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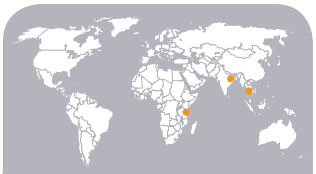
research evidence for policy

Nala, Nepal: Demonstrating a dry toilet that separates faeces and urine. Collected and stored separately according to specific guidelines, urine is a concentrated source of nutrients that can be used as a fertiliser in agriculture, replacing all or some commercial chemical fertiliser. Photo: Sandec

NCCR north south

Local solutions for sanitation



Case studies featured here were conducted in: Lao PDR, Tanzania, and Nepal

Policy message

- A narrow focus on conventional sanitation technologies and top-down planning often prevents improvement of sanitation in poor settlements.
- Simple, affordable, effective technologies are available. Introducing them via participatory planning – involving all stakeholders, particularly end-users – helps to ensure their acceptance and success.
- Planners should familiarise themselves and local stakeholders with all feasible technologies, enabling end-users to choose a system that fits their environment, priorities, and ability to pay.
- Favourable external conditions – political will, legal frameworks, financial arrangements, and professional capacities – are key to successful implementation.

Providing sanitation services is very difficult in developing countries, especially in unplanned settlements in rapidly growing cities. Costly, over-engineered sanitation solutions are often impractical and foster dependence on subsidies. Reliance on top-down planning acts as another bottleneck to improvements. Household-Centred Environmental Sanitation is an alternative approach that places end-users and local authorities at the centre of planning and implementation, enabling them to select sanitation systems that are appropriate to their household or community.

Urban sanitation challenges

Providing effective sanitation systems to millions of slum dwellers worldwide is a daunting task for engineers and urban planners. Conventional technologies – flush toilets connected to sewer systems – are typically unfeasible: they are often too expensive for local authorities and communities to build and maintain, are difficult to implement in crowded areas, and are otherwise impractical in unplanned settlements where land ownership may be in dispute. Further, conventional sanitation approaches can harm the environment if the waste is not properly treated.

Choosing the right technology

Fortunately, many alternative systems and technologies already exist. These are affordable, simple to use, and environmentally sustainable. To help narrow down the choice, a *Compendium of Sanitation Systems and Technologies* (Tilley et al. 2008) was developed by the Department of Water and Sanitation in Developing Countries (Sandec) of the Swiss Federal Institute of Aquatic Science and Technology (Eawag) and the Water Supply and Sanitation Collaborative Council (WSSCC). The *Compendium* (www.sandec.ch) provides an overview and detailed descriptions of sanitation technologies that may be

Featured case studies

Lao PDR: Community involvement begets ownership

As part of an HCES project in Hatsady Tai, a poor part of Vientiane, residents shared their priorities with local authorities and sanitation experts through household surveys and gender-balanced consultation workshops. They elected a Community Environmental Unit to represent their interests at every planning stage. A community leader negotiated between residents and the authorities, and brokered a contract with a bank that wished to connect to the new infrastructure. The Community Environmental Unit took charge of the new sanitation facilities: toilets, a small-bore sewer, wastewater treatment facilities, and drainage lines. As a result, residents assumed responsibility for a comprehensive new solid-waste management system that reduces their dependence on inadequate city services (Lüthi et al. 2009).

Tanzania: Legal preconditions and microfinance for sanitation

An HCES project in Chang'ombe, on the outskirts of Dodoma, highlights the importance of legal conditions and funding. After the local authority granted them land-tenure rights, residents had an incentive to invest in infrastructure. A new microfinance system provides groups of residents with loans for sanitation improvements. They may choose between three types of toilet, with monthly repayments ranging from USD 0.50 to USD 18 (Lüthi et al. 2009).

Nepal: Ensuring equal participation despite gender and caste

An HCES project in Nala highlights the challenge that gender roles and class distinctions can present to participatory planning. Almost all survey respondents have been women, because they traditionally do the work in the home. But they cannot provide income information or commit to paying for new sanitation services, as these are men's responsibilities. Similarly, the caste system complicates planning as "elites" typically dominate discussions. The HCES team prioritises the participation of the disenfranchised, uses poverty maps to target the poor, and mobilises women through traditional women's groups and credit and savings organisations (Sherpa et al. Submitted [2011]).

flexibly adapted to local conditions. Fifty-two "technology information sheets" describe the pros and cons of each technology and provide detailed instructions for implementation. Options range from anaerobic filters to pour-flush toilets and waterless sanitation systems that conserve resources and minimise or virtually eliminate environmental harm.

