

PRINCIPLES AND IMPLICATIONS OF HOUSEHOLD CENTRED-APPROACH IN ENVIRONMENTAL SANITATION¹

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INTRODUCTION

There is a large number of people around the world who still do not have access to adequate water, sanitation, drainage and solid waste disposal services. The latest statistics show that 1.1 billion people still do not have access to safe drinking water and 2.4 billion people do not have access to proper sanitation. The corresponding numbers for China are 320 Mio and 790 Mio, respectively. [1] Furthermore, in many urban areas of developing countries, less than 50% of the municipal solid waste is being collected and only a very little part of it is disposed off in an environmentally safe manner. This situation is not only causing illnesses and deaths but also slowing the economic progress of hundreds of millions of people in developing countries. 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 even more unless determined action is taken, because continuing population increases and increasing per capita water demand, fueled by improving economic conditions, will further contaminate and deplete sources of water which are finite, and in many countries already over-exploited.

THE CASE FOR CHANGE

There are of course many different reasons why still so many people around the world still have no access to environmental sanitation services: lack of political will; low prestige and recognition of the importance of sanitation; poor policy at all levels; poor institutional frameworks; inadequate and poorly-used resources; neglect of consumer preferences; ineffective promotion and low public awareness; neglect of the importance of women and children.[2] It is becoming more and more evident that the conventional approaches to environmental sanitation¹ are unable to make a significant dent in the service backlog which still exists. This was also the conclusion of a group of experts which met in 2000 at Bellagio, Italy, to review the present situation and to identify ways to overcome barriers to progress in sanitation. All participants accepted the need to challenge conventional thinking, and to do so persuasively to the wider international water resources and waste management community, public and private, as well as among the broader community of economic, social, and urban policy-makers [3]. The basis for this need is as follows:

- 'Business as usual' cannot provide services for the poor; the rapid rate of urbanisation poses particular problems of squalor, human indignity, and threat of epidemic.

¹ Environmental Sanitation (ES) has been defined 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 and 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." The Hilterfingen Group added to these components stormwater management, and water to the extent that water influences the method of waste disposal.

- ‘Business as usual’ is not sustainable even in the industrialised world; sewerage and drainage systems are over-extended and the use of water of drinking quality to transport human excreta is extravagant, wasteful, and the wastes thereby flushed add to the pollution of the environment.
- The under-utilisation of organic residues is economically wasteful, and belongs to a distorted view of waste management as confined to issues of disposal as opposed to resource utilisation.
- Centralised systems designed and implemented without consultation with, and the participation of, stakeholders at all levels are out-dated responses to public health and environmental problems, and are ineffective in today’s world. 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 which placed all aspects of water and waste within one integrated service delivery framework.
- The pressures of humanity on a fragile water resource base, and the corresponding need for environmental protection and freshwater savings, require that wastewater and wastes be recycled and used as a resource, within a circular system based on the household, community, and municipality, rather than a linear system.
- The export of industrialised world models of sanitation to environments characterised by water and resource scarcity is inappropriate, and amounts to an amoral continuation of wrong solutions.

GOALS AND OBJECTIVES OF ENVIRONMENTAL SANITATION

The goal of environmental sanitation is to contribute to the improvement of quality of life and the achievement of social development. Environmental sanitation should create and maintain conditions whereby not only people can lead healthy and productive lives, but also where the natural environment is protected and enhanced. This notion is also reflected in the term “Ecological Sanitation”.

To achieve these twin objectives, the universal goal of environmental sanitation can be stated as follows: *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* [4].

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

PRINCIPLES OF A NEW APPROACH IN ENVIRONMENTAL SANITATION

Based on the goals and objectives of environmental sanitation and in the light of the compelling arguments for radical re-thinking, the Bellagio group proposed the following principles as the underpinning basis for a new approach [3]:

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

- solutions should be tailored to the full spectrum of social, economic, health and environmental concerns
 - the household and community environment should be protected
 - the economic opportunities of waste recovery and use should be harnessed
2. *In line with good governance principles, decision-making should involve participation of all stakeholders, especially the consumers and providers of services.*
- decision-making at all levels should be based on informed choices
 - incentives for provision and consumption of services and facilities should be consistent with the overall goal and objective
 - rights of consumers and providers should be balanced by responsibilities to the wider human community and environment
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.*
- inputs should be reduced so as to promote efficiency and water and environmental security
 - exports of waste should be minimised to promote efficiency and reduce the spread of pollution
 - wastewater should be recycled and added to the water budget
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.*
- waste should be managed as close as possible to its source
 - water should be minimally used to transport waste
 - additional technologies for waste sanitisation and reuse should be developed

