

# Sanitation 21

## A Planning Framework for Improving City-wide Sanitation Services

September 2014



# About the publishers

**The International Water Association (IWA)** is an organisation that brings together people from across the water profession to deliver equitable and sustainable water solutions for our world. Together we aim to deliver practical solutions that are resilient and sustainable, meeting the urgent need for safe water, within and beyond urban areas. Through the Urban Sanitation Initiative, IWA aims to stimulate a widespread transformation in urban sanitation that enables reuse and resource recovery as well as promoting improved public and environmental health.

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## **IWA, Sandec-Eawag and GIZ are partners of the Sustainable Sanitation Alliance**

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# Authors and acknowledgements

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This new publication has benefited from the comments and contributions from members of the IWA Specialist Groups on ‘Sanitation and Water Management in Development Countries’ and ‘Resource Orientated Sanitation’, the SuSanA working group on Cities, and the GIZ Working Group on Water and Sanitation (part of the Transport, Environment, Energy, Water in Asia Regional sector network), as well as other GIZ colleagues.

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# Preface

Sanitation21 is an important component of the global sanitation toolkit, which presents a planning framework based on international best practices. Initially developed in 2006, this updated version builds on recent experiences where good planning has formed an integral part of achieving improvements in urban sanitation.

In the context of this document, planning is essentially about responding to real needs and making informed decisions about investments for sanitation improvements involving the prudent use of resources to meet recognized priorities. It helps to identify where investments are required, secure the necessary finances for implementation, and enable cost-recovery for long-term sustainability of sanitation services.

The document sets out key principles and process guidelines to help city stakeholders develop appropriate and affordable solutions to sanitation problems, taking into account technology issues, management arrangements, institutional challenges and demands for improvement from different stakeholders.

## **The framework is structured around the following five stages:**

- STAGE 1: Build institutional commitment and partnership for planning
- STAGE 2: Understand the existing context and define priorities
- STAGE 3: Develop systems for sanitation improvement
- STAGE 4: Develop models for service delivery
- STAGE 5: Prepare for implementation

Various key activities to support the planning process are presented within each stage. However, these activities should not be viewed as a blueprint to be adhered to exactly, because each situation will have distinct features specific to the local context. Sanitation21 acknowledges that there is no uniform, standardized planning procedure that can ensure sustainable planning outcomes in every city of the World. The framework, therefore, serves as a basic structure to guide the development of city sanitation plans, which are flexible enough to incorporate additional activities, or more detailed methodologies or planning tools depending on the specific requirements.

We and our partners at GIZ and Eawag-Sandec hope that you find this planning framework useful in your efforts to achieve complete coverage for urban sanitation.



**Glen T. Daigger** | President, IWA  
Ph.D., P.E., BCEE, NAE

# Table of Contents

<b>About the publishers</b> .....	<b>3</b>
<b>Authors and acknowledgements</b> .....	<b>4</b>
<b>Preface</b> .....	<b>5</b>
<b>I. Introduction</b> .....	<b>9</b>
Why is sanitation important? .....	<b>9</b>
Conventional responses to urban sanitation problems .....	<b>10</b>
Why a need for Sanitation21? .....	<b>10</b>
Who should read this document? .....	<b>11</b>
Purpose and relationship to the previous Sanitation21 document .....	<b>11</b>
<b>II. Principles of effective sanitation service delivery</b> .....	<b>12</b>
Respond to expectations for sanitation service improvement.....	<b>12</b>
Plan for inclusive and equitable sanitation services.....	<b>12</b>
Ensure services are affordable and financially viable.....	<b>12</b>
Integration with other municipal services.....	<b>13</b>
Focus on behavioural change.....	<b>13</b>
Engage with stakeholders.....	<b>13</b>
<b>III. Planning in context</b> .....	<b>14</b>
Local stakeholder interests and expectations.....	<b>14</b>
The political economy and the enabling environment.....	<b>15</b>
Taking into account activities and initiatives at the local level.....	<b>16</b>
Taking into consideration the diversity of cities.....	<b>16</b>
Planning within the context of available resources.....	<b>17</b>

<b>IV. Stages of the planning process</b> .....	<b>18</b>
<b>STAGE 1: Build institutional commitment and partnership for planning</b> .....	<b>19</b>
Establish planning process leader and city sanitation task force.....	<b>19</b>
Consultation and facilitation of the process.....	<b>20</b>
Assess key priorities and incentives.....	<b>20</b>
Define collective vision and priorities for improved sanitation.....	<b>21</b>
Agree upon the planning process.....	<b>21</b>
<b>STAGE 2: Understand the existing context and define priorities</b> .....	<b>21</b>
Collect and review information about existing services.....	<b>22</b>
Identify constraints to service provision.....	<b>24</b>
Undertake a sanitation market assessment.....	<b>24</b>
Identify priority areas for improvement.....	<b>25</b>
<b>STAGE 3: Develop systems for sanitation improvement</b> .....	<b>25</b>
Delineate zones for system development.....	<b>25</b>
Consider appropriate toilet facilities.....	<b>26</b>
Develop strategy for treatment, disposal or reuse.....	<b>26</b>
Collection and transportation of wastewater and faecal sludge.....	<b>27</b>
Consider operational and maintenance requirements.....	<b>27</b>
Assess costs of proposed improvement options.....	<b>27</b>
<b>STAGE 4: Develop models for service delivery</b> .....	<b>29</b>
Develop appropriate management arrangements.....	<b>29</b>
Derive cost-recovery mechanisms.....	<b>29</b>
Strengthen financing mechanisms.....	<b>30</b>
Develop arrangements for monitoring and regulation.....	<b>31</b>
<b>STAGE 5 Prepare for implementation</b> .....	<b>32</b>
Ensure proposals meet expectations for improvement.....	<b>32</b>
Sanitation promotion, advocacy and awareness-raising.....	<b>33</b>
Capacity building.....	<b>34</b>
<b>References</b> .....	<b>35</b>
<b>Sources of further information</b> .....	<b>36</b>

## List of Figures

Figure 1	Public health risks at different levels related to poor sanitation.....	9
Figure 2	An integrated perspective of environmental sanitation.....	13
Figure 3	Components of the enabling environment for sanitation planning.....	15
Figure 4	Cities are characterised by a diversity of settlement types.....	16
Figure 5	City wide sanitation plans require a range of different models for service delivery.....	17
Figure 6	Moving forward with realistic incremental improvements.....	17
Figure 7	Planning as part of the service delivery cycle.....	18
Figure 8	Methodology for city-wide planning for decentralized basic needs services.....	23
Figure 9	Faecal waste flows in Dakar, Senegal.....	23
Figure 10	Components of capacity building.....	34

## List of Tables

Table 1	Stakeholders and their interests in urban sanitation.....	15
Table 2	Stages and activities in the Sanitation21 planning process.....	18
Table 3	Relevant information about existing systems and services.....	22
Table 4	Types of cost associated with sanitation systems.....	28
Table 5	Service provider options for contracting out operation and maintenance requirements at different levels.....	30
Table 6	Examples of output indicators to trigger payment for performance based subsidies.....	31

## List of Boxes

Box 1	Concerted municipal strategy (CMS) in the town of Dschang, Cameroon.....	11
Box 2	City sanitation planning as part of national sanitation programmes in India and Indonesia.....	16
Box 3	The role of city sanitation working groups in Indonesia.....	20
Box 4	What do we mean by service level?.....	21
Box 5	Landscape analysis and business model assessment in Cambodia.....	24
Box 6	Environmental Health Risk Assessment for targeting improvement strategies.....	25
Box 7	Experiences from eThekweni, South Africa.....	26
Box 8	Application of life-cycle analysis for financial assessment of sanitation service delivery options.....	28
Box 9	Performance based subsidies to improve sanitation service delivery.....	30
Box 10	Monitoring Service Level Benchmarks (SLBs) to assess sanitation service improvements in India.....	32
Box 11	Experiences from the ACCESSanitation project in India and the Philippines.....	34

# I. Introduction

## Why is sanitation important?

Improving sanitation is of paramount importance to reduce risks of disease transmission in and around the home and to improve the quality of the environment beyond the household level (see Figure 1). In addition, as well as resulting in improved environmental health, sanitation systems combined with integrated treatment promote resource recycling through the reuse of water and recovery of nutrients and energy contained in wastewater.

