sustainable sanitation alliance

SuSanA factsheet

Planning of sustainable sanitation for cities

April 2012

1 Summary

This factsheet deals with the planning of sustainable sanitation for urban and peri-urban areas of developing countries and its importance for achieving comprehensive and inclusive sanitation coverage in cities.

The key messages of this factsheet are:

- Top-down, supply-driven planning continues to dominate much of sectoral planning in the developing world. The resulting capital-intensive solutions tend to be costly, energy-intensive and inflexible, and often fail to reach large proportions of the urban poor.
- Experience has shown that importing sanitation planning models from industrialised countries and implementing centralised "one-size-fits-all" solutions is in many cases inappropriate and not sustainable in developing countries. Thus, planning approaches must be adapted to better allow for the planning and implementation of context-specific sanitation systems.
- Recent innovations in sanitation planning include a more integrated planning approach; a greater emphasis on the actual needs and financial capacity of the users, encompassing close consultation with all stakeholders[1] and a systems approach to sanitation, integrating all domains of the city.
- There is a lack of integration between the various components of environmental sanitation[2] – excreta, domestic and industrial wastewater, solid waste and storm water are managed in separate systems, which are often run by different agencies or institutions. Better use of generated synergies through integrated approaches could lead to more sustainable and cost-effective solutions.
- Political economy issues: improving sanitation coverage especially for the urban poor means tackling vested interests and corrupt practices of regulatory authorities, the private sector and politicians. Planning must openly deal with these issues and seek to increase incentives for anti-corrupt behaviours and to achieve greater transparency at community and city levels.
- Local authorities, utilities and donors have to be convinced that commitment and effective participation from all stakeholders are needed to achieve adequate and inclusive sanitation services.

This factsheet elaborates on the shortcomings of supply-driven planning and presents three demand-led approaches which recognise that stakeholder involvement is a prerequisite to effective planning. Based on past experiences we propose guiding principles for better sanitation planning in cities of developing countries.

2 Introduction

The United Nation's International Year of Sanitation 2008 highlighted the need for an enormous increase in the number and use of sanitation facilities in order to meet the MDG target on basic sanitation (to halve, by 2015, the proportion of the population without sustainable access to basic sanitation). Although 1.3 billion people gained access to improved sanitation between 1990 and 2008, the world is still likely to miss the MDG target by one billion people. And even if the target was achieved, 1.7 billion would still remain unserved (WHO/UNICEF, 2010).

Figure 1: An unplanned urban area with iron sheet and mud houses in Mathare (Nairobi, Kenya) (source: L. Kraft, 2010).

One of the reasons why the world is not on track to meet the MDG sanitation target is that service provision cannot keep up with the unprecedented growth in urban populations and the increasing socio-economic disparities. While the number of people practicing open defecation declined in rural areas between 1990 and 2008, it increased in urban areas, with the poorest segment of the population being much more likely to practice open defecation than the wealthiest (WHO/UNICEF, 2010).

[1] Stakeholders in the sanitation sector are households, local and national authorities, community-based organisations, community leaders, utilities, private service providers, NGOs and farmers.

[2] Environmental sanitation includes sanitation, stormwater drainage and solid waste management. Water supply is also addressed in so far as it impacts on the above environmental sanitation services.

The daunting task of improving global access to sanitation is complicated by the fact that conventional technologies such as pit latrines or sewer systems that discharge into local water bodies are often not environmentally and economically sustainable (SuSanA, 2008).

To address these tremendous challenges, improved approaches for planning and implementation of sanitation infrastructure and services are urgently needed.

Planning in its most general sense is about decision making and can be defined as *"a process of making choices among the options that appear open for the future and then securing their implementation"* (Roberts, 1974).

Ever since the beginning of urban civilisation 5000 years ago, humans have to some extent been planning urban environments and their corresponding services and infrastructure. Since the 19th century, urbanism and urban planning have developed into a field of knowledge and practice whereby the city is viewed as an object for study, intervention and control.

The full range of urban sanitation problems is not discussed here, as this is the focus of the thematic paper "Sustainable Sanitation for Cities" (Panesar et al., 2008).

3 Shortcomings of conventional planning approaches

The principles of planning that continue to dominate the thinking of urban and infrastructure planners and political decision-makers in the South are based on the concept of "manageable towns". Today, however, large parts of cities in developing countries are completely neglected by mainstream planning. The majority of urban populations live in informal, unplanned settlements which are often considered illegal or unauthorised and only tolerated at best. The combination of the pace and scale of urban population growth in developing countries is undermining the efforts of city and municipal administrations to plan and guide urban development.

