

Delft, The Netherlands, 19-21 November 2008

IRC SYMPOSIUM : SANITATION FOR THE URBAN POOR
PARTNERSHIPS AND GOVERNANCE

Integrate at the Top, Involve at the Bottom - The Household-Centred Approach to Environmental Sanitation

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This paper presents initial experience with implementation of the Household-Centred Environmental Sanitation (HCES) approach, jointly developed by the WSSCC and the Eawag department Sandec (Water and Sanitation in Developing Countries). The presentation explores the theoretical foundations, the problems it seeks to address and practical experience with implementing the novel planning approach, presenting two case studies from Tanzania and Laos. HCES is a method which proposes to start the holistic planning process with household decisions on service needs, and then move outward from the household to the neighbourhood, town and upper levels of government. Thus, the link between community expression of needs and mobilization of resources to solve them is assured. The second part of the paper explores some of the innovative aspects of the planning approach, highlighting the urban sanitation options planning approach (informed systems approach) and its suitability for planning in unplanned urban contexts.

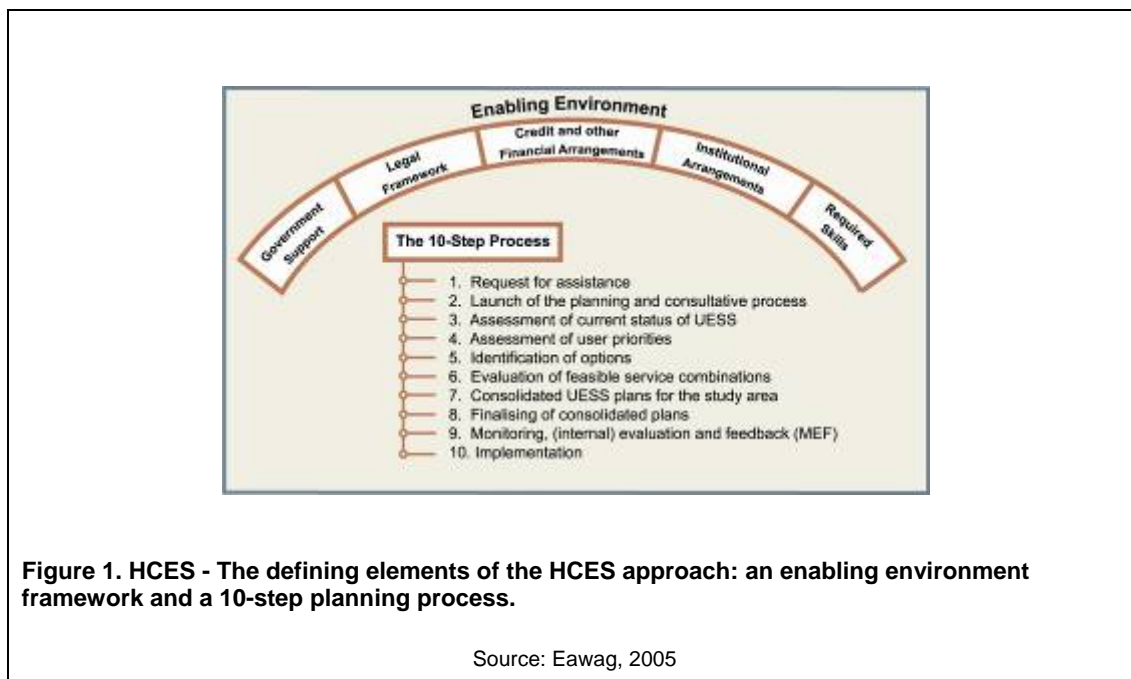
A Paradigm Change for Planning

In 2007 for the first time in the history of mankind the majority of the world's population will be urban. African and Asian cities in particular are growing at break-neck rates. Many, if not most of this new urban population will reside in mushrooming, unplanned and informal settlements or *favelas*, *bidonvilles*, *chawls* or *bustees* as they are popularly known. In these expansive urban and peri-urban settlements 'on-site sanitation' is the norm. Yet despite on-site, low-cost sanitation being the reality for the vast majority of the developing world's urban population, much of the focus for policymakers is still on network sewerage and top-down centralised systems designed and implemented without consultation with, and the participation of stakeholders and beneficiaries.