The *Compendium* encourages end-users and planners to expand their view of what is possible. Based on the Bellagio Principles for sustainable sanitation (see "Definitions"), its solutions emphasise human dignity, participation, local efficiency, and reuse of waste. Introducing sanitation systems that treat waste as a resource – for example, by recycling solid waste or using properly treated human waste in agriculture – is particularly salient in poorer settings.

Step by step to sustainable sanitation

It is not always a lack of appropriate technology that hinders improved sanitation in developing countries; over-reliance on top-down planning often presents the greatest stumbling block. In an effort to improve the planning of environmental sanitation in such settings, experts from WSSCC, Eawag-Sandec, and the NCCR North-South developed the Household-Centred Environmental Sanitation (HCES) approach. This places residents and local authorities – municipal leaders, sanitation departments, and community leaders – at the centre of the planning process. A key aim is to meet the sanitation needs of marginalised people: women, children, and the poorest.

The HCES approach encompasses seven steps

Step 1: To start, a sensitisation campaign is conducted on environmental sanitation and hygiene issues. Campaign organisers and community leaders work to build momentum and a basis for action. Initial community meetings are held and a community-level task force is formed.
Step 2: Next, the project is launched at a workshop that involves end-users, local authorities, urban planners, and engineers. Workshop organisers stress the sanitation issues at hand and try to secure commitments from local stakeholders. A broader sanitation task force is assembled, representing all the major stakeholders.
Step 3: After the workshop, baseline sanitation conditions and needs are assessed via written surveys, personal interviews, and group discussions. This enables solutions to be developed that cater for men or women, different religious groups, and habits such as washing or wiping after defecation.
Step 4: Once all the stakeholders have had a chance to provide input, the surveys, interviews, and group discussions are validated to set priorities.
Step 5: Based on the collected data, experts identify all viable options for sanitation services and technology, using the *Compendium* as needed; stakeholders discuss the pros and cons of each, and choose the most appropriate solution.
Step 6: Next, an action plan is developed in collaboration with all stakeholders.
Step 7: Finally, the action plan is implemented – continuous monitoring and evaluation ensure that stakeholders' predefined priorities are addressed.

With the support of the NCCR North-South, the HCES approach has been tested in several developing countries, including Lao PDR, Nepal, and Tanzania (see "Featured case studies"). These have revealed the strengths and weaknesses of the approach and underscored the importance of supportive or hindering contextual factors.

The "enabling environment"

Identifying and fostering "enabling environments" – including supportive political allies, professional capacities, legal frameworks, and financial arrangements – are an important aim of the HCES approach.

Political support is vital to improve sanitation. Basic governmental support, or permission, may be obtained relatively easily. However, gaining substantive commitments – human or financial resources – can be difficult. The HCES approach aims to broaden support gradually by building local capacities and demonstrating effectiveness in pilot projects.

Professional capacity and technical knowledge are essential for improving sanitation using alternative technologies and participatory approaches. Providing the *Compendium* and HCES guidelines along with on-site training, aid in mediation, and trouble-shooting support can help to build the necessary capacities among local authorities, engineers, builders, and communities.

Legal frameworks must be carefully examined, for example those governing health and building codes or the technical standards of water-supply and sewer systems. In many developing countries, these standards are based on those of industrialised countries, despite their impracticality. However, suggestions for more appropriate standards often emerge in HCES-mandated stakeholder dialogues, and these can then be proposed at higher political levels. The legal framework of tenure rights must also be examined: inhabitants of unplanned settlements are more likely to invest in sanitation improvements when granted formal rights of residence or ownership.

Financial arrangements must also be considered. Municipalities often cannot afford sanitation improvements, while end-users are unable or unwilling to pay for them on their own. Microfinance arrangements, community development funds, and cost-saving measures – like the use of inexpensive local materials – can make it possible to pay for improvements. Nevertheless, traditional subsidies or external funds are often necessary.