Current practices of town planning tend to be dominated by top-down, technocratic approaches which are excessively restrictive, divorced from reality and oblivious to the present and future needs of poor citizens. This type of planning is adopted in the so-called Master Plan[3] or Comprehensive Development Plan approach. Experiences from the last few decades have shown that the implementation of master plans rarely keeps pace with the development of new areas. The practice of planning lags behind what happens on the ground: first, there is occupancy or squatting; second, construction; third, "informal" planning of basic infrastructure; and fourth, normative regularisation.

There are other problems with a top-down, technocratic planning practice:

- It is often dominated by vested interests, powerful elites and influential figures at national and local level that tend to promote expensive "supply-driven" approaches (see following section). Little attempt is made to include the views of all stakeholders, particularly the users, when large schemes and new neighbourhoods are planned and implemented.
- A major disadvantage of master plans is their inflexibility in form and content. This inflexibility stems from the burdensome procedure to produce and later amend the official plans. If a plan requires modification after formal adoption, councils must repeat all of the procedures required prior to adoption.
- The restrictive nature of city master plans is also problematic. Current urban planning departments are heavily biased towards development control, covering only a fraction of the built city.
- The majority of national legislation and regulations tend to favour planning of centralised sewer-based solutions – neglecting household interests and their ability to pay for these systems. Centralised sewer-based solutions carry with them a technology lock-in, have high capital, operation and maintenance costs, and need a reliable supply of energy to run. Often, the process lacks consideration of other decentralised solutions that could prove to be more economical and environmentally viable options.
- The lack of a holistic approach in establishing a service delivery chain from collection to reuse and disposal often leads to dysfunctional decentralised solutions.

Supply-driven planning

The traditional planning approach to urban sanitation infrastructure has been one in which planners and engineers assess the needs of a given area, and then decide what type of service will be provided (supply-driven approach). A common failure of planning and implementation in the past, was the failure to take into account the needs and conditions of the users of the sanitation facilities as well as of other important stakeholders (land owners, financial institutions, users of wastewater or other products generated from sanitation systems).

Government and donor agencies generally continue to rely on supply-driven approaches that have distinct drawbacks (Wright, 1997):

- The main beneficiaries are the richer neighbourhoods that can afford higher levels of services (sewers, septic tanks, household water connections, etc.) which are often also subsidised. Poorer neighbourhoods tend to be excluded for both cost and technical reasons.
- Investment and operation and maintenance (O&M) costs are often not recovered, with the result being that neither proper O&M nor service extensions are possible.
- Due to the costs of these capital-intensive solutions being so high, public investment to improve sanitation coverage also in poor urban areas is typically not available.
- If solutions are sought for low-income neighbourhoods, they tend to be "one-size-fits-all" solutions, with little consideration of the negative effects such as possible environmental pollution.

[3] A master plan is a comprehensive long-term strategy with detailed guidance and instructions in achieving its set goals.

- The high initial cost of such large-scale projects restricts competition as only large companies have the resources to tender for such construction contracts, hence smaller and medium-size local contractors are excluded.

An example of supply-driven sanitation is the Centrally Sponsored Rural Sanitation Programme (CRSP) which was launched in 1985 in India to improve sanitation coverage in rural areas. The approach adopted by the Government of India was to provide free or heavily subsidised services in the form of twin-pit pour-flush toilets. The only potential customers were upper-income land owners living in large permanent dwellings and a few influential local figures who had these toilets built for themselves at the state's expense (Black and Fawcett, 2008). Fortunately, the Indian Government has drawn lessons from failed programmes like these and is now supporting more demand-led initiatives such as the Total Sanitation Campaign (WSP, 2010).

Unfortunately, most infrastructure planning and service delivery to date continues to be supply-driven with a high degree of centralised control, little local accountability and little involvement of the end users. Gradually utilities and service providers are "waking up" to the fact that "more of the same" will not suffice. In the past decade, several new multi-stakeholder and partnership approaches have been developed and tested. These will be focussed on in the following section.