The Household-Centred Environmental Sanitation (HCES) approach was consequently developed by the Environmental Sanitation Working Group of the Water Supply and Sanitation Collaborative Council (WSSCC). Preliminary guidelines were published in 2005 targeting public officials and decision-makers and sector specialists (Eawag, 2005). The overall goal of the HCES approach is to contribute to the achievement of the MDGs by promoting sanitation that is sustainable and reaches the poorest communities in urban and peri-urban settings.

The HCES approach follows an integrated approach where safe water supply, environmental sanitation and hygiene promotion are addressed simultaneously. HCES places the household and neighborhood at the core of the planning and implementation process. Decisions on determining the type of environmental sanitation

services to be implemented is heavily based on the actual *needs* and *means* of the users and is done in close consultation with all stakeholders. Rather than suggesting and/or promoting one specific solution or technology, the HCES approach suggests a holistic planning process whose key participants are the beneficiaries, including those at the household level, especially women, who make the basic decisions on personal hygiene and environmental services. Local government and government agencies respond to the needs by creating an environment which enables the successful implementation of the services identified as the most adequate during the participatory planning process. A further feature is the environmental sustainability concept based on circular resource management systems, where environmental sanitation problems are addressed as close as possible to their source and an emphasis is placed on resource conservation and waste reduction.



Testing the HCES Planning Approach

In the past year, six testing sites were selected and the process initiated: one site in Costa Rica, Central America one in Burkina Faso, West Africa, two in East Africa (Kenya and Tanzania) and two in Asia (Laos and Nepal). The selected sites in Latin America, Africa and Asia are all situated in two typical urban settings of the developing world:

1. Unplanned informal settlements or slums (inner-city or near centre of town)

These overcrowded, informal, low-income urban communities usually house over half a city's population in Africa and South Asia. They are characterized by low water consumption (20 - 40 litres per capita per day) and usually a wastewater volume of up to 40 litres per capita per day (usually higher in South-East Asia). Housing is of poor structural quality and population densities can go well beyond 500 persons per hectare.

2. Peri-urban city fringe settlements (previous agricultural or barren land)

These settlements are less dense (<200p./ha) but are also characterized by insecure residential status, inadequate access to safe water and sanitation infrastructure and poor quality habitats. On-site sanitation is the norm with frequent problems associated with contaminated shallow wells and non-regulated faecal sludge management.

Planning with, not for the Community

Not unlike the community-led total sanitation approach in rural settings (Kar and Chambers 2008), HCES stresses the importance of people's capacity, skills and local knowledge. A one-day interactive community

workshop ensures that the communities' views and knowledge is recognised and forms a valuable input to the assessment report that follows in the third planning step. This launching event ensures that the whole community is actively involved in project planning, implementation and monitoring from the beginning. At the end of the launching workshop an Environmental Sanitation Task Force or HCES Development Committee is formed, comprising all major stakeholders involved in championing the process.

Successful implementation of the HCES approach requires the dissemination of information on affordable and sustainable sanitation options to those responsible for improving environmental services, such as municipal officials, urban planners, and community representatives or chiefs. To fulfil their new roles, process stakeholders need to be provided with information and assistance so their capacity to make decisions, implement and manage services grows.

Identifying sanitation options and evaluating service combinations

Usually when talking about 'sanitation' one speaks *not* of sanitation, but rather of a single technology, or an instrument, that is designed to treat wastewater. Septic tanks, pit latrines, and composting toilets, among others, are often referred to as sanitation systems. What these are in fact, are technologies; technologies are merely single parts of a sanitation system. However, too often a technology (under the guise of being a sanitation solution) is implemented, only to realize later that there has been no provision made for the treated effluent (which is soon diverted into open drains), the faecal sludge (which, in the absence of a collection site, is soon being dumped in open fields), or other various sidestreams that may emerge. So while the technology itself may work, the system as a whole may actually be a failure.

