Alternative Environmental Sanitation Approaches in Developing Countries

Half of the world population does not have access to hygienic sanitation systems. The conventional "top-down approaches" often fail. Therefore, EAWAG together with an international group of experts developed the "Household-Centred Environmental Sanitation (HCES) Approach" which places the household in the centre of the planning process.

The number of people around the world who still do not have access to adequate water, sanitation, drainage and solid waste disposal services is alarming (see box). This worrying situation provides sufficient evidence that past and current conventional approaches to environmental sanitation are unable to make a significant dent in the service backlog which still exists. At the same time, the world's natural supply of freshwater is subject to increasing environmental and economic pressures. The situation is likely to worsen dramatically unless determined action is taken. Continuing increases of population and per capita water demand, fuelled by improving economic conditions, will further contaminate and deplete finite and often over-exploited sources of water.

A new approach has been developed by EAWAG in cooperation with international leading experts to overcome the serious lack of sanitation services, causing illnesses and slowing the economic progress of hundreds of millions of people in developing countries: the "Household-Centred Environmental Sanitation (HCES) Approach".

New Paradigm and Working Principles are Needed

There is a need to challenge conventional thinking. This must be done persuasively to the wider international water resources and waste management community, as well as among the broader community of economic, social, and urban policy-makers. The basis for this need is as follows:

- "Business as usual" cannot provide services for the poor; the rapid rate of urbanization poses particular problems of squalor, human indignity, and threat of epidemic.
- "Business as usual" is not sustainable even in the industrialized world; sewage and drainage systems are over-extended and the use of water of drinking quality to transport human excreta is extravagant and wasteful.
- Centralized systems designed and implemented without consultation with, and the participation of, stakeholders at all levels are outmoded responses to public health and environmental problems. Stakeholder participation is vital.
- There is a lack of integration between excreta disposal, wastewater disposal, solid waste disposal, and storm drainage. Many problems would be resolved by a new paradigm that places all aspects of water and waste within one integrated service delivery framework.
- The increasing need for environmental protection and freshwater savings requires that waste water and wastes be recycled and used as a resource. This must be achieved within a circular system based on the household, community, and municipality, rather than a linear system.
- The export of industrialized world models of sanitation to environments characterized by water and resource scarcity is inappropriate, and amounts to a continuation of wrong solutions.

Source [4]

- **1.1 billion people do not have access to safe drinking water.**
- **2.4 billion people do not have access to proper sanitation.**
- **50 % of all solid waste is uncollected.**
- **No one knows how many people are flooded out each year.**
- **3 billion people have to survive on less than 2 US$ per day.**

In the light of these compelling arguments for radical re-thinking, the so-called Bellagio Principles [1, see box], must be seen as the underpinning basis for the new HCES approach. This concept includes two components: the Household-Centred Approach and the Circular System of Resource Management. It offers the promise of overcoming the shortcomings of "business as usual" because its two components correct existing unsustainable practices of planning and resource management.

Stakeholders at All Levels Participate in the Planning Process

The Household-Centred Approach is a radical departure from past central planning approaches (Fig. 1). It places the stakeholder at the core of the planning process. Therefore, the approach responds directly

The Bellagio Principles

Meeting at Bellagio, Italy in February 2000, an expert group brought together by the Environmental Sanitation Working Group of the Water Supply and Sanitation Collaborative Council (WSSCC) agreed that current waste management policies and practices are abusive to human well-being, economically unaffordable and environmentally unsustainable. They formulated the following principles [1]:

1. Human dignity, quality of life and environmental security at household level should be at the centre of the new approach, which should be responsive and accountable to needs and demands in the local and national setting.

2. In line with good governance principles, decision-making should involve participation of all stakeholders, especially the consumers and providers of services.

3. Waste should be considered a resource, and its management should be holistic and form part of integrated water resources, nutrient flows and waste management processes.

4. The domain in which environmental sanitation problems are resolved should be kept to the minimum practicable size (household, community, town, district, catchment, city) and wastes diluted as little as possible.

to the needs and demands of the user, rather than central planner's often ill-informed opinions about them. It is based on the following principles:

- Stakeholders are members of a "zone", and act as members of that zone (zones range from households to the nation). Participation is in accordance with the manner in which those zones are organized.
- Zones may be defined by political boundaries (for example, city wards and towns) or reflect common interests (for example, watersheds or river basins).
- Decisions are reached through consultation with all stakeholders affected by the decision, in accordance with the methods selected by the zone in question (for example, votes at national level in a democratic system, town hall meetings at local level, or informal discussions at neighborhood level).
- Problems should be solved as close to their source as possible. Only if the affected zone is unable to solve the problem should the problem be "exported", that is, referred to the zone at the next level.
- Decisions, and the responsibility for implementing them, flow from the household to the community to the city and finally to the central government. Thus, individual households determine what on-site sanitation they want; together with other households, they decide on the piped water system they want for their community, together with other communities, they determine how the city should treat and dispose of its waste water. Policies and regulations are determined by central government, with implementation delegated to the appropriate levels flowing towards the household.