Improved services and infrastructure may also enhance the attractiveness of a city for investment. For example in India, cities that have implemented city wide sanitation programmes

with funding from national government have been rated better by financial credit institutions. A combination of these benefits ensures better conditions of environmental health in cities and their environs, which are vital for well-being and socio-economic development.

As a result, investments in improved sanitation are proven to be cost-beneficial. According to figures from the World Health Organization, the economic return on every dollar invested in improving sanitation results in an average of US\$ 5.5 benefit (WHO 2012). This level of economic benefit varies greatly from country to country and also from place to place within each country, but as this value does not include

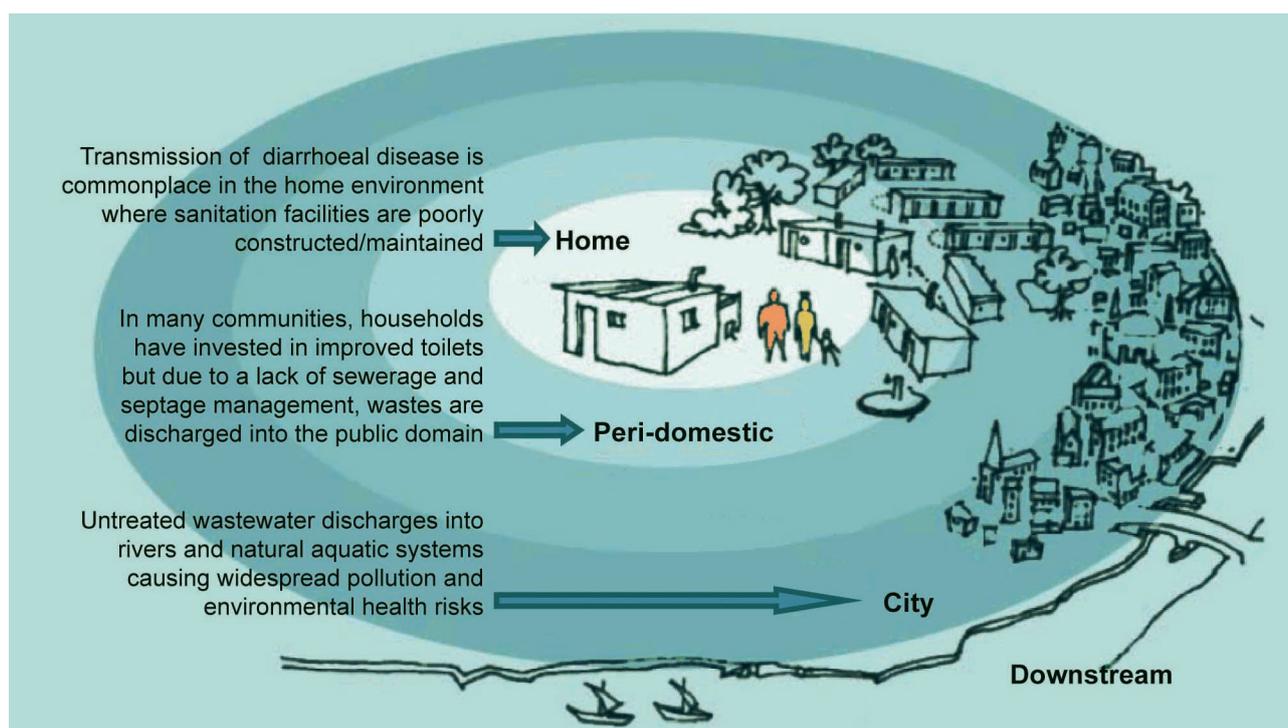


Figure 1: Public health risks at different levels related to poor sanitation (adapted from DFID, 1998)

all potential benefits, the total in many cases is likely to be greater than this.

## Conventional responses to urban sanitation problems

In most urban areas, the overall responsibility for sanitation services is usually held by the local authority. In larger cities, utilities have been established to provide sanitation services, but generally their focus is limited to sewerage serving a relatively small proportion of the population. The conventional master planning approach, which in many instances is supported by international financing institutions, focusses primarily on sewerage system extensions and rehabilitation of existing systems. This often overlooks the fact that in many cases, the revenue for these services is insufficient to pay for operation and maintenance costs. In addition, the majority of urban dwellers, especially poor people, rely on non-sewered sanitation systems which generate wastes that are generally termed "faecal sludge". According to the Water and Sanitation Program (WSP, 2014) almost two-thirds of households in the cities studied rely on on-site sanitation facilities and on average, faecal waste from only 22 percent of households using on-site systems is safely managed.

Rapid urbanisation means that many households do not connect to the municipal system because either they:

- i) live outside of the area served by the formal system;
- ii) live in illegal settlements and are denied connections to public services;
- iii) are unable to pay service charges; or
- iv) are unwilling to pay because they already have some form of sanitation.

These households use various forms of on-site sanitation serviced on an ad hoc basis either by a private company with a desludging vehicle or by informal groups of labourers. In both cases, there is often nowhere for the sludge to dispose of safely and as a result the faecal sludge is discharged into the environment untreated. In developing country cities, inadequate faecal sludge management generates significant negative public health and environmental risks.

## Why a need for Sanitation21?

The need for a new approach towards planning for improved sanitation services in low and middle-income countries emerged as a response to the inadequacies of conventional master

planning approaches which have paid insufficient attention to:

- Equitable service delivery requirements for low-income and informal settlements, which often need arrangements that differ from the mainstream services for the rest of the city.
- The important role of the private sector in sanitation service provision, notably small-scale entrepreneurs (both informal and formal).
- The potential benefits of alternative, innovative approaches for service delivery to overcome physical, financial or institutional constraints.
- The need to ensure that there is sufficient demand to pay for services and cost recovery to pay for operation and maintenance costs.
- Capacity building requirements required for ensuring that facilities and infrastructure are adequately managed and maintained.

Various new planning methodologies have been developed and applied, embodying this shift in thinking. The experiences from these planning approaches are incorporated into the Sanitation21 planning framework, which epitomises the new generation of sanitation master planning. Unlike conventional master planning approaches, these planning approaches consider a wider range of aspects of sanitation that are not specifically related to infrastructure. These relate to issues of poverty, inequity, land ownership, environmental concerns, or the wider political economy.

Building on these experiences, Sanitation21 serves as a city wide planning tool to develop an equitable city-wide sanitation service delivery plan; guiding recommendations for upgrading services which are realistic within the local capacity for implementation and the availability of funding and resources. It encourages decision-making based on sound information and suggests improvements wherever information is missing in order to prepare the city for the next planning step.

In summary, the Sanitation21 approach aims to achieve the following:

- A vision of the need for sanitation improvements which is shared between different stakeholders within the city.
- A clear definition of realistic priorities for improvement across the entire city.
- A comprehensive sanitation development plan that corresponds to users' demands and different physical and socio-economic conditions within the city.

- A supportive enabling environment with regards to policy and governance for promoting the implementation of proposed components of the plan.
- Capacity building actions required for ensuring that facilities and infrastructure are adequately managed and maintained.