Sandec has developed a Compendium of Sanitation Systems and Technologies (Tilley *et al*, 2008) to facilitate a more transparent, participatory approach to Step 5 of the HCES approach. Classically, sanitation systems have been viewed as 'packages', or groupings of components that work together to move and treat wastewater; a flush toilet, combined sewers, and an activated sludge treatment plant is a common 'package' system in most western cities. In the developing world the common sanitation package is a pit latrine which is pumped out by vacuum trucks and the sludge is left to settle in ponds. These systems, though effective in some situations are too often applied as 'fix-all' solutions even in areas for which they are entirely inappropriate.

When systems are designed as groupings of technologies, there is no room for flexibility or adaptation to local customs and needs. By viewing each aspect of the system as an individual component and selecting specific components based on its appropriateness to the geography, culture, economics and wants of the community, a more robust, efficient, and therefore well-managed system can be developed.

The Compendium is broken into five sections: User Interface, On-site Storage, Conveyance, Treatment, and Residual and Resource Recovery. Within each section, a variety of options exist; users select one option from each section to build an entire system. For most professionals who receive training in only the most standard technologies, the Compendium provides an overview of the full range of options that are available. The Compendium will thus allow all stakeholders to participate in the selection process and make informed decisions. Although the options presented are appropriate for ecosan solutions, and decentralized-type systems, a spectrum of options (including options like low-cost or condominium sewers) are also included to present a fair, unbiased list of options from which users can choose. The two following case studies examine how the final choice of sanitation options has been conducted in two different locations in Tanzania and Laos.

Tanzania case study: Chang'ombe Settlement, Dodoma, Tanzania

Context: peri-urban

Surface area: 165 ha

Population size & density: 35'000 (212 p/ha)

Climate: Dry, low rainfall: 570mm/a

Chang'ombe is a low-income, unplanned settlement on the northern fringe of Dodoma, the entire settlement has recently been regularized providing security of tenure for the 35'000 inhabitants by the Capital Development Authority (CDA). Together with the local partner NGO 'Mamado' (Maji na Maendeleo

Dodoma), Eawag-Sandec is currently implementing the household-centred approach and aims to prepare an urban environmental sanitation service plan (UESS) for the Chang'ombe area by the end of 2008. The multi-stakeholder process involves the town's service utility, the local authority, NGOs as well as neighborhood committees concerned with water and sanitation.

The household-centred approach kicked off in October 2007 with a launching workshop (*HCES Step 2*) involving all segments of the community, including women's groups, teachers, religious leaders, youth representatives and elected ward committee members. At this workshop the main foundations for the one-year planning process were laid. A HCES steering group was elected and a stakeholder assessment and prioritization (key stakeholders and secondary stakeholders) was conducted.

Step 3 involved the production of an assessment report on environmental sanitation in Chang'ombe, including issues of institutional responsibilities, community hygiene behaviour and attitudes as well as an analysis of current infrastructural deficits in the study area. The final outcome of Step 3 was the "Chang'ombe Status Assessment Report", published in February 2008.

Assessment of User Priorities (HCES Step 4)

This includes an investigation of the community's needs and development priorities. This was done using a questionnaire with 8 questions. Because of the large area, the workshop participants broke into four groups according to geographical area and ranked a long-list of problem areas and were asked to prioritize these. The three top priorities were identified as (i) poor roads, (ii) irregular water supply and (iii) sanitation (poor state of latrines). The first priority reflects the poor state of Chang'ombe's roads, most of them dirt tracks which become water-logged during the rainy season. Water supply was ranked second due to the low overall availability and lack of community domestic points (CDP) or water kiosks. Many families thus tend to fetch their water from unsafe sources such as traditional open dug wells. The third priority reflects the poor state of household sanitation - almost 90% of the residents use simple latrines which often collapse during the rainy season, contaminating the entire neighbourhood.

Since the Capital Development Authority (CDA) of Dodoma is currently preparing a road construction project in Chang'ombe, the HCES approach deals only with the prioritized problem areas of environmental sanitation.

Identifying and Assessing Options (HCES Step 5)

Potentially the most important step in the entire HCES 10-step process is the assessment of viable and implementable environmental sanitation options. This step includes the assessment of institutional, technological and financial options. In the case of Dodoma this was done in two steps:

- An **experts workshop** involving sector experts from public sector (municipal council, health department, utility and service provider, ward leaders) and NGOs (local and international);
- A **community sanitation options workshop**, open to all Chang'ombe residents (attended by 70 participants) and involving all relevant ward-level representatives like Education Committee, Environment Committee, etc. (see images below).