4 Innovations in sanitation planning

There are three important approaches to sanitation planning for urban and peri-urban areas of developing countries which recognise that stakeholder involvement is a prerequisite to effective planning, and seek to overcome the shortcomings of top-down and supply-driven approaches:

- The Strategic Sanitation Approach (Wright, 1997)
- Community-Led Urban Environmental Sanitation Planning: CLUES (Lüthi et al*.,* 2011a)
- Sanitation 21 (Parkinson and Saywell, 2011)

Example 1: The Strategic Sanitation Approach (SSA)

Strategic planning is an integrated, comprehensive approach that emphasises not only the technical and economic aspects, but also the challenges of institutional capacity and public participation. Central to the approach is the comprehensive systems analysis of the strategic options selected. The strategic planning process differs from sectoral planning in its global approach and from the classical master planning approach, in its methodology and its orientation – it is more flexible and responsive, less static and not overly complex.

The Strategic Sanitation Approach (SSA) was developed in the 1990s by the UNDP-World Bank "Water and Sanitation Programme" (WSP) and tested in two pilot towns in Kumasi, Ghana and Ouagadougou, Burkina Faso (Saidi-Sharouze and Botte, 1994). The most comprehensive review of the SSA was published by Wright (1997).

Central to SSA are the twin principles of demand and the attention paid to incentives. The former is seen first and foremost in economic terms and strongly linked to the concept of willingness to pay. This has raised a debate on the appropriateness of limiting demand to economic aspects only. While urban poor residents may indicate a high willingness to pay for services such as water and electricity, they may indicate a low willingness to pay for other services such as sanitation or drainage which have important impacts on environment and health (Cotton and Tayler, 2000). Demand is a multi-faceted issue which must also include cultural norms, individual behavioural aspects as well as economic aspects (ability to pay and financing mechanisms).

Preconditions for adopting a strategic sanitation planning approach include the formulation of demand-based policy (as opposed to supply-driven approaches described above) and the development of an institutional framework to provide the right incentive structure. Programme management is done by a "core group" of experts from the City Engineers Department, the Planning Department and selected short-term consultants.

Box 1: Kumasi Sanitation Project (1989-1994)

The Kumasi Sanitation Project in Ghana applied SSA to develop a flexible strategy for urban sanitation in Kumasi, a city of 770,000 inhabitants in which 75% lacked adequate sanitation services. A demand-oriented approach was adopted that differed from previous agency-led initiatives by:

- tailoring recommendations on technical options to each type of housing in the city;
- considering user preferences and willingness to pay;
- using a short term planning horizon (10-15 years);
- emphasising actions that can be taken now;
- breaking the strategic plan into projects that can be implemented separately.

The project partners were the Kumasi Metropolitan Assembly (KMA), the UNDP-World Bank Regional Water & Sanitation Group for West Africa for technical assistance and the Kwame Nkrumah University of Science and Technology (KNUST). By the end of the 5 year pilot project, 160 KVIPs (with 240 individual units) serving a population of 4,000 in the low-income pilot areas were built and a simplified sewerage system cum septic tanks was built in the Asafo area serving around 20,000 persons.

Source: Saywell and Hunt (1999)

The UNDP and World Bank funded Strategic Sanitation Approach was a great step forward in adopting more realistic and appropriate sanitation planning strategies for cities of developing countries. There are however, three drawbacks worth mentioning:

- Despite the rather high amounts invested by the project (1 million US$ for Phase 1 during 1990-2000), coverage rates in Kumasi remained very low, due to the high construction cost and the amount of subsidy of the strongly promoted KVIP[4] (~200 US$); households did not have a choice of lower-cost options.

[4] KVIP stands for Kumasi Ventilated Improved Pit Latrine.

- The technical, planning and promotion approach followed was biased towards the technology choice rather than health or hygiene promotion.
- The SSA does not deal with all processes of the sanitation system and failed to plan for the wider aspects of faecal sludge management (transport, treatment, and disposal or reuse).

The SSA was also implemented in India, Pakistan, Thailand, Indonesia, Brazil and Burkina Faso[5]. Its effectiveness has been proven in Indonesia where the government intends to scale up the formulation of city strategies from 2010 onwards (Collin et al., 2009).

Example 2: Community-Led Urban Environmental Sanitation (CLUES)

CLUES is a demand-led approach for the planning and implementation of environmental sanitation infrastructure and services in deprived urban and peri-urban communities. It is a multi-sector and multi-actor approach which emphasises the participation of all stakeholders from an early stage. It places the community at the core of planning and implementation.