### Who should read this document?

This document is for those who are concerned about the quality of urban sanitation services and are looking for guidance to improve these services. Therefore, it will be of interest to those who work for local authorities, utilities or non-governmental organizations as well as consultants providing advice about ways to improve sanitation service delivery. Box 1 provides a good example of how efforts put into the planning process can pay off in terms of attracting investment for implementation. This can be used to illustrate to institutional stakeholders the benefit of planning.

### Purpose and relationship to the previous Sanitation21 document

In 2006, an IWA Task Group produced a framework for city sanitation planning entitled *Sanitation21 – Simple Approaches to Complex Sanitation: A Draft Framework for Analysis*. This document was based on the realization that improving the quality and effectiveness of sanitation services requires a much broader range of considerations other than those related to the type of technology employed. The Task Force recognised that successful sanitation planning activities need to be based on a sound understanding of the existing situation and respond to demand from an improved sanitation service at different levels – from the household level to the municipal authorities (IWA, 2006).

This new publication encapsulates experiences in sanitation planning, particularly from those from India and Indonesia, to ground the conceptual framework into reality. It also draws from other relevant documentation such as *Effective Strategic Planning for Urban Sanitation Service - Fundamentals of Good Practice* produced by GHK, *Urban Sanitation: A Guide to Strategic Planning* published by Practical Action Publishing, and documentation from

Eawag-Sandec related to the Household-Centre Environmental Sanitation Approach and, more recently, the Community-Led Urban Environmental Sanitation (CLUES) planning guidelines.

#### Box 1: Concerted Municipal Strategy (CMS) in the town of Dschang, Cameroon

Dschang is one of the towns in West Africa where the Concerted Municipal Strategy (CMS) approach has been demonstrated to be a successful undertaking. The process, which encompasses both sanitation and water supply services was led by the municipality with the support of a facilitator, and ensured the involvement of various stakeholders at each step of the process. This process involved a detailed diagnostic including a socio-economic and technical component followed by sharing and discussing the diagnostic findings with all stakeholders prior to defining the interventions for the strategy. The main priorities regarding sanitation agreed by the municipality and local actors were to:

- Strengthen local capacity for the management of sanitation services;
- Rehabilitate and construct new community facilities in selected densely-populated peri-urban areas;
- Install systems for safe management of pit latrine faecal sludge and septage from septic tanks.

Following a one year process for the elaboration of the strategy and the establishment of a dedicated municipal agency for the water and sanitation sector, the agency was able to use the strategy and action plan developed to mobilize resources from national and international sources amounting to 2 million Euro for investments to improve access to water and sanitation within the municipal area

Source: PS-Eau

Readers familiar with the original Sanitation21 planning framework will see that the fundamentals of Sanitation21 presented below are essentially the same. This new document builds on the previous document, but places stronger emphasis on the planning process and activities to strengthen planning to ensure that the outcomes from investments to improve sanitation service delivery are sustainable.

# II. Principles of effective sanitation service delivery

The following principles outline the basis of effective service delivery that are embedded in Sanitation21:

## **Respond to expectations for sanitation service improvement**

The most important principle is the need to respond to users' expectations by providing improved services that are appropriate to their ability and willingness to pay for service improvements. Successful sanitation planning activities are therefore based on an understanding of the level of interest for sanitation improvements from households, communities and civic bodies for improved sanitation and the capacity of institutions to promote demand and stimulate behavioural change across a range of stakeholders.

## **Plan for inclusive and equitable sanitation services**

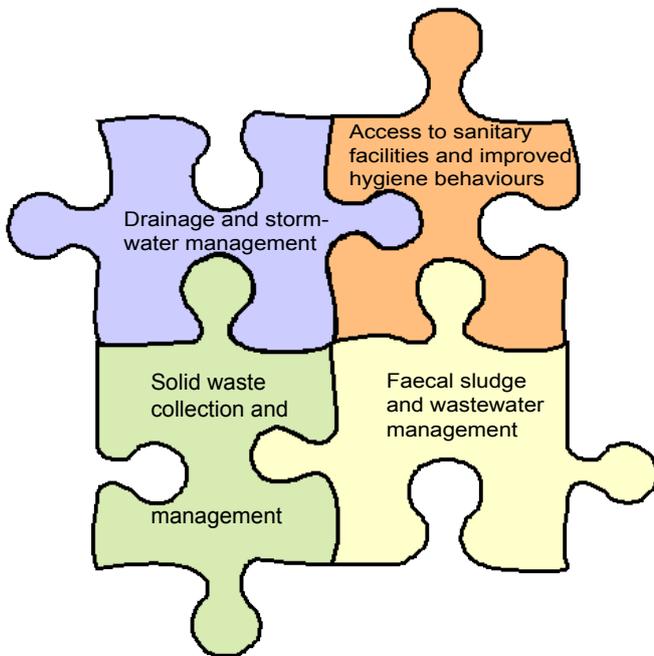
Especially considering that sanitation is now recognised by the United Nations as a Human Right, city sanitation plans need to cover all areas of the city, including low-income, informal and illegal settlements. Although there are many constraints to service delivery in these areas, city authorities need to proactively seek to resolve these and facilitate solutions to ensure that all residents can access improved sanitation.

## **Ensure services are affordable and financially viable**

Even when facilities have been provided, they will fail sooner or later unless funds are available to cover their on-going operation and maintenance costs. Even if capital costs are subsidised, all sanitation systems should aim for sustainable cost recovery to cover operational, regular maintenance and capital maintenance costs.

## **Integration with other municipal services**

As shown in Figure 2, good city sanitation plans recognise the links between sanitation and other municipal services. For example, uncollected solid waste ends up in drains and sewers, greatly increasing maintenance requirements. Consideration of the integration between these different services is important to ensure effective sanitation service delivery. In addition, integrated waste management provides greater opportunities for efficiencies in service delivery and resource recovery and reuse (for example, composting or anaerobic digestion of faecal sludge and organic solid waste).



**Figure 2:** Integrated perspective of environmental sanitation

### Focus on behavioural change

In order to achieve the full benefits of sanitation, particularly in terms of public health outcomes, the appropriate use of sanitation facilities often necessitates users to make changes to their existing behaviors. Therefore, an awareness and behavior change campaign is an essential part of a city sanitation plan in addition to proposals to develop infrastructure and facilities for excreta management. In addition is the need for behavioural changes at all levels, which may require changed management practice to embrace innovations in service delivery that challenge existing perceptions at political and institutional levels.

### Engage with stakeholders

Engagement with different stakeholder groups is a critical activity that is essential for the successful development of sustainable sanitation services and promotion on behaviour changes. This is dependent on effective communication with local stakeholders, to ensure that they see the relevance of the planning process and are sufficiently motivated to be actively involved and subsequently that they support the implementation of the plan. Effective communication between these stakeholders, particularly the customer, service provider and regulator is therefore fundamental for sustaining service delivery.

# III. Planning in context

Many plans are initiated with a preconceived idea about what the plan is aiming to achieve without taking a broader perspective about the current situation and, responding to this situation, how to move forward in a way that fits in with local stakeholder expectations and the availability of resources. This section focuses on the importance of planning in context taking into consideration aspects such as the governance framework and the wider political economy which influence the enabling environment for initiatives to improve sanitation services. Planning in context should also consider the actions that have been undertaken previously by a range of actors, and recognize the diversity of the urban environment which will influence the approaches for sanitation system upgrade in different parts of the city. The level of detail in the plan will depend upon the availability of data and information, which may differ significantly from city to city. Consequently the planning process plays an important role in improving the information base which has ongoing benefits for future implementation and monitoring of service providers.