Image 1. HCES Community Options Workshop in Dodoma



Image 2. HCES Community Options Workshop in Dodoma

The planning approach adopted for this Step 5 options workshop follows a new participatory planning format that discusses different system options and technologies in a multi-stakeholder format. After the experts workshop narrows down the system options to two (Single Pit System and Waterless System with Urine Diversion) the different technology options are explained and analysed by community workshop participants. In the case of Chang'ombe the final selection included a menu of 3 possible on-site technology options at household level which are appropriate for the water-scarce environment found in Dodoma and accepted by the Community:

- **Ventilated improved pit latrines**- lined pits (with bricks) and with a ventilation pipe;
- **Ecosan dehydration vaults** - a dry toilet which separates urine from the faeces;
- **Fossa alterna** - a waterless double-pit technology which is the cheapest option (< USD 100.-)

Of the three, only the VIP requires secondary treatment and/or appropriate discharge. Both other options have lower maintenance costs and provide opportunities for peri-urban agricultural activities (eco-humus, compost, etc) prevalent in the Chang'ombe neighbourhood.

In a further step, these three pilot sanitation facilities were recently built to test user acceptance before moving to wide-scale replication for the entire neighbourhood. The pilot facilities allowed the project to assess the accurate costs and quality of construction by the local masons and to suggest further improvements and adaptations to bring down the costs before up-scaling. The pilot facilities built at public venues like ward offices or schools allow service users to test and enjoy 'user interface' sanitation facilities that are novel and quite different to use.

Social marketing and mobilizing funding

The HCES project is now addressing two key issues for implementing the environmental sanitation plans for Chang'ombe:

- social marketing for creating demand at the household level;
- mobilizing funds for wide-scale implementation by utilizing a system of revolving funds;

Full scale implementation of the 12 month planning process is expected to begin in early 2009 once seed money has been secured.

Laos case study: Hatsady Tai, Vientiane

Context: urban

Surface area: 6 ha

Population size & density: 890 inhabitants (148p/ha)

Climate: tropical monsoon, high rainfall: 1700mm/a (May to September)

Context

The overarching development goal of the Government of Laos is to rise above least developed countries status by the year 2020 (MPI, 2006). Increased access to adequate urban environmental sanitation services (UESS) is recognised as an important element of socio-economic development, and is highlighted as a priority intervention in the government's Sixth Five-year Socioeconomic Plan 2006-2010 (SFSP). The Prime Ministerial Decree 14 (2000) provides for a decentralised planning system, delegating planning and implementation responsibilities to the district and village level, respectively, and promoting community participation in the development process. However, a number of factors hamper the effective implementation of the decentralisation policy, including the lack of supportive planning guidance. In practice, participatory planning has usually not been successfully applied in sub-district planning. The HCES planning approach is seen as a promising tool by national and provincial authorities to overcome some of the hindering factors.

HCES project location, institutional setup

A HCES project was launched in an urban village ("ban") of Vientiane in 2007. The project is coordinated by the Public Works and Transport Institute (PTI), under the Ministry of Public Works and Transport (MPWT). Ban Hatsady Tai was selected as project site following an official request for assistance submitted by the village authorities to PTI (*HCES Step 1*). Project site, project coordination committee and planning methodology (i.e. the HCES planning process) were discussed and approved by all relevant stakeholders at a project launching workshop conducted in February 2007 (*HCES Step 2*).

The project is managed by a newly formed HCES Development Committee (HDC), chaired by PTI. Other members of the Committee include the head of the village (*Naiban*) and the Village Environmental Unit (VEU). The VEU was created during *Step 4* of the HCES planning process. It consists of 12 members, including community members and representatives of the different mass organisations on village level (Lao People's Revolutionary Party, Lao Women Union, Lao Elderly Association, Lao Youth Organisation). The HDC is assisted by governmental and private organisations on a mandate basis in the various phases of the project cycle. For example, the coordination of the people-centred solid waste management component was handed over to the Water Resources and Environment Administration of Vientiane (*VT-WREA*). The HDC is supported by Eawag-Sandec and the Asian Institute of Technology (AIT).