The Household-Centred Environmental Sanitation Approach

Based on these Bellagio Principles, the Environmental Sanitation Working Group of the Water Supply and Sanitation Collaborative Council conceived a new approach for planning environmental sanitation services: *the Household Centred Environmental Sanitation (HCES) Approach* [4,5]. The HCES approach offers the promise of overcoming the shortcomings of business as usual because its two components correct existing unsustainable practices of planning and resource management. These components are:

- 1) *Household Centered Environmental Sanitation (HCES)* makes the household the focal point of Environmental Sanitation Planning, reversing the customary order of centralized top-down planning. It is based on the concept that the user of services should have a deciding voice in the design of the service, and that environmental sanitation problems should be solved as close as possible to the site where they occur. Only problems not manageable at the household level should be “exported” to the neighborhood, town, city and so on up to larger jurisdiction. Making the household the key stakeholder also provides women with a strong voice in the planning process, and changes the government’s role from that of provider to that of enabler; and
- 2) *The Circular System of Resource Management (CSR)* that, in contrast to the current linear system, emphasizes conservation, recycling and reuse of resources. The circular system practices what economists preach: waste is a

misplaced resource. By applying this concept, the circular system reduces “downstream” pollution.

Structure of decision making in the Household-centred approach

The conventional approach to water supply and environmental sanitation is based on a highly-centralized system of decision-making, usually under the control of the national government. In recent years, many governments have attempted to decentralize, first by deconcentrating their functions, then by delegating these functions to second-and third-tier governments (for example, to provinces and municipalities). Eventually, some governments have devolved responsibility for service provision to local authorities.

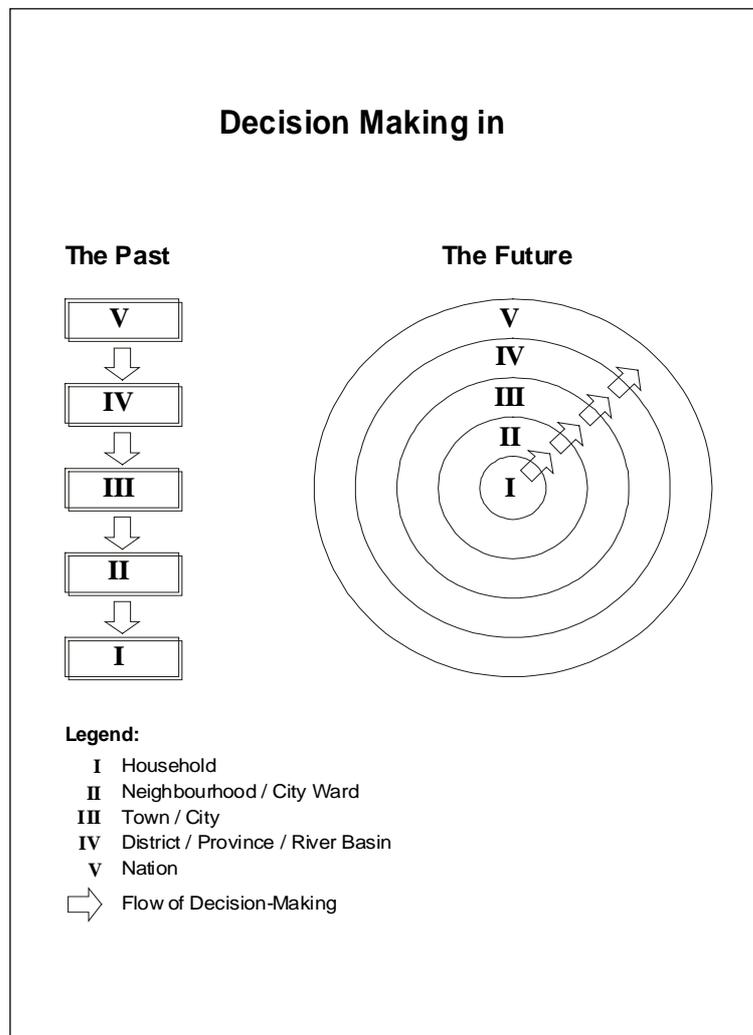
The results of these efforts have been mixed. Deconcentration and delegation leave central policy-makers in charge, and do little to encourage initiatives by local office-holders and managers; decisions are still made at the center, which also holds tightly onto the purse strings.

The problems with devolution generally result from the fact that only the new responsibilities, not the means of implementing them, are transferred to the local authorities. Frequently the government neither relinquishes its revenue-generating powers, nor provides the local authorities with the funds necessary to successfully operate the services for which they are now responsible.

The HCES Approach is a radical departure from past central planning approaches. As shown in the figure it places the stakeholder at the core of the planning process. Therefore, the approach responds directly 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 (for example, communities and neighborhoods consist of households, towns consist of communities, etc.).