## Local stakeholder interests and expectations

There is little point in planning if this is not undertaken in a way that is perceived to be in line with stakeholders' interests and their expectations (see Table 1). For example, it is likely that many households will have already invested in some form of sanitation facility and therefore expecting them to connect to a sewerage network and pay charges may not be realistic. It is therefore important to consider the effectiveness of existing arrangements and how these can be improved before embarking on expensive new investments.

Managing these expectations is an important part of the planning process as different stakeholders will respond differently according to their level of expectations from the planning activity. The Sanitation21 planning approach encourages those responsible for planning to consider different stakeholder perspectives as the way that problems are perceived and their relative importance will influence what these stakeholders expect to be the outcome from the planning activities.

One of the keys to success in planning is to ensure that the different stakeholders are involved in ways that are appropriate to their interests and communications to the various stakeholder groups before and during the planning process is of utmost importance. Rather than talking about stakeholders in a general way, it is helpful to identify more specifically who these stakeholders are and in what domain – or sphere of influence – they operate. There are four primary domains defined in the Sanitation21 planning approach:

- **Household domain** – the private sphere within which households make decisions about their behaviours and investments to improve sanitation facilities. The household domain also includes landlords who are responsible for the facilities in rented properties.
- **Community domain** – This is the level at which communities are collectively involved in planning activities but also involves local level political administrators and providers of services within communities.
- **City domain** is the level at which services are centrally planned and organised, and financial decisions are taken. The primary actors in this domain are the local authority

**Table 1:** Stakeholders and their interests in urban sanitation across different domains of the city

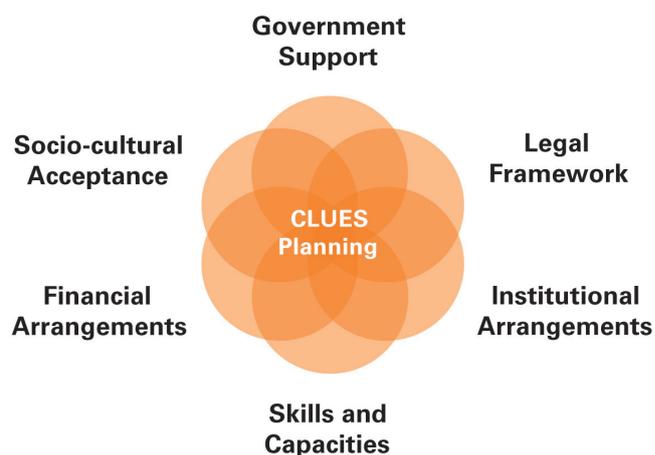
Domain	Stakeholders	Primary interests
<b>Household</b>	<ul style="list-style-type: none"> <li>Local residents (homeowners and tenants)</li> <li>Landlords</li> <li>Pit emptiers and desludging companies</li> </ul>	<ul style="list-style-type: none"> <li>access /convenience</li> <li>health and wellbeing</li> <li>affordability</li> <li>rent</li> </ul>
<b>Community</b>	<ul style="list-style-type: none"> <li>Community based organizations and non-governmental organizations</li> <li>Staff from schools, health centres and other institutional buildings</li> <li>Local level municipal administration</li> <li>Private sector organisations</li> </ul>	<ul style="list-style-type: none"> <li>a clean and liveable environment</li> <li>employment</li> <li>social development</li> <li>improved living standard</li> <li>business opportunities</li> </ul>
<b>City</b>	<ul style="list-style-type: none"> <li>Local authority</li> <li>Administrative body</li> <li>Utility</li> <li>Environmental health department</li> <li>Association of pit emptiers / desludgers</li> </ul>	<ul style="list-style-type: none"> <li>good governance</li> <li>socio-economic development</li> <li>fiscal strength</li> <li>civic pride</li> </ul>
<b>Beyond the city</b>	<ul style="list-style-type: none"> <li>Ministry of Health</li> <li>Ministry of Environment</li> <li>National Government</li> </ul>	<ul style="list-style-type: none"> <li>environmental protection</li> <li>water security and food security</li> <li>national and international development objectives</li> </ul>

and governmental bodies or the utility responsible for the planning, development and provision of sanitation services.

- **National or provincial domain** – institutions and organisations from outside of the city such as ministries defining policy, regulation and strategies which determine practice on the ground and influence city level decision-making.

### The political economy and the enabling environment

The political economy of sanitation refers to the social, political, and economic processes and actors that determine the extent and nature of sanitation investment and service provision. Understanding and managing the political economy of sanitation consists of identifying and addressing stakeholder interests and institutional determinants of sanitation investment process and outcomes (World Bank 2011). In this context, it is therefore important to consider the factors that contribute towards the enabling environment for sustainable sanitation service provision (see Figure 3).



**Figure 3:** Components of the enabling environment for sanitation planning (adapted from Lüthi et al 2011)

As described in Box 2, experiences from different countries show that city level planning initiatives are much more likely to be successful if they are undertaken where there is a higher level support from national or state government. It highlights the fact that, if the national legislation and the regulatory

### Box 2: City sanitation planning as part of national sanitation programmes in India and Indonesia

A good example where city level planning is promoted by National Government is the Indonesia Sanitation Sector Development Program (ISSDP), which commenced in 2009 with the objective to roll out a citywide sanitation strategy approach to all towns and cities of Indonesia by 2014 (see Yuwono et al 2010 for more information). Another example is the National Urban Sanitation Policy (NUSP) in India which was launched in 2008 by the Ministry of Urban Development. The policy provides a framework for the preparation of State Sanitation Strategies and City Sanitation Plans (CSPs) which are the cornerstones for investments to upgrade city sanitation services.

framework that governs the delivery of sanitation services are not well formulated, then it becomes difficult to design projects that result in sustainable improvements to service delivery.

### Taking into account activities and initiatives at the local level

An important consideration is the interface between city sanitation planning and activities going on at the local level. Whereas city level planning is more strategic, covering the whole area under the jurisdiction of the local authority making use of formalized planning procedures, local-level initiatives focus on improvements to services in specific neighbourhoods, often as part of ward development plans.

Thus, community based planning is most relevant in informal settlements and unplanned peri-urban areas responding to local demands and dealing with problematic issues often related to lack of infrastructure, poor services and a range of concerns affecting the local community. Whereas city sanitation planning involves consultation of representatives from stakeholder groups, community-based planning means that community itself holds greater responsibility for the planning process itself and the actual outcome from this process. This requires a greater interaction between community members, which may require support from experts with social planning skills to facilitate participatory decision-making.

One such community-based planning approach, which is compatible with Sanitation21, is the Community-led Total Sanitation approach (See Further reading). Another example

is the recently developed POSAF (Planning Oriented Sustainability Assessment Framework) approach (see Starkl et al. 2013). These community level planning activities can run in parallel to and feed into the wider city sanitation planning activities, focussing on those areas which are marginalised from the municipal systems. The process may identify areas which can be connected to the city wide services and those that require a different approach due to the specific characteristics of the settlement.

### Taking into consideration the diversity of cities

The characteristics of low-income settlements means that they are intrinsically more difficult to serve and therefore conventional service delivery approaches are often not viable. Figure 4 illustrates the varied nature of settlements in cities; highlighting that there is a need for a range of sanitation service models for different physical and socio-economic contexts. For instance, this may be due to particular physical constraints such as low-lying ground, steep slopes, or densely packed housing with very poor access via narrow and irregular pathways. In addition there are frequently social issues compounded by poverty, which means that working in these areas requires a different approach from other parts of the city.



Figure 4: Cities are characterised by a diversity of settlement types

This also highlights the fact that no one type of technology will be appropriate for all areas of the city and the outcome from the application of the Sanitation21 planning approach is likely to lead towards recommendations for on-site sanitation for some areas, whereas decentralised/ semi-centralised systems or centralised sewerage may be appropriate for other areas (see Figure 5).