Recycling and Reuse of Resources is Fundamental

The Circular System of Resource Management (Fig. 2) is an important principle of the HCES approach. It aims at minimizing waste transfer across circle boundaries by reducing waste-generating inputs and maximum recycling/reuse activities in each circle. In contrast to the current linear system, the Circular System of Resource Management emphasizes conservation of resources, and the recycling and reuse of resources. Resources in the case of environmental sanitation are water, goods used by households, commerce and industry, and rain water. The circular system practices what economists preach: waste is a misplaced resource.

Implications of Applying the HCES Approach

Implementation of the HCES approach requires stakeholders within the zone to plan and implement environmental sanitation infrastructure and service delivery in a sustainable way. The approaches that should guide them in arriving at such sustainable solutions within each zone include some or all of the following [2]:

- Water demand management: in order to minimize wasteful use of water, and so reduce the need for new source development and limit the production of waste water.
- Reuse and recycling of water: in order to minimize the need for wastewater collection, treatment and disposal.
- Solid waste recycling: in order to reduce the burden of collecting and disposing of solid wastes.
- Nutrient recovery: either at the household level (for example, ecological sanitation), or on a wider scale (for example, urban agriculture).

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About 40% of the world population do not have access to proper sanitation.

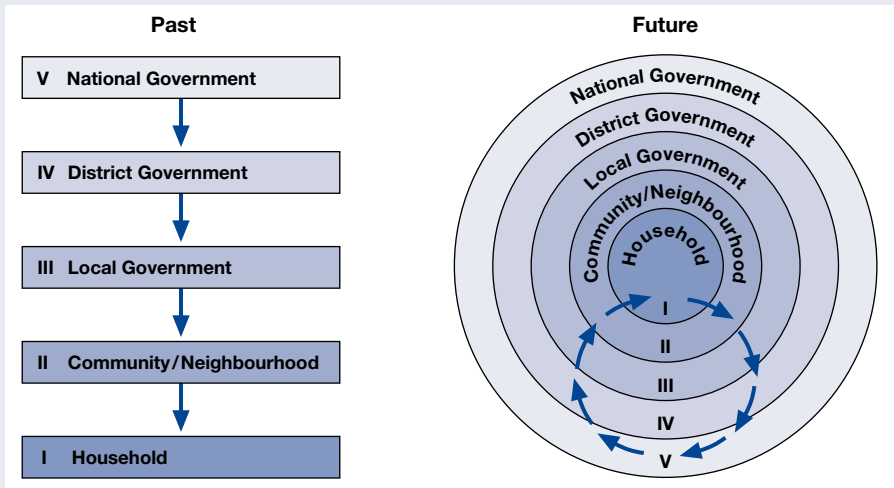

Fig. 1: The household at the core of the planning process. The HCES approach attempts to avoid the problems resulting from either "top-down" or "bottom-up" approaches, by employing both within an integrated framework.

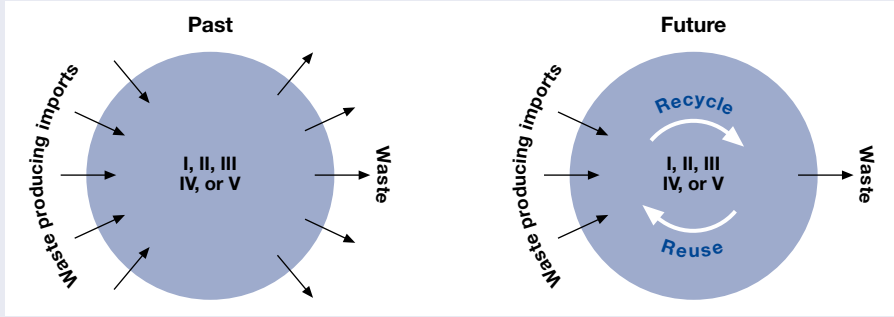

Fig. 2: The Circular System of Resource Management: Minimizing imports and maximizing recycling and reuse within boundaries.

- Improved rainwater management: reducing runoff by local measures, including detention and treatment, and the reuse of storm water to benefit the community.
- Strong emphasis on intermediate technologies: so as to encourage household- and community-level construction, operation and management of facilities, and permit reuse and/or disposal at the local level.
- Institutional arrangements and mechanisms: that stress the involvement of the users, encourage the participation of the private sector, facilitate cooperation across zone or sub-zone boundaries, and ensure the provision of technical assistance across zone boundaries where needed.
- Economic analysis procedures: that clearly illustrate the economic benefits of good planning as well as the consequences of sub-optimal development.
- Effective and sustainable financial incentives: to encourage the adoption of economically-desirable alternatives.
- Financial procedures: that determine whether problems should be solved within the zone itself, or whether a joint solution should be selected to serve more than one zone.
- Cost recovery practices: (predominantly user charges in Zones I and II; tax revenues elsewhere) that ensure financial viability, are socially equitable, and promote the "circular system" and the productive use of "waste".