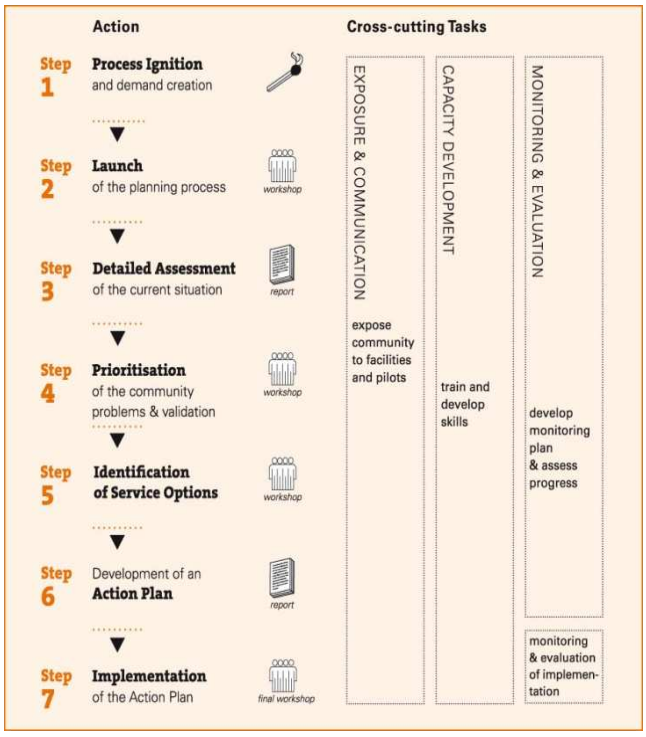

Figure 2: The seven steps of CLUES planning (source: EAWAG, 2011)

By involving all relevant stakeholders, particularly the targeted community, this approach attempts to consider the whole range of perspectives and expectations. This should help to find and implement, through common agreement, the best possible environmental sanitation solution.

CLUES is a further development of the Household-Centred Environmental Sanitation (HCES) planning approach (Eawag, 2005) with a revised and simplified set of planning guidelines, which is based on the Bellagio principles for sustainable sanitation (WSSCC, 2000). Intensive piloting and evaluation of the HCES approach took place between 2006 and 2010 in Africa, Asia and Latin America, in seven different urban and peri-urban sites (see Box 2).

Box 2: CLUES in Nala, Nepal (2009-2011)

CLUES was field-tested in Nala, a peri-urban setting in Nepal. The aim was to validate the planning approach, identify challenges and improve the process. The participatory multi-stakeholder process involved household mapping and surveys, user needs identification and prioritization as well as stakeholder analysis.

Following an experts' assessment of potential sanitation options, community sensitization campaigns took place through exposure visits, a sanitation bazaar (figure 3), and focused community interactions. Among the pre-selected sanitation alternatives the community members showed strong preference for a small-bore sewerage system with a decentralised wastewater treatment plant. An action plan which details the wastewater, stormwater and solid waste management concepts was developed. Health and hygiene upgrading as well as local capacity building were additional components of the plan. Implementation started in 2010, focusing on upgrading household sanitation facilities, constructing the sewer network and decentralised wastewater treatment system, and building local capacity.

Several experiences and lessons have been gained from this participatory, integrated environmental sanitation planning exercise in Nala. Setting the right balance between empowering people to take informed decisions and keeping the participation process intact until the final stage was a major challenge. Although participatory planning consumes time, it is worth investing as it builds local ownership and assists in informed decision-making processes for selecting affordable sanitation options that best meet the users' needs.

Source: Sherpa et al. (2012)

Figure 3: Sanitation bazaar as part of the CLUES process in Nala, Nepal (source: Sandec, 2009)

[5] IWA Water Wiki: http://iwawaterwiki.org/xwiki/bin/view/Articles/Strategic+Sanitation+Approach#HEvidenceofeffectiveness

There are three cross-cutting tasks which are relevant throughout the entire planning process.

1. *Awareness raising and communication* are key to creating demand and raising people's ability to make informed choices about the most appropriate solutions.
2. *Capacity development* aims to strengthen skills for process management and collaborative planning and skills like engineering, construction, operation and maintenance.
3. *Process monitoring and evaluation* allows one to identify and correct mistakes, imbalances or even to change the shape and direction of the project before it is too late.

In order for a CLUES process to be effective and successful, it has to be embedded in a so-called enabling environment. An enabling environment can be seen as the set of interrelated conditions that impact on the potential to bring about sustained and effective change (adapted from World Bank, 2003). The six elements that define an enabling environment (see Figure 4) need to be nurtured and pro-actively fostered to provide favourable conditions for planning in challenging urban environments.