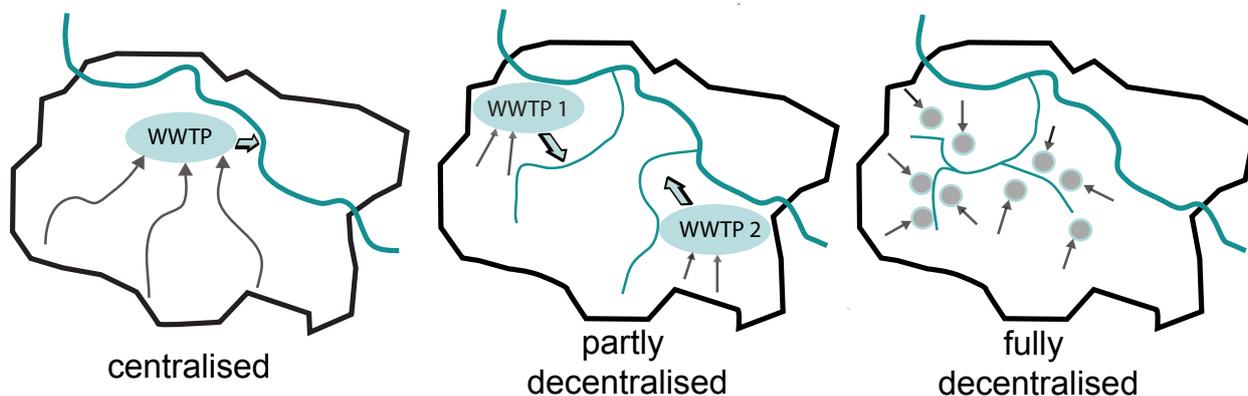


Figure 5: City wide sanitation plans require a range of different models for service delivery (Starkl et al., 2012)

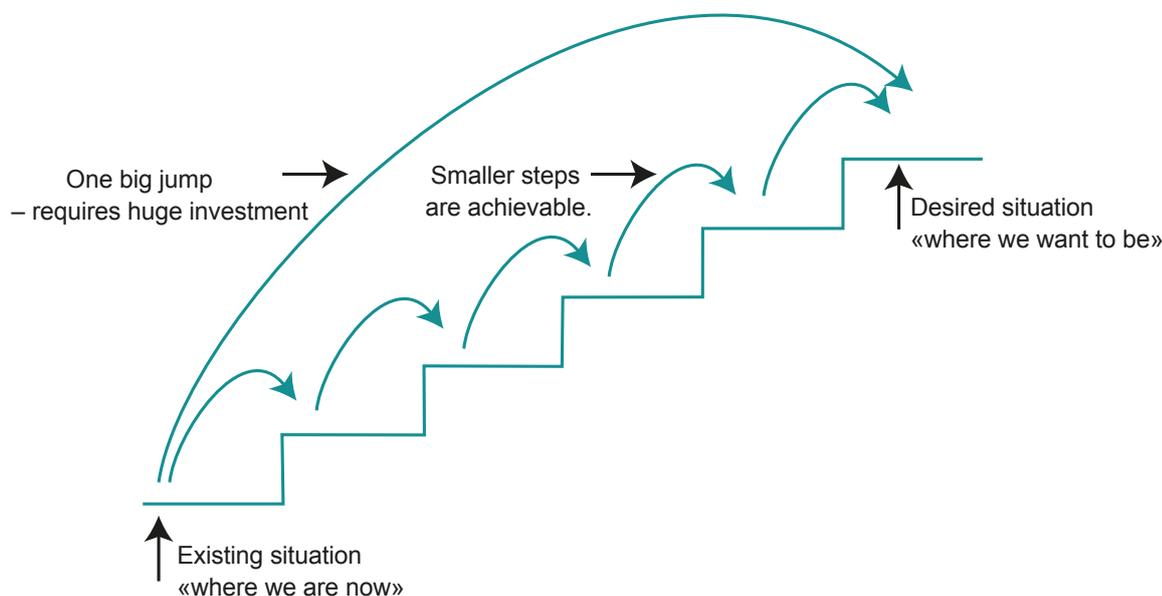


Figure 6: Moving forward with realistic incremental improvements (adapted from GHK 2002)

### Planning within the context of available resources

As mentioned in the introduction, city sanitation plans are often prepared with aspirational objectives, without a realistic consideration of what is actually achievable given the availability of existing resources and ignoring existing investments. The availability of financial resources for system upgrade is also often a limiting factor and therefore, a more pragmatic approach is to plan for improvements in incremental steps (see Figure 6). Piloting, research and development should therefore be seen as part of the service delivery cycle in order to introduce locally effective innovations within an incremental approach towards improvement.

There are however situations when there is a need for a larger investment to enable a step-change in service delivery. For

example, when local conditions have changed significantly over time to reach a stage when the existing facilities cannot function effectively, or where these facilities were never satisfactory in the first place. The most common situation where this is relevant is where the level of urbanization and water consumption have increased and on-site systems cannot function effectively anymore. In these situations, there is a sound argument for the installation of a sewerage system, which requires a large investment.

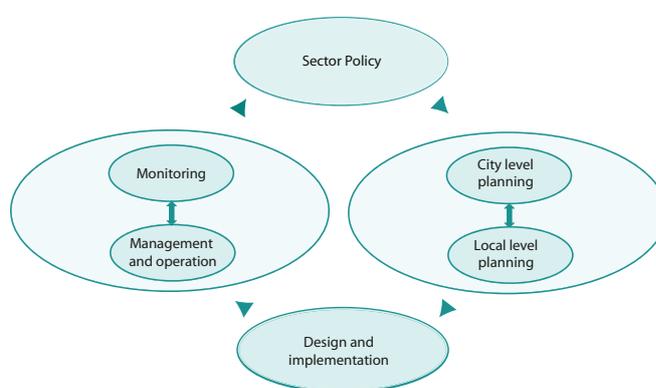
In making these decisions, a key consideration is to ensure that investments are cost-beneficial over the period of their asset life from start-up until the time for replacement. Potentially this may lead towards a staged approach in which a decentralised system is connected to a centralised system in the future.

# IV. Stages of the planning process

City sanitation plans should highlight priority areas such as upgrading of sanitation services in specific areas, improvement to the sanitation service delivery chain, or support to the local authority to develop the regulatory framework. Figure 7 illustrates the linkages between city development plans, city sanitation plans and local level planning. It highlights the fact that planning forms an integral part of the service delivery cycle in which the outcome determines the prioritization of improvements and the design of projects to meet the identified needs. In addition, investments will be wasted if there is insufficient consideration of operation and maintenance at the planning stage.

City sanitation plans should prioritise recommendations into short, medium and long-term measures for step-wise implementation and should provide the basis for design but without the details for implementation or operation. Project preparation requires more attention to technical and financial detail than strategic plans, assigning responsibility for implementation to specific organisations according to an agreed timeframe to achieve key outcomes.

This section outlines the planning process in relation to the activities and outputs from the five stages of the process summarized below in Box 3. These may be undertaken in sequence but in many instances the activities are likely to be iterative and therefore one activity does not necessarily need to be fully completed before the next one is initiated. The steps outlined below are therefore meant to provide guidance on the overall process rather than be a blueprint.



**Figure 7:** Planning as part of the service delivery cycle

**Table 2:** Stages and activities in the Sanitation21 planning process

**Stage 1 Build institutional commitment and partnership for planning**

- Establish planning process leader and city sanitation task force.
- Consultation and facilitation of the process.
- Assess key priorities and incentives.
- Define collective vision and priorities for sanitation improvement.
- Agree upon the planning process.

**Stage 2 Understand the existing context and define priorities**

- Collect and review information about existing sanitation facilities.
- Identify constraints to service provision.