Socio-cultural acceptance is also crucial. It depends on matching each aspect of the proposed sanitation services as closely as possible to end-users' perceptions and preferences. Furthermore, the community must be willing to participate in the planning, implementation, and management of the services, and accept group decisions.

Building "wanted" toilets

Above all, the enthusiasm and involvement of end-users are essential to ensure an enabling environment and the long-term success of any sanitation improvements. The HCES approach should not be applied without an explicit request for assistance from the people who stand to benefit most. According to the International Water Association's Vienna Charter on Urban Sanitation, every toilet built should be a "wanted" toilet: one that end-users themselves are committed to investing in, operating, and maintaining.

From HCES to CLUES

Building on the HCES approach, an adapted set of planning guidelines has been created named CLUES, for Community-Led Urban Environmental Sanitation. The new guidelines are more specifically aimed at the community level. *http://www.eawag.ch/forschung/sandec/publikationen/sesp/index_EN*

Definitions

The Bellagio Principles for sustainable sanitation were created in 2000 at a conference of experts on environmental sanitation in Bellagio, Italy. Members of the Water Supply and Sanitation Collaborative Council endorsed the principles at their 5th Global Forum in Iguaçu, Brazil, that same year. They provide the conceptual basis for the Household-Centred Environmental Sanitation approach.

1. Sanitation systems are designed to enhance human dignity, quality of life, and environmental security.
2. Decision-making involves all stakeholders, especially consumers and providers of services.
3. Waste and sewage are seen as potential resources.
4. Sanitation problems are solved at the minimum practicable level – household, community, town, district, catchment area, city – and wastes are diluted as little as possible.

In Chang'ombe, Tanzania, examples of three different toilets were constructed in public areas. They enabled residents and local authorities to assess the costs and quality of each technology. Here, a local woman builds a urine-diverting dry toilet. Photo: Sandec

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Policy implications of NCCR North-South research

Obstacles to sanitation in poor settlements

High-level policymakers wishing to improve sanitation in developing countries often focus on conventional sanitation systems designed and implemented without consulting end-users. Centrally managed and typically reliant on sewer networks, these systems are often unaffordable for local authorities or utilities to build or maintain properly, may neglect end-users' priorities, and are otherwise unfeasible in crowded, unplanned settlements.

Alternative technologies and participatory planning offer solutions

Alternative sanitation technologies already exist that are affordable, sustainable, and easy to build. Systems that treat waste as a potential resource are especially relevant in poor areas. Every setting is different, but participatory planning can ensure that the right sanitation solution is found: end-users should be presented with all feasible options and given the chance to choose what best fits their needs and environment. Demonstration units enable end-users to test options in real-world settings.

Participation aids local acceptance

Planning sanitation improvements in a participatory way means considering all points of view before making a decision, such as the differing needs of women and men or religious groups.

"Enabling environments" are crucial

Identifying and fostering favourable external conditions – or "enabling environments" – are key to improving sanitation. Supportive laws, political and financial resources, and professional capacity are indispensable to the planning and implementation of effective sanitation systems. Yet even if the enabling environment is less than ideal, sanitation improvements may still be possible. Launching bottom-up planning processes may trigger a gradual shift in external conditions, producing a more favourable environment.

Further reading

Lüthi C, Morel A, Tilley E, Ulrich L. 2011. *Community-Led Urban Environmental Sanitation Guidelines for Decision-Makers with 30 Tools.* Dübendorf, Switzerland: Eawag [Swiss Federal Institute of Aquatic Science and Technology]. www.sandec.ch

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Sherpa M, Lüthi C, Koottatep T. Submitted [2011]. Challenges of communicative environmental sanitation planning: A case study in Nepal. Manuscript available from Mingma Sherpa.

Tilley E, Lüthi C, Morel A, Zurbrügg C, Schertenleib R. 2008. *Compendium of Sanitation Systems and Technologies.* Dübendorf, Switzerland: Eawag [Swiss Federal Institute of Aquatic Science and Technology]. www.sandec.ch

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