

EAWAG

Swiss Federal Institute for Environmental Science and Technology
Ueberlandstrasse 133 CH - 8600 Duebendorf Switzerland



SANDEC

Water & Sanitation in
Developing Countries

HOUSEHOLD-CENTRED ENVIRONMENTAL SANITATION

**Report of the Hilterfingen workshop on
*Environmental Sanitation in the 21st Century***

15 - 19 March 1999

1.2 billion people do not have access to safe drinking water

3 billion people do not have access to proper sanitation

Perhaps 50 per cent of all solid wastes is uncollected

No one knows how many people are flooded out each year

and

3 billion people have to survive on less than US\$2/day

Content

1. Introduction
2. The case for change
3. A vision for environmental sanitation in the 21st century
4. Target audiences and future steps

Annex A: Workshop participants

Annex B: Instruments for reviewing the application of the HCES model

Annex C: Research needs

1. Introduction

At its Fourth Global Forum in Manila in November 1997, the Water Supply and Sanitation Collaborative Council (WSSCC) received endorsement to prepare a vision for water supply and sanitation for the 21st century ("VISION 21") including the goals and strategies to make that vision a reality. It was further decided to collaborate in this effort with the World Water Council in its preparation of a "Vision for Water, Life and the Environment". Consultations with the World Water Council Vision Management Unit has resulted in the agreement that Vision 21 will provide the water supply and sanitation component of the larger World Water Vision.

At the Global Forum in Manila, the WSSCC also set up an Environmental Sanitation Working Group (ESWG) for developing strategies and models to overcome barriers to progress in environmental sanitation (ES)¹. One of the mandates given to the ESGW is to provide the environmental sanitation input to VISION 21. Consequently, a sub-group of the ESGW (Annex A) met from 15-19 March 1999 in Hilterfingen (Switzerland) and developed the first draft of a vision on Environmental sanitation for the 21st century which will be presented to the drafting team of VISION 21 in May 1999.

The group also identified the instruments for reviewing the application of the new vision (Annex B) and discussed research needs (Annex C). Furthermore, the group had a preliminary discussion of the specific research topics which might be looked at under technology but reached no firm conclusions.

¹ An earlier WSSCC Working Group on Promotion of Sanitation has defined ES as: "Interventions to reduce peoples' exposure to disease by providing a clean environment in which to live with measures to break the cycle of disease. This usually includes disposal of or hygienic management of human and animal excreta, refuse wastewater, the control of disease vectors, and the provision of washing facilities for personal and domestic hygiene. ES involves both behaviours and facilities which work together to form a hygienic environment"

2. The case for change

In the light of the numbers of people in today's world who still do not have access to adequate water, sanitation, drainage and waste disposal services, it is clear that conventional approaches to environmental sanitation are failing a large proportion of humanity. At the same time, the world's natural supply of freshwater is subject to increasing environmental and economic pressures.

Poor planning lies at the heart of current shortcomings in environmental sanitation interventions. At present, only lip-service is given by environmental sanitation professionals to environmental management issues. Too often, services are not conceived in an integrated way which takes into account all their potential impacts. For example, provision of a water supply without allowing for the removal of wastewater may create standing water, thereby outweighing positive benefits. The need for holistic and integrated planning has been insufficiently recognised.

There has also been a tendency to develop systems which respond to perceived problems of environmental waste management, rather than to the actual needs of households and communities. Decisions regarding interventions -- especially those requiring sophisticated technology, such as sewerage -- are commonly taken at a political or administrative level far removed from the people to be served. This frequently results in the refusal of the supposed users of services to accept operational responsibility, thereby jeopardising service sustainability. In order to promote user ownership of services, decisions should be taken at a level as close as possible to the source of the problem, in consultation with the people most directly affected.

Therefore, on grounds both of human need and better environmental management, it is important for the environmental sanitation community to radically re-direct its thinking. Any vision of environmental sanitation for the 21st century needs to identify efficient, sustainable and cost-effective ways which have the capacity to balance improvements in the quality of people's lives with support for the well-being of the environment.