- Undertake a sanitation market assessment.
- Identify priority areas for improvement.

### **Stage 3: Develop systems for sanitation improvement**

- Delineate zones for system development.
- Consider appropriate toilet technologies.
- Develop strategy for treatment, disposal or reuse.
- Collection and transportation of wastewater and faecal sludge.
- Consider operational and maintenance requirements.
- Assess costs of proposed improvement options.

### **Stage 4: Develop models for service delivery**

- Develop appropriate management arrangements.
- Derive cost-recovery mechanisms.
- Strengthen financing mechanisms.
- Develop arrangements for monitoring and regulation.

### **Stage 5: Prepare for implementation**

- Ensure proposals meet expectations for improvement.
  - Sanitation promotion, advocacy and awareness-raising.
  - Capacity building.
- 

## **Stage 1: Build institutional commitment and partnership for planning**

One of the inherent challenges with sanitation planning and subsequent implementation of city sanitation plans is that they require a range of institutions and organisations to work together. Therefore, the level of commitment, capacity and the relationships between these institutions has a significant bearing on the planning process. Consequently, the success of the sanitation planning activity will be strongly influenced by the extent of collaboration between the local authorities, utilities and the other stakeholders.

### **Activities in Stage 1 of the planning process:**

- Establish planning process leader and city sanitation task force
- Consultation and facilitation of the process
- Assess key priorities and incentives
- Define a collective vision of sanitation and priorities for improvement
- Agree upon the planning process

*Outcome from Stage 1:* The outcome from Stage 1 should be the formation of a Task Force with representation from the relevant stakeholders and agreement between members about their common vision for sanitation improvement and principles that are to govern the way that services are to be delivered. This should help to mitigate future disagreements about overall policy towards sanitation services in the city and demonstrates their commitment towards improving sanitation services on the ground.

### **Establish planning process leader and city sanitation task force**

Although there is clearly a need for engagement between the various institutions responsible for urban planning, public works, health, finance, there needs to be one institution that plays the lead role to ensure that the planning process maintains strong direction and achieves the objectives agreed by key stakeholders. The local authority is generally the most appropriate lead of the sanitation planning process because of the official mandate for municipal governance and services as well as being the body responsible for upholding lines of accountability between service providers and the public.

The local authority needs to ensure that the relevant institutional stakeholders are fully committed and has the leadership capacity to convene the other institutions and, where necessary, mediate any differences in opinion and resolve any institutional blockages. There must be sufficient time and opportunity for these stakeholders to become

### **Box 3: The role of city sanitation working groups in Indonesia**

In Indonesia, the national programme initiates activity in a city once a letter from the Mayor of the city has been received by the Governor (Head of the Province) expressing commitment and interest to join the program. The Accelerated Sanitation Development Program (PPSP) then established Provincial Sanitation Working Groups, operating under the Governor's office, with the aim to coordinate, facilitate and supervise the sanitation development activities to be carried out by each province.

The City Sanitation Working Groups (Pokja Sanitasi) form the backbone for the Accelerated Sanitation Development Program. These are formally endorsed entities consisting of representatives from governmental and non-governmental institutions involved in and/or related to sanitation/environmental development at the city (regency) level. The working groups operate under the leadership of the local planning agency (Bappeda) with specific tasks with regards to sanitation development planning and implementation including:

- promote/advocate the improvement of sanitation conditions in their constituency, both to the general public, decision makers in the local government as well as the non-governmental/private sector;
- prepare a 5-year strategic sanitation plan including annual implementation programs/activities on the basis of an empirical analysis of sanitation conditions in their constituency;
- identify and propose funding (mechanisms) for the proposed programs/activities;
- arrange and oversee the implementation of the programs/activities for which funding was secured;
- develop appropriate management arrangements for the operational and maintenance of sanitation infrastructure.

Source: Personal communication: Sjoerd Kerstens (Royal Haskoning/DHV)

involved and this may require some time and effort – firstly to gain the support from the mayor and subsequently from the other institutional stakeholders. Experiences from Indonesia (see Box 3) and India show that the creation of a city sanitation task force is an important foundation for the planning process and an effective means to engage with different institutions from the public and private sector and non-governmental organizations.

### **Consultation and facilitation of the process**

Stakeholder consultation is necessary at different levels and at various fora; usually with the involvement of NGOs to facilitate interaction with civic society. It is clear that the success of sanitation planning activities is dependent upon good communication between stakeholders. Therefore, a continuous focus on stakeholder engagement is a key part of the planning and implementation process to ensure that representatives from different stakeholder groups are adequately informed and consulted. This is especially important with the wider stakeholder involvement in setting of the functions and specific objectives of the improved services.

There is a need for facilitation of the planning process between institutional members of the city sanitation task force to guide the planning process and support stakeholder consultation. A good facilitator requires social skills for interaction, negotiation and mediation with stakeholders and a good understanding of cultural and institutional sensitivities. Throughout the planning process, there is likely to be a need for external support to help stakeholders consider the implications of different options and their viability in accordance with local conditions. Provision of funds to support consultation activities, paying for publicity or development of channels for dissemination and communications can help to reach different stakeholder groups, improve transparency of decision-making and promote ownership of the plan.

### **Assess key priorities and incentives**

This activity focuses on key questions relating to: Who are the key stakeholders and the main service providers? and What are their interests with respect to sanitation? The assessment should recognize the roles that the different stakeholders play in sanitation service provision, considering their key priorities and organizational strengths for implementation and management of sanitation services. It should also consider policies and regulations related to sanitation, and the existing arrangements with regards to financing of sanitation improvements and mechanisms to recover costs.

The assessment should include governmental authorities (both the elected political bodies and regulatory bodies) and public and private sector entities involved in the provision of sanitation services. As well as utilities, small-scale private enterprises (both formal and informal) play an important role in service delivery (especially for faecal sludge collection and transportation). In addition, NGOs often support sanitation service improvements and their contribution should be recognized and included in the stakeholder assessment.

### **Define collective vision and priorities for improved sanitation**

This stage involves the development of a collective vision and the identification of the strategic priorities for sanitation improvements. There may be need to revisit these priorities after the assessment of the existing situation, but it is good at an early stage to draft the expected priorities based upon existing expectations in relation to official institutional mandates. This process should be managed so as to encourage stakeholders to consider the priorities from a service delivery perspective, rather than focussing the discussion on specific types of technology. Preparing a list of criteria or functions that the improved system should meet is therefore a good start to develop strategies for the improvement. These criteria may subsequently be used as the basis for the development of service level agreements with service providers (see Box 4).

#### **Box 4: What do we mean by service level?**

Service level refers to the level of benefit achieved in relation to user requirements or the need to protect the environment. In terms of user requirements, the key considerations are generally related to access to facilities, convenience of use and privacy; comfort, compatibility with cultural norms and level of hygiene (including smell). Users are generally not so concerned about the downstream impacts on the environment, but the local and governmental authorities have the duty to maintain the quality of the natural watercourses. The level of service related to the environment is therefore determined by the required use of these waters. e.g. fishing and other recreational activities. There are some aspects of service provision that should never be compromised – notably those pertaining to public health. However, there are other factors which mean that service levels may not be uniform throughout the city. For instance, in high-density slum areas it is often unrealistic to provide facilities for every household and therefore communal latrines may be the only option.

### **Agree upon the planning process**

The final step in this first stage of the planning process is for the Task Force to agree upon the activities in the planning process itself, identify the specific activities where different organisations will be playing a key role and to fix a time schedule for the planning activities. External agencies can provide support to the Task Force and develop the technical and management capacities of local institutions involved in the planning process, many of whom will be responsible for implementation and management. However, if the planning process is driven by external agencies in too short a time scale, the plan will invariably lack ownership and there will be no incentive to move forward with the implementation of the plan.