Existing UESS in Hatsady Tai

Ban Hatsady Tai is an urban village (“*ban*”) located in the centre of Vientiane. The village counts 180 households (889 inhabitants). Most low-income households are grouped in the congested centre of the village, where environmental sanitation services are least developed. This centre (counting 72 households) was delimited as the project area by the local authorities and the community (*HCES Step 3*).

UESS in the project area are very poor. The UESS assessment (*HCES Step 3*) revealed that (i) most households (90%) rely on old and defective cesspits for wastewater disposal; (ii) as there is no sewer system, greywater and effluent from cesspits and septic tanks are discharged into the rudimentary drainage system (open earth channels); (iii) the project area is regularly flooded due to inadequate stormwater drainage; (iv) solid waste dumping and burning within the project boundaries is still a common practice.

The improvement of UESS was defined by the community as the main development issue in the village, with stormwater drainage, wastewater management and solid waste management set as first, second and third priority, respectively (*HCES Step 4*).

Definition of options to improve UESS

The determination of possible options to improve current UESS in Hatsady Tai (*HCES Step 5*) was conducted in a series of steps (Figure 2). The UESS assessment report (outcome of *HCES Step 3*), the priorities defined by the community (outcome of *HCES Step 4*) and a draft version of the Compendium of Sanitation Systems and Technologies (Tilley et al, 2008) were used as entry point.

The applicability of different sanitation systems was first assessed by a group of national and international experts. The main factors which influenced the pre-selection include: (i) people traditionally use water for flushing and anal cleansing, (ii) reuse of human waste (including urine) is culturally not yet accepted in Lao PDR, (iii) the housing density is very high, (iv) soil infiltration capacity is low and hinders local infiltration of wastewater.

Three systems pre-selected by the expert group were then adapted to the local context (translated and simplified system templates) and discussed with the VEU and the Naiban (Images 3 and 4).



Image 3. System templates adapted to Laotian context



Image 4. Vientiane options workshop

The HDC concluded that a combination of 2 sanitation systems was most adapted to efficiently manage the main sanitation products (stormwater, blackwater, greywater), building on the existing sanitation services. The adapted system consists of rehabilitating and retrofitting existing cesspits to sedimentation chambers for black- and greywater pre-treatment, connecting these chambers to a solids-free shallow-depth sewer system with semi-centralised anaerobic treatment systems. The effluent of these systems is discharged together with effluent from existing household septic tanks to an improved stormwater drainage network, which connects to the city drainage network. Faecal sludge management is handed over to private service providers. Subsequently (*HCES Step 6*), first plans of the UESS were drafted by the environmental sanitation experts of the HDC. The plans included possible layout of the system (i.e. placement of drainage channels, sewer and semi-centralised treatment systems, technological options for drainage and wastewater treatment), cost estimations and O&M requirements for each component. The drafted plans were presented and discussed at a community consultation workshop.