3. Vision for Environmental Sanitation

In arriving at a new vision for environmental sanitation in the 21st century, the group determined that any 'vision' must contain two components: an expression in concrete terms of goals and objectives to be reached; and a description of the means or methods to be used which would facilitate their attainment.

3.1 Goals and objectives

The goal of environmental sanitation is to contribute to the improvement of quality of life and the achievement of social development. Building on the earlier WSSCC Working Group definition of environmental sanitation, the group felt that the goal of environmental sanitation should create and maintain conditions whereby:

- **people lead healthy and productive lives; and**
- **the natural environment is protected and enhanced.**

To achieve these twin objectives, the group restated the universal goal of environmental sanitation as: **Water and sanitation for all within a framework which balances the needs of people with those of the environment to support healthy life on earth.**

This requires the promotion of services which:

- are people-centred
- meet basic needs
- serve the unserved
- improve public health
- reduce impact of poverty
- are sustainable environmentally, socially, institutionally, economically and financially
- respond to demand
- respect the need to preserve and protect the resource base
- protect/enhance ecological integrity

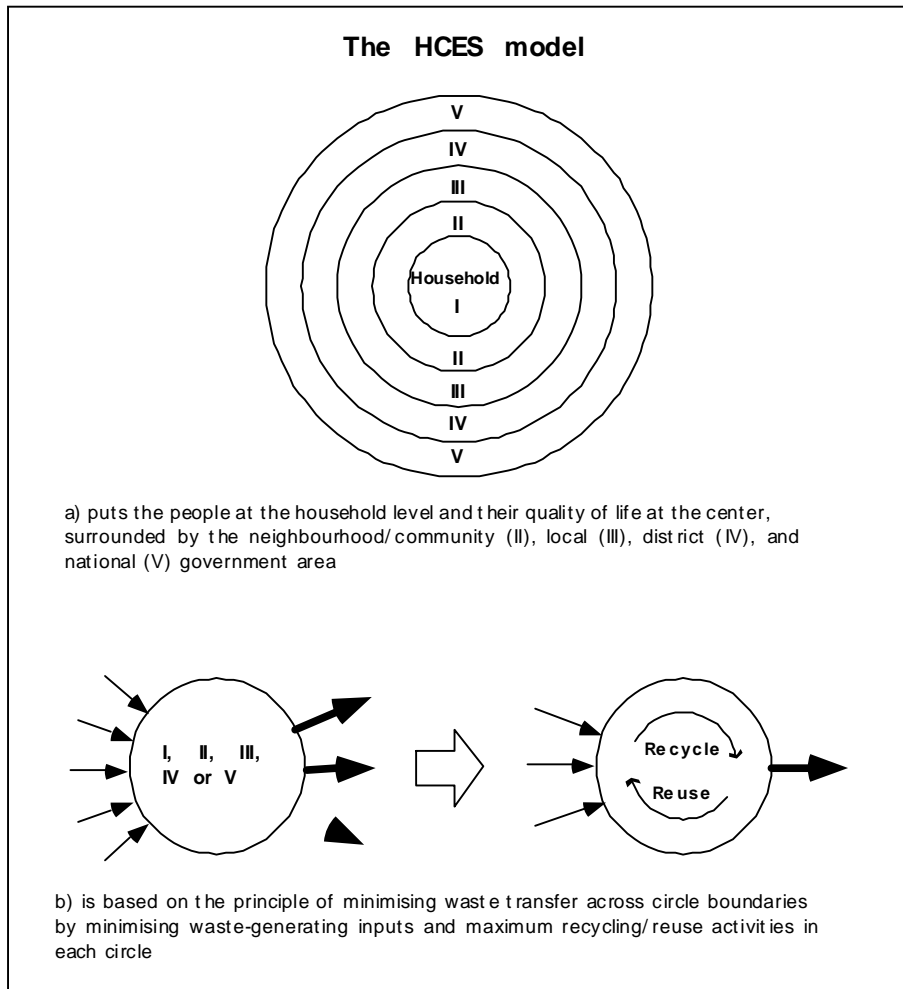
3.2 The model: Household-centred environmental sanitation

Recognising the deficiencies of conventional service design and delivery models, the group elaborated and suggests a radically different approach which will improve the chances of attaining the agreed goals and objectives. The model takes as its fundamental premise the need to put people and their quality of life at the centre of any environmental sanitation system. It is based on two principles (recognising that they should be applied in such a way as to balance economic and environmental good):

- The minimisation of waste-generating inputs (water, goods and materials), and the reduction of waste outputs (wastewater, solid waste and stormwater); and

- The solution of environmental sanitation problems as close as possible to where they occur.