## **Stage 2: Understand the existing context and define priorities**

Sanitation plans need to be based upon a good understanding of the existing physical and socio-economic context in different areas of the city that influence the viability of different types of sanitation services. In most settlements, some level of investment in sanitation infrastructure will already have been made, whether by government agencies, households or others. The condition and functionality of these existing facilities will have a strong influence on the options for improvement. As well as assessing the types of facility / infrastructure that already exist, it is important to learn from the successes and failures of previous projects designed to improve sanitation in the city.

#### **Activities in Stage 2 of the planning process:**

- Collect and review information about existing services
- Identify constraints to service provision
- Undertake a sanitation market assessment
- Identify priority areas for improvement

*Outcome from Stage 2:* The outcome from this stage should be a clear understanding of problems to be addressed, priority areas for improvement and locations which require service expansion and those that require upgrading. It should also include details of short, medium and long term priorities.

## Collect and review information about existing services

Table 3 outlines key information about existing services that should inform decisions about the types of sanitation system and strategies for upgrading. Initially, existing documentation should be collected and reviewed as the basis for the development of the sanitation plan. This should include existing policies and strategy papers, maps, project documents and other plans (including those that were not implemented).

Records about infrastructure coverage and service provision are often out of date, incomplete and may well be inaccurate. Information about informal service providers is often very limited or non-existent. There may be a need for some surveys to collect quantitative or qualitative information to help inform and support decision-making processes. However, extensive and resource consuming surveys are not recommended as these activities can cost a lot and distract the city sanitation task force from other more strategic considerations.

Comparing the volumes of wastewater and faecal sludge with the capacity of the collection and treatment facilities will indicate those areas which are most underserved and therefore prone to the highest environmental health risks.

It is important to focus on the actual capacity rather than the design capacity as these are often not the same. This approach has been used to map sanitation stressed areas in various cities in India as part of the National City Sanitation Planning (CSP) programme (see Figure 8).

An important aspect is whether people are already using toilets or if there are still parts of the population that practice open defecation. Figure 9 shows faecal waste flows in Dakar and the relative proportion managed by different forms of sanitation and the extent to which the waste is adequately treated. A graphic illustration such as this can quickly and easily convey to stakeholders the prevailing sanitation situation in the city, which can communicate effectively the magnitude of the problem and the critical areas to be addressed.

**Table 3: Relevant information about existing systems and services (adapted from WSP 2008)**

<b>On-site facilities</b>	
<b>Open defaecation</b>	<ul style="list-style-type: none"> <li>• Areas where open defaecation (or 'flying toilets') is practiced.</li> </ul>
<b>Toilets/Latrines</b>	<ul style="list-style-type: none"> <li>• Types and coverage of household, communal and public latrines.</li> <li>• Cost of construction and charges for use of latrines</li> </ul>
<b>On-site treatment</b>	<ul style="list-style-type: none"> <li>• Types of on-site treatment utilised and which areas they are used.</li> </ul>
<b>Waste collection &amp; conveyance</b>	
<b>Faecal sludge and septage collection services</b>	<ul style="list-style-type: none"> <li>• Extent and frequency of desludging, existence of transfer stations</li> </ul>
<b>Existing sewerage infrastructure</b>	<ul style="list-style-type: none"> <li>• Coverage of sewerage and proportion of households with household connections</li> <li>• Cost of sanitation services</li> </ul>
<b>Costs of providing services</b>	<ul style="list-style-type: none"> <li>• Costs of services and ability to pay</li> </ul>
<b>Management arrangements</b>	<ul style="list-style-type: none"> <li>• Details and capacity of service providers in the formal and informal sector</li> </ul>
<b>Downstream treatment and reuse</b>	
<b>Treatment facilities</b>	<ul style="list-style-type: none"> <li>• Location and types of treatment facility</li> <li>• Volume of wastewater and faecal sludge discharged at the treatment facilities.</li> </ul>
<b>Discharge / reuse</b>	<ul style="list-style-type: none"> <li>• Locations where wastewater and faecal sludge is disposed / reused.</li> </ul>
<b>Management arrangements</b>	<ul style="list-style-type: none"> <li>• Details of operator, regulatory requirements, licencing etc.</li> </ul>

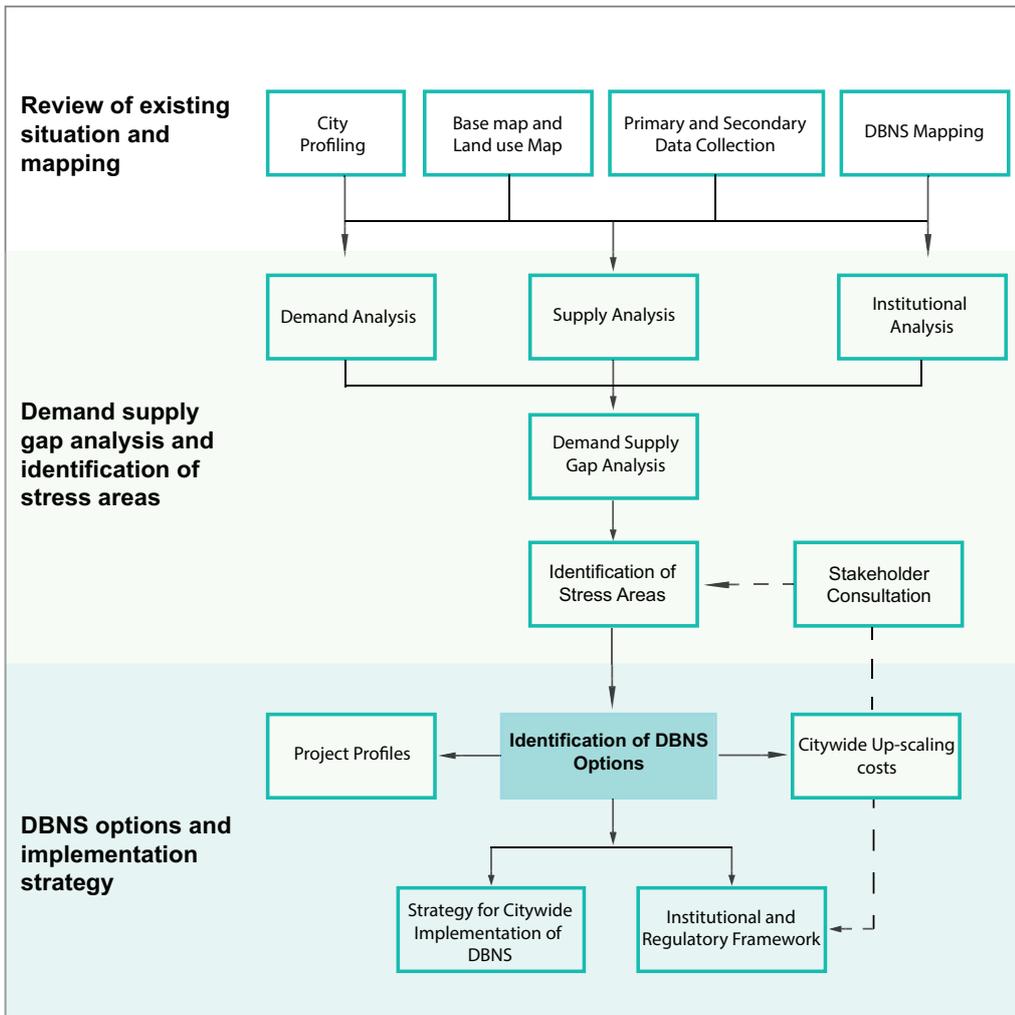


Figure 8: Methodology for city-wide planning for decentralized basic needs services (Source: Kraemer et al, 2010)