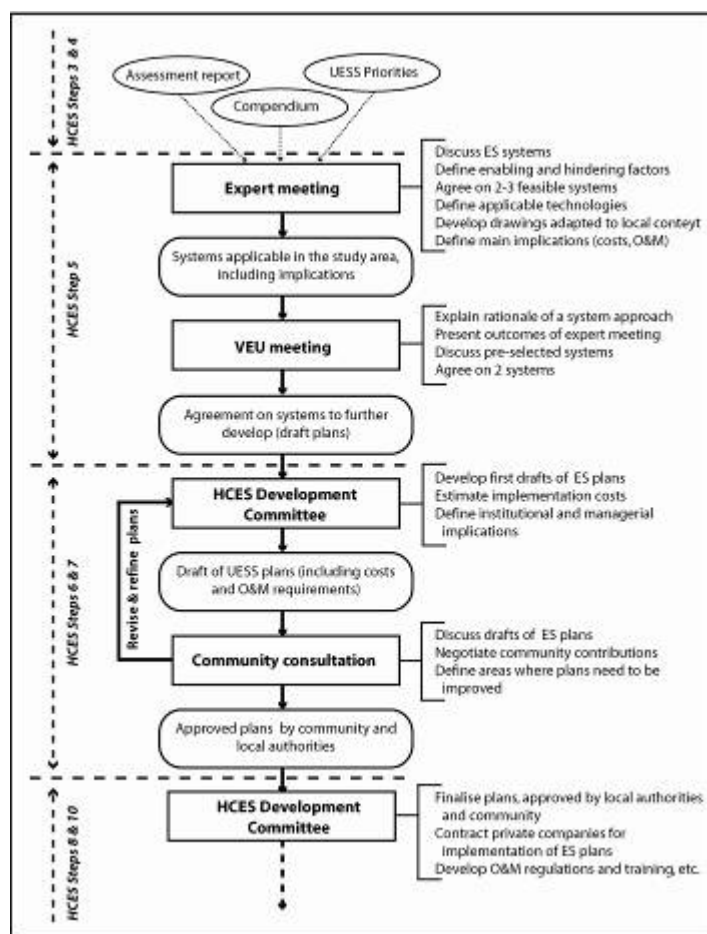


Figure 2. Processes, activities and outcomes of Step 5-7 of the HCES planning process in Vientiane, Laos

Source: Eawag-Sandec

While the basic sanitation concept and its implications (Table 1, below) were approved by the participants, a series of recommendations and requests were formulated (e.g. revision of the topographic map, cost estimation for household infrastructure upgrading).

Table 1: Implications of the project for beneficiaries and local authorities

Main implications for the beneficiaries			
Cover investments at household level (retrofitting of cesspits, connection to sewer system).			(✓)
Retrofit some buildings which hinder implementation of UESS.			✓
Provide land for implementation of drainage and semi-centralised wastewater treatment.			✓
Contribute (in kind, labour or cash) to implementation and O&M of UESS.			(✓)
Main implications for the local authorities			
Create instruments to support low-income households in mobilizing funds for household infrastructure improvements.			(✓)
Adapt institutional setup and implement regulations to guarantee sustainable management of UESS (financial management, O&M).			✓
Negotiate with higher level authorities the connection to city services (drainage, maintenance of wastewater treatment systems etc.).			✓
Assure that community contributes to implementation and O&M of UESS.			(✓)
Financial implications (cost estimation)			
	Planning (USD per beneficiary)	Implementation (USD per beneficiary)	O&M (per month) (USD per beneficiary)
Covered by project	50	150	0
Covered by beneficiaries	5	30	0.6
Total	55	170	0.6

Note: ✓ = approved; (✓) = basically approved, but implementation not yet defined.

The project is currently in its iterative stage (HCES Step 7), where plans are gradually adapted and refined following the agreements reached amongst the community, the PCC and city authorities. Approval of the detailed plan is expected in October 2008; implementation is expected to be finalised in March 2009.

Conclusion: critical assessment of the HCES planning approach

The new multi-stakeholder planning format developed in Step 5 “Identification of Options” which we named “Informed Systems Approach” uses the Compendium as a planning tool for informed decision making. This approach has so far been tested in three different contexts in Nairobi, Dodoma and Vientiane. The novel approach is seen as a useful planning method which encourages demand responsive solutions instead of expert, over-engineered and supply-driven solutions. Too much of current sanitation planning starts at the city level and never reaches the end-users or households that are supposedly at the centre of national and local government efforts.

The informed systems approach avoids the pitfalls of a decision-making process where one factor or one perspective ends up driving a program which has wide-ranging effects on behaviour, costs and maintenance - key factors which led to the failure of so many projects and programs in the past. The options planning tools still need to be further developed and adapted to local circumstances to make it a useful tool for the huge variety of specific contexts in the urban sphere (dense slum or suburban/peri-urban, wet or dry contexts, informal or formalized tenure, etc). Our next steps will therefore be the further development of these tools to facilitate community choice for affordable and adapted sanitation solutions.