In order to apply these principles, the model proposes an administrative structure for environmental sanitation services composed of concentric circles with the household at the hub, matched to human settlement/administrative/ political structures, and to the water resource and waste disposal base.



The process begins at the household level, i.e. the level at which consumers decide what level of service(s) they want and can afford, on the basis of available information

about costs, benefits and operational responsibilities. The household is the core, the first circle in the management of environmental services.

The next circle of activity is the neighbourhood or community, to which the household relinquishes those environmental sanitation functions that it is not itself able to assume. The community, in turn, passes on those responsibilities it is unable to meet to the next circle -- local government area, urban ward, town or municipal. Five tiers of circle are envisaged -- household, community, local, district, national -- but the area and size of population encompassed by any circle is flexible. They can reflect any convenient administrative or political structure or topographical area. In passing responsibilities from one circle to another, the principle to be followed is that only tasks beyond the capacity of one circle are handed on to the next.

At the household level, most of the responsibilities related to service provision will be operational. In the intermediate levels, operational responsibilities will decrease while policy responsibilities grow in proportion to the position of the circle. At the level of the outermost circle -- national or river basin -- most of the responsibilities will concern the development of environmental sanitation policies, strategic planning and regulations.

Among the advantages of the HCES model are the following:

- The approach balances human and environmental needs and is likely to be more sustainable than any model currently in use.
- The approach can be applied regardless of political system, but in order to be sustainable implies a commitment to decentralised, participatory structures.
- The basic concept and approach of the model is applicable in industrialised as well as in developing settings. It can be used anywhere, independently of economic level, size of population, and environmental characteristics, at either the micro or macro level. For instance, it is equally as applicable to an urban neighbourhood in the United States or Europe as to a rural community in Africa or Asia. Of course this does not imply, that the specific solutions and services should and will look everywhere the same. Different conditions will lead to different solutions even if the same principles are applied.

3.3 Implications of adopting the household-centred ES model

The implications of adopting the household-centred model are profound, and require that the environmental sanitation community radically rethink its policies and practices. In particular, placing the household at the centre of the model demands an adaptation of technology to match people's needs, rather than a change of people's behaviour to accommodate technology.

The adaptations required by the model are already feasible on the basis of existing knowledge, institutional frameworks and technical means. However, a rigorous analysis of stakeholder capacities at all levels is required, by examining all aspects of

environmental sanitation services: institutional, legal and regulatory, economic and financial, social and cultural, technological, planning, information and communications, and knowledge generation (see Annexe B).

In the light of the principle at the heart of the model -- that problems should be solved as close as possible to the place of origin -- the employment or adaptation of existing technologies not customarily used in conventional environmental sanitation services would improve the effectiveness of the model. Research focusing on resource-conserving technologies (especially water) will enable an increasing number of environmental sanitation problems to be solved within the innermost circles (i.e. at household and community level). This kind of applied research is, therefore, an immediate priority, and a list of possible topics is provided in Annexe C.

4. Target Audiences and future steps

The target audiences of the household-centred ES model are:

- Decision makers at all levels
- External support agencies
- Professionals
- Users of ES services

The participants of the workshop decided on the following process and schedule for the future steps:

1. The concept and approach suggested in this report will be reviewed by a wider audience before it is presented to the drafting committee by mid May 1999.
2. An expanded model description with a fictional case study will be prepared by mid May 1999.
3. The expanded model description will be presented to the full Environmental Sanitation Working Group and discussed during an e-mail conference to be held in the period June/July 1999
4. Existing projects will be identified that suit the HCES model as examples/case studies (April - August 1999)
5. Articulation of guidelines and detailed case studies (fictional/hypothetical) which will be presented the latest at the Fifth Forum of the WSSCC in autumn 2000.