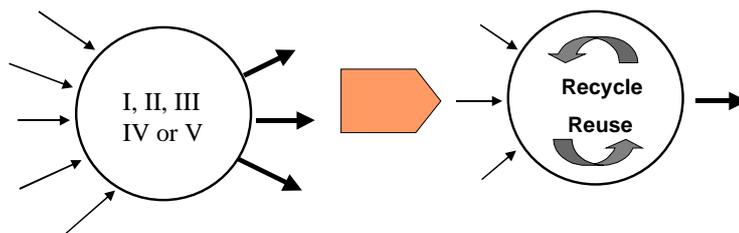
- Zones may be defined by political boundaries (for example, city wards and towns) or reflect common interests (for example, watersheds or river basins).
- Decisions are reached through consultation with all stakeholders affected by the decision, in accordance with the methods selected by the zone in 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 (for example, where feasible, a community should provide services to households within it; common wastewater treatment facilities for several communities should be provided by a consortium of the communities). 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 (there may also be intervening zones that need to be considered; for example, wards within the city, districts within a province; or provinces within the nation). 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 wastewater. Policies and regulations are determined by central government, with implementation delegated to the appropriate levels flowing towards the household.

Circular System of Resource Management

An important principle of the HCES approach is to minimise waste transfer across circle boundaries by minimising waste-generating inputs and maximum recycling/reuse activities in each circle.

In contrast to the current linear system, the *Circular System of Resource Management (CSR)* emphasizes conservation (reducing imports) of resources, and the recycling and reuse of resources used (minimizing exports). 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. By applying this concept, the circular system reduces “downstream” pollution.

Principle Of Minimising Waste Transfer Across Circle Boundaries



Implications of applying the HCES model

However the boundaries of each zone in the HCES model are defined², implementation of the HCES approach requires stakeholders within the zone to plan

² It should be noted that the boundaries appropriate to each of the various sub-sectors may not be identical. A fundamental exercise in establishing the HCES model is therefore to determine how best to treat the study area in terms of zones and sub-zones, as well as of sectors and sub-sectors. This is

and implement environmental sanitation infrastructure and service delivery in a manner that is sustainable with the resources which are available to them within the zone (or which can be made available from another zone). The approaches that should guide them in arriving at such sustainable solutions within each zone include some or all of the following:

- *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 wastewater;
- *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*, whether at the household level (for example, eco-sanitation), or on a wider scale (for example, urban agriculture);
- *Improved rainwater management*, reducing runoff by on-site or local measures, including detention and treatment, and the reuse of stormwater to benefit the community, such as storage for fire fighting and recreational or amenity use, thus reducing uncontrolled discharge to surface waters;
- *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 (such as wholesale – retail relationships for service delivery), 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 (for example, in terms of environmental damage; wasteful use of water, energy or other resources; or relying on imported skills and equipment and so failing to make the best use of local resources);
- *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 (for example, a city-wide system serving a number of wards). Where economic and financial considerations indicate that a shared solution is preferable, appropriate cost-sharing mechanisms need to be established.
- *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 “wastes”.

In summary, programs and projects designed in accordance with the HCES approach will, like all successful and sustainable development efforts, have to address all aspects of development: social, institutional, economic and financial, and technological. The difference is that they will truly be “bottom up”, beginning with the preferences and capabilities of the households. It should be underlined, however, that the HCES approach does not automatically imply, that the sanitation problem can and should be solved at the household level. There might be good reasons why the sanitation problem can better be solved at the community or even city level. But in any case, the thinking and search for solutions should start at the household level.

probably best resolved through an analysis of actual case studies, rather than as an abstract theoretical concept.

DIFFERENT OPTIONS FOR ECOLOGICALLY SOUND SANITATION SYSTEMS

There are different possibilities to design a sanitation system which is in accordance to the Bellagio Principles. One option is certainly the installation of on-site sanitation systems using ecological toilets with urine diversion [6]. It is interesting to note that important research is also being conducted in several places in Europe and the United States where a lot of money has already been invested in conventional sewer and wastewater treatment systems. The purpose of this research is to find alternative systems which require less water, close the nutrient loop and, therefore, are ecologically more sustainable [7,8]. For instance, separating and storing urine in toilets, collecting it at night via the regular sewage system, and subsequently processing it into fertilizer, significantly reduces the waste stream reaching the sewage treatment plant. Therefore, elimination of nutrients in the treatment plant is no longer necessary and 70-80% of pharmaceuticals and hormones secreted by humans no longer reach the sewage treatment plant [9]. Nutrients can be recycled from concentrated urine much more efficiently than from dilute waste stream, although application of these nutrients in agriculture probably requires treatment in order to reduce the levels of pharmaceuticals.

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