Institutionalizing better planning processes

The HCES pilot projects have clearly demonstrated the importance of involving all key stakeholders (including governmental agencies, NGOs, the private sector and the beneficiaries) from the very beginning to ensure institutionally anchored solutions. A key factor influencing success of the pilot projects and the potential to translate these experiences into planning policies relates to the project lead and ownership:

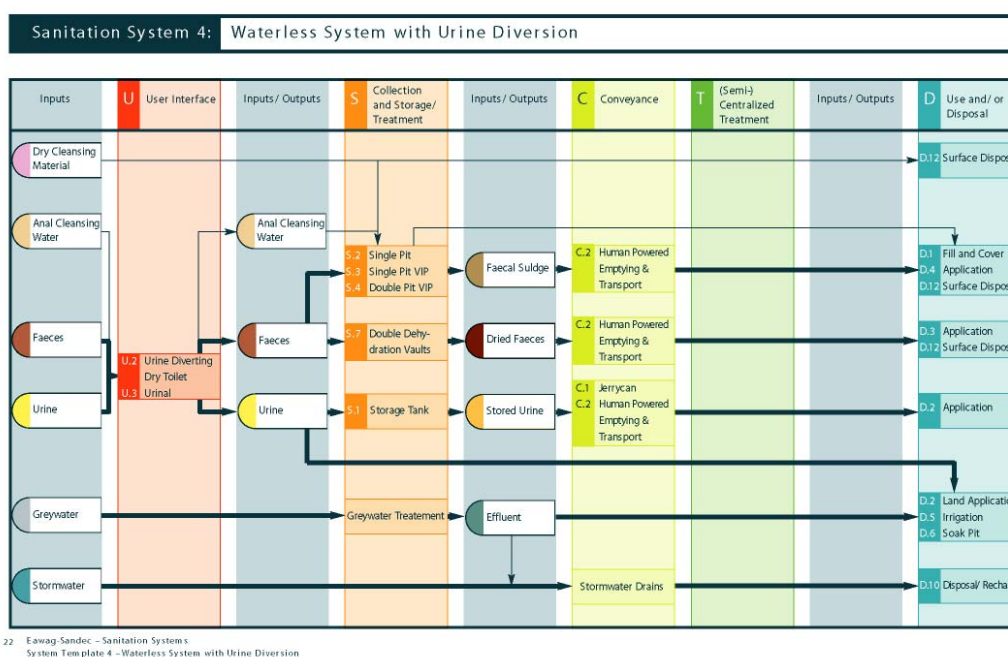
In Lao PDR, the HCES project responds in part to a government call for a standardised participatory planning methodology. The HCES planning process is led by a national governmental agency, and as such has the potential to directly impact planning policies in case of success. The limitation of working with governmental agencies is their basic reluctance to deviate from the conventional way of doing things (i.e. stick to conventional planning methodologies and sanitation technologies), and to overcome the top-down decision-making processes which still pervade. Beneficiaries are consulted in short meetings instead of

being fully involved in the solution-finding process, resulting in “shopping lists” which are difficult to implement. There is a clear need to further develop the capacity-development and facilitation dimensions of the household-centred approach, enabling to move from rhetoric to a systematic process of participatory planning and management of UESS.

On the other hand, in Tanzania, a country with a thriving non-governmental sector, it has been shown that NGO initiatives are more successful as they are responsive to local demands and more accountable to beneficiaries. They also show a greater degree of flexibility in terms of design through technology innovations and alternative management arrangements (e.g. social marketing, adopting participative planning tools, etc).

Demand responsive approaches are slow

Demand responsive approaches like HCES are perceived as slow and too complex and time-consuming to deliver for many national and local authorities. While it is true that a 12 month multi-stakeholder planning process can be a cumbersome affair for a community or municipal authority who would like to see quick results, there are no shortcuts to a sound, demand-led planning process which attains real ownership. The one-year process also had positive effects, as it enabled a reluctant stakeholder like the autonomous urban water and sewerage authority DUWASA to rethink its approach to service delivery for poor and unplanned neighborhoods in Dodoma. In our view, the investment in time and human resources is justified because the HCES approach has proven to be a successful planning methodology that can overcome the ‘fragmented government responsibilities, and the daunting cost of conventional sewerage’ (Eales, 2008) which makes sustainable sanitation in unplanned urban areas so hard to accomplish.



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System Template 4 - Waterless System with Urine Diversion

Figure 3. Compendium system template showing the system options for a waterless, urine-diverting system

Source: Tilley, Lüthi, Morel *et al* (2008)

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Keywords

household-centred sanitation, environmental sanitation, urban infrastructure, technology choice

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