List and addresses of Participants

ANNEX A

Brian APPLETON	Water Supply and Sanitation Collaborative Council	c/o WHO 20 Avenue Appia, CH-1211 Geneva 27	Tel. +41-22-791 3517 Fax +41-22-791 4847 appletonb@who.ch
John H. AUSTIN	Health and Child Survival Fellows Program	USAID Washington, DC 20523-3700, USA	Tel. +1-202-712-5763 Fax +1-202-216-3702 jaustin@usaid.gov
Ilham Ali BASAHI	Faculty of Engineering	University of Sana'a P.O.Box 1398, Sana'a, Republic of Yemen	Tel. +967-1)-417313/ 250514 Fax +967-1)-416393 LAMI@y.net.ye
Maggie BLACK	Consultant	41 Kingston Road, Oxford, OX2 6RH U.K.	Tel. +44-1865-513844 Fax +44-1865-510017 maggie@black.win-uk.net
Andrew COTTON	WEDC, Urban Infrastructure Unit	Loughborough Univ. Leicestershire LE11 3TU U.K.	Tel. +44-1509 222885 Fax +44-1509 211079 a.p.cotton@lboro.ac.uk
Hans M.G. van DAMME	Water Supply and Sanitation Collaborative Council	1st Poellaan 59, NL-2161 LA LISSE The Netherlands	Tel. +31-252 422 560 Fax +31-252 422 570 hansvandamme.wsscc@wxs.r
Brian GROVER	UNDP/World Bank Water and Sanitation Program	The Woorld Bank 1818 H Street N.W. Washington D.C. 20433	Tel. +1-202-473-0693 Fax +1-202-522-3228 Bgrover1@worldbank.org
John M. KALBERMATTEN	Kalbermatten Associates, Inc.,	609 Main Street Bethlehem PA 18018-3801	Tel. +1-610-419 2517 Fax +1-610-419 1692 Jmkkainc@aol.com
Arun KASHYAP	The Rockefeller Foundation	420 Fifth Avenue New York, NY 10018-2701 /USA	Tel. +1-212-852 8394 Fax +1-212-852 8461 akashyap@rockfound.org
Harry McPHERSON	Consultant		Tel.: +1-403-239 0835 Fax +1-403-208 2864 Domgab@caovision.com
Roland SCHERTENLEIB	SANDEC	Ueberlandstrasse 133 CH-8600 Duebendorf Switzerland	Tel. +41-1-823 50 18 Fax +41-1-823 53 99 Schertenleib@eawag.ch
Kevin TAYLER	GHK Research & Training	St. James Hall, Moore Park Road, London SW6 2JW/ UK	Tel. +44-171-736 8212 Fax +44-171-736 0784 Taylerk@GHKint.com

1. Institutional
2. Legal and regulatory
3. Economic and financial
4. Social/cultural
5. Technological
6. Planning process
7. Information/communication
8. Knowledge generation (R&D)

1. Institutional

- a) Review and assess existing institutional framework (official/actual, formal/informal)
- b) Define circle boundaries, in light of existing administrative entities and physical characteristics.
- c) Identify stakeholders and define their roles, responsibilities and levels of authority.
- d) Establish mechanisms to support linkages, channels of communication and transactions between circles.
- e) Identify HRD/capacity building requirements.
- f) Identify R&D requirements.
- g) Promote involvement of the private commercial sector.

2. Legal and regulatory

- a) Review and assess the existing legal and regulatory framework, including its enforcement and operational effectiveness.
- b) Establish appropriate legal instruments for implementation, monitoring and compliance.

3. Economic and financial

- a) Review and assess the macroeconomic environment with regard to its impact on water and sanitation.
- b) Review and assess the financial environment, including prices, subsidies, taxes, tariffs and methods of cost recovery.
- c) Review and assess sources and flows of finance, both for investment and operation, with particular emphasis on systems of concessionary finance.
- d) Review and assess financial management systems including the efficiency of cost recovery mechanisms.
- e) Establish financial policies for flows of funds (full cost pricing with targeted subsidies, investment, cost recovery)
- f) Encourage the participation of micro-enterprises through fiscal measures and incentives.