Figure 4: The six elements of an enabling environment (source: EAWAG, 2011)

CLUES adopts a flexible and neutral approach with regard to technology choice, taking into account economic factors (ability and willingness to pay) and social benefits such as privacy, dignity and convenience. The approach combines expert knowledge at national and municipal level with local knowledge at community level. CLUES is primarily focused on solving sanitation problems in unserved (often informal) settlements and aims at deriving solutions requiring minimum external support and, at the same time, complementing citywide and strategic approaches such as Sanitation 21.

Example 3: Sanitation 21 – Simple approaches to complex sanitation

Sanitation 21 is a comprehensive approach for the assessment of planned or unplanned sanitation situations. However, unlike the previous example which provides detailed guidelines, this is a planning framework, and it does not provide in-depth guidance for planners and operators. The Sanitation 21 approach suggests that technical planners and designers have to develop more sophisticated planning systems that respond to the needs of rapidly growing cities. With regards to the human and political context, this will require a change in the manner of making technical decisions. Sanitation 21 draws on well-established principles of good planning and design practice from within the technical world and also from a lot of inputs by the developing world contexts (Parkinson and Saywell, 2011).

Box 3: The 9 planning steps of Sanitation 21

Part 1: Defining the context

1. Identify key actors at each level. Carefully assess the range of interest groups.
2. Identify interests of key groups - what do they want from a sanitation system?
3. Understand what external factors drive decisions at each level. Are they fixed or can/should they be changed?
4. Identify capacities at each level for implementation and long-term management of any system. Include interests, skills, resources, and time.

Part 2: Sanitation systems or options

5. Analysis of existing systems. Where there is an existing system, map this against the identified levels. Segregate the system to make it clear what elements exist and function at each level.
6. Identify in detail the management requirements for the systems segregated across each level. These requirements include skills, human resources, time, tools etc.

Part 3: Fit for Purpose

7. Does the proposed or existing system meet the objectives at each level? Does it provide the service households expect? Will it address environmental concerns at the city level?
8. Can the system be managed the way it needs to be managed at each level? If not, what are the alternative system arrangements (institutionally or technically) making it more likely for management to be carried out in the long term?
9. By taking all the previous steps and technical considerations into account, will (or does) the system work? If a number of workable options are thus identified, these (and only these) may be suitable for an economic and financial assessment to identify the long-term costs of the solution.

Source: Parkinson and Saywell (2011)

The Sanitation 21 planning framework includes three parts (see Box 3):

- Part 1: The Context – understanding the context and environment;
- Part 2: Technical Options – the sanitation system and its components;
- Part 3: Fit for Purpose – how well does the system fit with the context?

Sanitation 21 was conceived with the same vision as the community-led approach presented above. Similarities include the concept of dividing the city into different domains of intervention (household to city level), the system options analysis and the importance of analysing stakeholders'

interests or "drivers" at each level. Unlike the two previous approaches, Sanitation 21 has not yet been tested on the ground.

Sanitation 21 identifies eight generalised system typologies depending on the different flow streams. The systems range from on-site dry toilets with (semi-)centralised treatment to conventional waterborne sewerage with centralised treatment.

Sanitation 21 includes further planning innovations such as in Part 3 of the framework, where the likelihood of success at each level should be assessed. The "level approach" allows an assessment of the proposed or existing system across all urban levels. This can reveal why a system which appears to meet the city's objectives may not result in better services for households, or why a system selected by households may result in worsening the situation at "downstream" levels.

Whilst the Sanitation 21 planning framework is not a new planning approach, its principles are based on the intense prior planning work and it motivates a new mindset amongst technical planners and those responsible for urban sanitation. In particular, it seeks to open up debates and encourages the technical professional community to think beyond "business as usual" approaches, appealing to strong business arguments of efficiency and effectiveness in design as the way to bring about positive change.

Table 1 provides an overview of the features and strengths of each approach presented. The three examples illustrate that there is no "silver bullet" for planning for sustainable sanitation – each approach has advantages and disadvantages depending on context, available skills and capacity. Future research efforts must focus on how these approaches can be further improved, linked with each other, institutionalised and taken to scale.

