950, modified by Winchind 1990 (unpublished)

How much domestic water supply, then, is really needed to prevent the major water and sanitation diseases? The classic wisdom of the sector is that each human needs one to two litres per day to prevent dehydration and death and 10 to 30 litres per day for personal and domestic hygiene. Thus two litres need to be safe for human consumption and 20 litres need to be available for washing. This latter figure would vary enormously according to whether water is used for flushing a toilet. Nonetheless, this classic wisdom is also consistent with the findings of Esrey et al and demonstrates further how little water is needed to maintain health.

**Myth 2: Water is needed for sanitation.**

It is frequently argued that one should not and cannot provide sanitation without water. This argument originates both from assumptions about the need for water to flush toilets and the need for water for washing. It is further supported by stories that communities wanted water supply before they would discuss sanitation. Water, naturally, would be a higher priority for any community lacking sufficient quantities and/or quality of water. Water is necessary for life itself; sanitation is necessary for health.

However, this argument should not be regarded as a hard and fast rule. Firstly, there are many good sanitation systems requiring no water. These include pit latrines, VIP latrines, double-vault composting latrines, and double and single vault dry latrine systems. Even hand cleansing can take place with a minimum of water. Many traditional societies clean their hands effectively with ash or soil. While it is desirable to have sufficient water for personal and domestic hygiene, improvements in excreta disposal and hand cleansing need not necessarily wait first for improvements in water supply. The construction of dry latrine systems and other measures prevent open defecation and spread of faeces in the environment could bring about tremendous improvements in community health.

*Myth 3: The only good sanitation system for urban areas is waterborne sewerage.*

It is widely believed that when population densities reach a certain level, the most efficient and cost effective sanitation system is waterborne sewerage. Alternatives to waterborne sewerage for urban areas exist but they are not widely known nor well developed. Strongly holding to this myth, the sector has not yet undertaken the task that is inevitably before us: to develop for broad scale use sanitation systems not requiring water as the vehicle for transport. Fresh water is scarce and precious, our present sewerage systems are polluting fresh and salt water on a large scale, and most poor communities in urban areas will never be able to afford sewerage systems.

Many dry latrine and composting latrine systems have been in wide use for thousands of years in both urban and rural areas. Dry systems with urine separation are used traditionally in Yemen and Zanzibar. Compost systems are used in Pakistan, Viet Nam and China. In *Sanitation Without Water*, Winblad (1985) catalogues 17 dry latrine systems in as many countries, most of which are traditional in origin. Others are under development in Sweden, Finland and in Central America. There is no lack of ideas and further research and development is required.

One of the best ways to topple Myth 3 is to take a systems approach to sanitation. Both Niemczynowicz (1993) and Strong and Arrhenius (1993) argue for the urgent need to view sanitation within the larger ecosystem, both local and global. Current decisions are taken with only local considerations in mind. Strong and Arrhenius (1993) argue that human excreta should be reused in order to recycle carbon back into agricultural purposes and to reduce deleterious effects on coastal ecosystems and slow global warming. Niemczynowicz (1993) equally pleads for a stop to sewerage systems which do not function satisfactorily in a global, environmental sense. Human faeces are an excellent soil conditioner, returning to the soil valuable carbon. Human urine is nearly identical to many commercial fertilizers and is nearly bacteriologically free of pathogens. The challenge is to reuse urine immediately and find ways of rendering human faeces pathogen free as quickly as possible through natural heat and drying processes.

## **A new paradigm for sanitation**

The Collaborative Council Working Group on Sanitation feels strongly that we need a new paradigm for sanitation to push us forward. Instead of linking sanitation just to water, the paradigm should connect sanitation to the entire eco-system. It needs to identify how sanitation should work with other sectors to solve their problems: agriculture, marine sciences, poverty alleviation and those concerned with water scarcity. And very importantly, sanitation should be linked to three criteria against which we judge the quality of future systems: **equity, prevention and sustainability**. Sanitation systems of the future should ensure greater equity in the distribution of basic needs, prevention of harm to human health and the environment in general, and sustainability of whatever new sanitation systems are developed. Finally, the paradigm should ensure community participation and recognize that hygiene behaviour change is a key important part of the triangle of water, sanitation and hygiene.

When we put water-borne sewerage against these criteria, it does not fare well. **Equity:** sewer systems are typically only for wealthier sections of society and in water scarce situations make the rich minority waste water that is badly needed by the poor majority. **Prevention:** sewer systems carry a potentially dangerous material away from the producer but then disperse it into the environment, lakes, rivers, oceans and ground water, spreading the disease organisms. **Sustainability:** because sewerage is water-dependent and capital intensive, it is not sustainable in the long term.

If sewerage and other water-linked sanitation is not our vision, then what is? There are some very interesting developments taking place. On the technology side, researchers from all parts of the globe are developing new kinds of sanitation systems requiring no water. They are being widely tested and show great potential for urban areas. In Central America thousands of dry latrines are in

use and functioning well. Models for upscale markets need to be developed so that the urban rich also use dry latrine systems. These dry sanitation systems should provide more equity, as they use no water and are cheaper and easier to build. They should provide more prevention, as they do not disperse disease-causing organisms into the environment. They should be more sustainable in that they do not depend upon water and do not have high recurrent costs.

On the programme side, there are new approaches to communities which show greater promise: working through schools and children, participatory methods for community planning, and greater involvement of the private sector. These approaches move away from a provision model of sanitation and toward one of local empowerment.

## Conclusion

Each of us can contribute to the promotion of sanitation by working toward this new paradigm. Aid agencies are encouraged to support research into sanitation systems without water that meet the criteria of *equity, prevention and sustainability*. Educational and training institutions need to adjust their curricula away from sewerage and other water-related sanitation systems and focus on the realities of a world with scarce water resources, growing populations and increasing urbanization. They need to teach sanitation as part of the larger ecosystem and need to focus on people-centred approaches to sanitation, rather than technology-centred ones. Implementing institutions should apply the criteria of equity, prevention and sustainability to all future projects.

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