4. Social/cultural

- a) Review and assess existing socio-cultural structures and norms (including gender issues)
- b) Review and assess health practices and hygiene behaviours, including those connected to water use and management of excreta and other wastes.
- c) Identify existing access to environmental sanitation services.
- d) Assess unmet needs for services
- e) Explore demand for services with potential users.
- f) Explore and promote opportunities for stakeholder participation.

5. Technological

- a) Review and assess existing technologies/practices
 - What is available ?
 - How are existing problems of sanitation resolved (practices in use) ?
- b) Assess boundary conditions (what constitutes critical constraints)
- c) Explore potential options with stakeholders (Solve the problem as close to the source as possible) keeping the following in consideration:
 - Costs
 - Risks
 - Needs/Demand
 - Financing
 - Available resources
 - Required Skills (existence of adequate capacity at various levels)
 - Institutional requirements
 - Impact
- d) Identify stakeholders
- e) Select most appropriate options with stakeholders

6. Planning process

- a) Gain stakeholder commitment to the idea of planning
- b) Review and assess existing planning processes (formal/informal) and actual practice
 - Who is doing/influencing the planning ?
 - Stakeholder participation ?
 - Coordination within the sector and with other sectors ?
 - Existing fragmentation/linkages
- c) Allocate roles and responsibilities in the planning process
- d) Establish needed planning structure and authorities
- e) Develop/implement/monitor/amend plans

7. Information/communication

- a) Determine data requirements
- b) Review data/information systems
 - Identify the gaps
- c) Analyse the flows and use of data
- d) Review communication channels and their effectiveness

- e) Establish responsibilities for data collection and management
- f) Plan process for communicating information to different audiences

8. Knowledge generation (R&D)

- a) Review and assess existing structure/processes and systems for knowledge generation & application and identify gaps
- b) Review and assess existing knowledge and identify gaps
- c) Develop creative proposals/plans to fill in the gaps

1. Institutional

- a) Institutional structure and roles
- b) Links between technology and institutions
- c) Watershed-Based administration
- d) The effects of central governments intervention in environmental sanitation services
- e) The role of NGOs in the institutional strengthening of the communities
- f) Case analysis of appropriate programs-institutional
- g) Strengthening of cooperatives in rural areas in developing countries
- h) Institutional options for linking circles
- i) HRD needs for supporting structure

2. Legal and regulatory

- a) Authorising / Empowering each circle
- b) Environmental standards linked to Model boundaries

3. Economic and financial

- a) Alternatives for financing ES at each annulus
- b) Critical review of tax + tariff + subsidy systems

4. Social/cultural

- a) Critical review of the potential and limitations of community-managed approaches.
- b) Community participation and interaction mechanisms between different stockholders in environmental sanitation.
- c) Gender issues related to HCES model.
- d) Demand creation (household).
- e) Children's sanitation.

5. Technological

- a) Potential and limitations of different technologies
- b) Black water - Grey water separation.
- c) Impact of water saving appliances.
- d) Excreta transport media other than water.
- e) On-site recycling and reuse (Non-Household).
- f) Ultra water-saving appliances.
- g) Pathogen travel in soils and bedrock.
- h) Guidance tools on the implications of technology choice:
 - Institutional.
 - Financial.

- Environmental.
- i) Performance of different systems under field conditions.
- j) Upgrading traditional environmental sanitation systems.
- k) Options for dealing with wastes at the local level.

6. Planning process

- a) Decision-making algorithms for New ES Mode
- b) Case analysis of Appropriate Programs (Environmental, Financial, Social)
- c) Criteria for setting roles and responsibilities in each zone
- d) Minimum baseline information requirements.
- e) Moving from pilots to the mainstream.
- f) Performance indicators to evaluate against.

7. Information/communication

- a) Mechanisms for communication / transactions between circles.
- b) Dissemination mechanisms