Table 1: An overview of the main characteristics of the three sanitation planning approaches

	Strategic Sanitation Approach (SSA)	**Community-Led Urban Environmental Sanitation (CLUES)**	**Sanitation 21 – Simple approaches to complex sanitation**
Focal aspects	- socio-economic - technical - institutional set-up	- user involvement - enabling environment - action planning - environmental aspects	- socio-economic - technical - environmental aspects
Stakeholder involvement & methods used	- community consultation - core group of experts	- all stakeholders encouraged - to participate - include community in all planning steps	- focus on planners & experts - institutional mapping, understand the drivers at each level
Technology choice	- unbundle solutions by zone or neighbourhood - mostly disposal oriented	- open to all system options - solutions according to expressed needs & available resources - involvement of stakeholders, final choice by community	- open to all system options - integrated solutions across boundaries
Special features	- cost-recovery important - contingent valuation survey - willingness to pay	- waste diluted as little as possible integrated solutions: environmental sanitation - complementary to city-wide approaches	- holistic: from households to downstream domains - city-wide approach

5 Guiding principles for better sanitation planning

When planning for the complex realities of the one billion people currently living in informal urban settlements worldwide, some radical rethinking is required. This factsheet maps out the key issues that need to be addressed in order to achieve progress in replicating good practice and moving to scale. Some key issues and pointers for adopting successful planning approaches are summarised below.

a) Understand power relationships

Stakeholder assessment, institutional mapping and regulatory review tools of analysis are effective for analysing existing power relationships and vested interests in an urban context. Such an analysis must include formal and informal institutional arrangements, as well as public, private and civil society institutions. It should focus on groups and individuals whose interests are likely to diverge. Understanding the dynamics and the regulatory environment of an urban setting is a prerequisite for producing informed planning solutions. This means being aware of and trying to work against corrupt practices by promoting the greatest possible transparency of planning decisions.

b) Ensure effective participation

All of the above planning approaches underline the importance of stakeholder participation. It is of great importance to empower local people through raising their skills and capacities. The key issue here is information sharing from the outset of any project or programme.

There are three capacity components which should be developed for improving participation and action. These are (adapted from Goethert and Hamdi, 1997)[6]:

- **Individual capacity** (particular skills individual people in the community have)
- **Collective capacity** (a community's capacity to organise, mobilise and support collective actions)
- **Institutional capacity** (the institutional framework having an influence on communities and their longer-term sustainable development)

c) Build partnerships and reach consensus

Good partnerships and participatory programmes begin when actors come together to achieve a common goal based on agreed priorities. Of great importance is developing local champions at community and municipal level which can drive the process forward. Wherever possible, one should utilise participatory action planning methods to converge the interests of stakeholders and to pool resources, and effectively incorporate them in the project objectives. It should be noted however, that partnerships are not always easy and that it takes considerable effort and time to maintain them and to keep them going over time.

d) Aim for closed-loop solutions if appropriate

Waste should be considered as a resource and its reuse should be encouraged from the very start of any planning process. Examples for reuse or "productive sanitation" are greywater reuse, production of biogas, liquid fertiliser or soil conditioner, composting etc. (see also Gensch et al., 2012). These technologies may also be less energy intensive and have lower capital and operation costs than other end-of-pipe solutions which are purely disposal oriented. Testing of pilot technologies can be the first step in convincing users about safety, advantages and convenience.

e) Be realistic about the complexity of sanitation interventions

Lacking political will, unclear land ownership and tenure, as well as technical, financial and institutional challenges of providing affordable and manageable sanitation solutions for dense, informal settlements have been the main reasons for low coverage to date. To move forwards, initiatives should aim for the "unbundling of interventions": breaking the plan into projects that can be implemented separately and incrementally. There is a trade-off to be made between short-term "quick fix" solutions versus long-term sustainable infrastructure improvements.

f) Understand the drivers of sanitation

We should recognise that sanitation improvements have many drivers and sources of motivation – not only the existing sector institutions and their agendas, but also individual aspects such as customs and habits, context specific practices, social status, or the demand for reusable products such as fertiliser from sanitation systems. To bring urban sanitation coverage to scale, new innovative tools like social marketing, Urban Community-Led Total Sanitation[7] campaigns and public-private partnerships must be adopted and applied in a context-specific manner. This is discussed further in the SuSanA factsheet on public awareness and sanitation marketing.[8]

The concepts presented in this factsheet have formed the basis for a more extensive book entitled "Sustainable sanitation in cities: a framework for action" by the same authors which was published in 2011 (Lüthi *et al.*, 2011b).

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[6] For more on Capacity Development for Sustainable Sanitation, see Spuhler et al., (2012): www.susana.org/lang-en/library?view=ccbktypeitem&type=2&id=1229

[7] See Sijbesma, C. (2011) Sanitation financing models for the urban poor, see Chapter 5.2: www.irc.nl/home/information_services/publications/publications_by_date/sanitation_financing_models_for_the_urban_poor

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