Guideline for Implementing the HCES Approach

Successful implementation of the HCES approach requires the dissemination of information and assistance to those responsible for improving environmental services. Therefore, provisional guidelines were prepared which are mainly targeted at municipal planners (especially those responsible for planning urban environmental services) and civic officials, such as mayors and city managers [3]. These are the people who will initially have to take the decisions on whether and how to apply HCES, who will implement and support the process, and who will be responsible to their citizens for the results. The guideline is intended to assist them to understand the HCES approach, to apply it in their own context, and to be able to explain it to the user communities. The provisional guideline provides specific assistance for the development and implementation of the HCES approach. It comprises two sections dealing with the creation of an "enabling environment" and the procedure to go through a 10-step process.

An "enabling environment" is important for the success of any investment program, but it is especially vital when applying an innovative approach, such as HCES. Most of the critical elements (Fig. 3) should be identified or become evident during the program development process. Ideally, they should be identified, at least in broad terms, prior to the program launch so that the entire process does not start off with misunderstandings. It is essential that they are recognized before or during the identification and evaluation of options at the latest, since if these critical elements cannot be assured, then some of the options may not be feasible.

The ten typical steps involved in developing and implementing an HCES program are presented in sequence (Fig. 3), but in practice they will usually overlap. Some steps may need to be repeated more than once in an iteration to find acceptable solutions, and they will always need to be undertaken bearing in mind the concerns of the municipality as a whole.

The provisional guideline will be tested in selected projects, which will be subjected to careful monitoring and evaluation. That process will not only test the provisional guideline and reveal areas which need to be improved; it will also bring out the topics which need to be particularly stressed during implementation, and the issues which are likely to arise.

Projects based on the HCES approach will take more time to develop than single-sector, capital-intensive projects. The investment in development is justified, as the HCES approach offers the one result that previous approaches have been unable to achieve: sustainability.

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Further Informationen: www.sandec.eawag.ch, www.wsscc.org

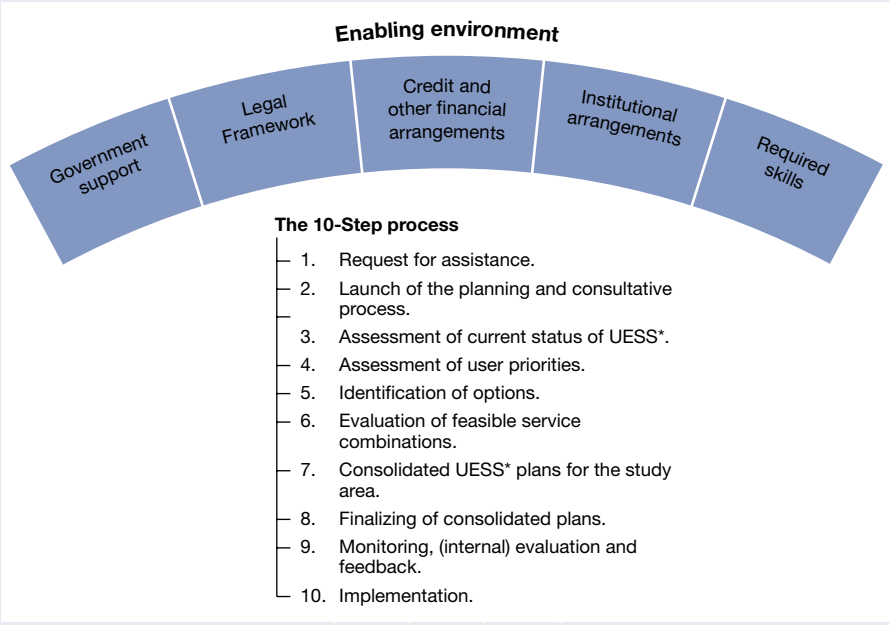

Fig. 3: The two main components of the provisional guideline for the implementation of the HCES approach: the enabling environment and the 10-step process. *UESS = Urban environmental sanitation services.

[1] EAWAG/SANDEC and Water Supply and Sanitation Collaborative Council – WSSCC (2000): Bellagio expert consultation on environmental sanitation in the 21st century. Report of the Bellagio Workshop, February 2000. www.sandec.ch/Publications/PublicationsHome.htm

[2] Schertenleib R. (2001): The Bellagio principles and a household centred approach in environmental sanitation. In: C. Werner, J. Schlick, G. Witte, A. Hildebrandt (eds.) Proceedings of the 1st International Symposium on Ecological Sanitation – Closing the loop in wastewater management and sanitation, October 2000, Bonn, Germany. Publisher: Gesellschaft für Technische Zusammenarbeit, Eschborn, Germany, p. 52–57.

[3] Schertenleib R., Morel A., Kalbermatten J., Saywell D. (2003): Guidelines for the implementation of the Bellagio principles and the household-centred environmental sanitation approach (HCES). In: C. Werner, J. Schlick, G. Witte, A. Hildebrandt (eds.) Proceedings of the 2nd International Symposium on Ecological Sanitation, April 2003, Lübeck, Germany. Publisher: Gesellschaft für Technische Zusammenarbeit, Eschborn, Germany, in press.

[4] WHO, UNICEF, WSSCC (2000): Global water supply and sanitation assessment 2000 Report. Geneva, Switzerland, 80 p.