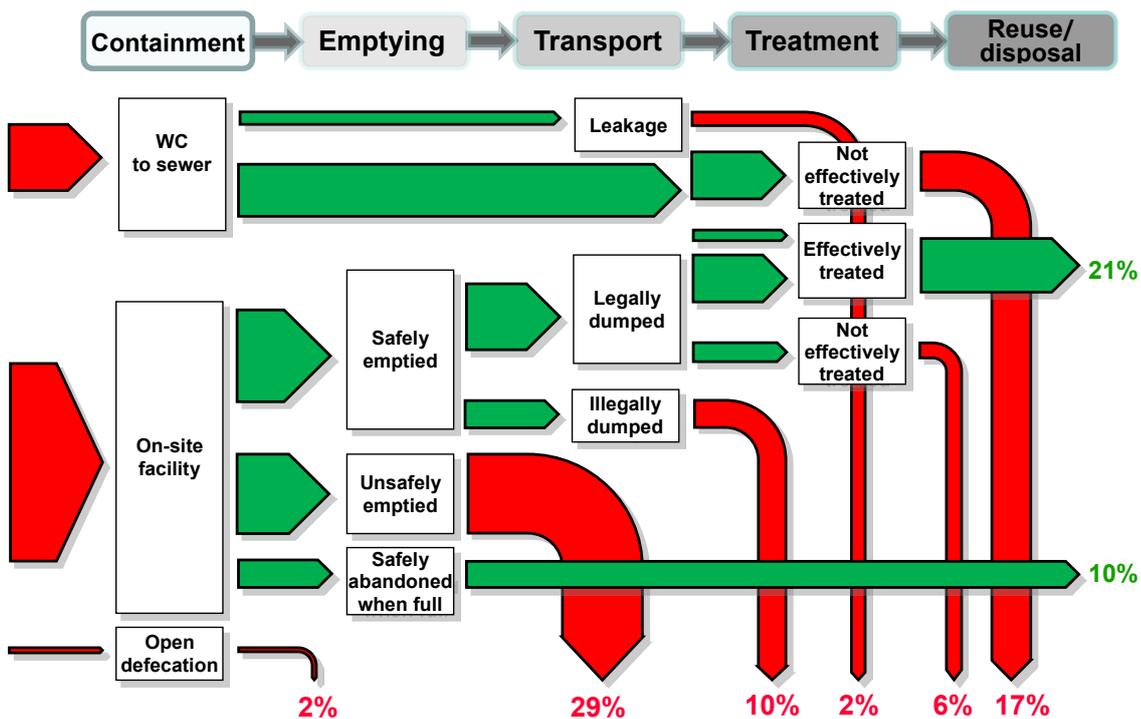


Figure 9: Faecal waste flows in Dakar, Senegal (WSP, 2014)

## Identify constraints to service provision

Looking in detail at existing constraints as well as reviewing the successes and failures of previous recommendations embedded in sanitation improvement strategies is an informative part of the process. For example, it is important to understand the constraints that affect sanitation services in different parts of the city. This may be due to physical factors such as lack of water, rocky ground, lack of space and/or socio-economic factors such as the lack of ability. A common constraint is that low-income communities may not be recognised by the local authority due to lack of tenure and therefore the official service providers are not able to extend services to these areas.

This activity should also consider critical hygiene and sanitation issues/behaviours in the respective communities which will subsequently determine the relevance/importance for the later awareness raising interventions. In this case, special measures for awareness-raising and achieving behaviour change may subsequently be recommended in the strategic plan to support the implementation process.

## Undertake a sanitation market assessment

Different communities and user groups are likely to have different requirements and may also differ in capacities in which they can contribute towards improving sanitation. As described in Box 5, a sanitation market assessment is an important activity to understand better the current types of service being provided and the demand for improved levels of service with a view towards answering key questions necessary to provide services that people can afford. The market assessment should include an assessment of existing sanitation service providers of these services and their customers in terms of what people would like; what they are willing to pay for, and their ability to pay.

This involves household surveys and focus group discussions with representatives from different stakeholders to collect both quantitative and qualitative data about existing services and demand for improvements. This will also make it easier to do the sanitation promotion and awareness raising to support the implementation of the plan. The sanitation market assessment also looks into detail at existing service providers (both public and private) taking into account their capacity in terms of the number of staff and equipment which affects their ability to respond to market demands for improvements.

### Box 5: Landscape analysis and business model assessment in Cambodia

The landscape analysis and business model assessment aimed to better understand the arrangements for extraction and transportation of faecal sludge in Cambodia. It collected information about the conditions in which operators provide services; their technical, financial and economic situation, and their share of the market. Following on from this it provided key data and recommendations about the opportunities, constraints, conditions and potentiality of development of these markets in a prospective analysis.

The assessment identified that most mechanical extraction and transportation operators are small enterprises owning one truck with two to three staff. These operators were characterized as being:

**Type 1: *Survivors*** with low number of customers and low profit but often used as a mean to supplement income from other sources.

**Type 2: *Competitors*** – older operators having 2-3 trucks with a medium sized client base and reasonable profit, but losing customers as a result of emerging new operators as competitors.

**Type 3: *Performers*** – dealing with the highest number of customers and making a good level of profit per year and per truck.

The study showed different results for different cities but a great deal of competition in a market that is increasing but already saturated. As a result, there is no need for more operators but a need to formalise and strengthen the regulatory framework and construction of decentralized treatment systems managed by private operators or public utilities in order to reduce transportation costs. These treatment plants could be managed both by private or public authorities with more regulation from public authorities.

Source: GRET, 2012

## Identify priority areas for improvement

Decision makers require tools to distinguish areas of the city which need prioritization based upon an assessment of risks. As described below in Box 6, spatial planning tools to map risks can be effective communication tools to visualise the existing situation and target attention towards those parts of the city where deficiencies in the sanitation chain are most concentrated. These diagrams and maps can be used to promote discussions amongst stakeholders about the priority areas and potential solutions to recognised problems.

### Box 6: Environmental Health Risk Assessment for targeting improvement strategies

A mapping of sanitary conditions using rapid Environmental Health Risk Assessment (EHRA) is one of the key elements of city sanitation planning in Indonesia. The assessment typically takes about 6 weeks and consists of the following activities:

- i) Clustering of areas with similar features in terms of poverty, urban density, and
- ii) Risk assessment of a sample in each defined cluster of typically 400 households per city.

The priority areas are identified according to risk which is based on an assessment of:

- i) impact (poverty levels, pop density, size of population in a district and urban/rural characteristics), and
- ii) exposure which takes into account behavioural issues (e.g. hand washing), water supply, wastewater and solid waste services and drainage.

A map of the Sanitation Risk Index is the final result of EHRA study and, for each city, the results are documented in a 'white book' (buku putih) with the aim to ensure that funds for upgrading are allocated for the priority areas.

Source: Personal communication: Sjoerd Kerstens (Royal Haskoning/DHV)

## Stage 3: Develop systems for sanitation improvement

There are many factors to consider when selecting the most appropriate systems to serve different areas of the city. Decisions need to be based on a good understanding of the existing situation taking into consideration the specific topographic, social, financial and institutional context from Stage 2. Specific attention is required to assure that proposed solutions provide services for all, including those who live in hard-to-serve areas. These are often the areas that challenge conventional service delivery approaches.

This stage in the planning process encourages stakeholders to consider various potential strategies for urban sanitation service delivery; building on existing investments and indigenous knowledge and expertise, but may also seek to embrace technological innovation where these enable a step-change in service level.

### Activities in Stage 3 of the planning process involve:

- Delineate zones for system development
- Consider appropriate toilet facilities
- Develop strategy for treatment, disposal or reuse
- Collection and transportation of wastewater and faecal sludge
- Consider operational and maintenance requirements
- Assess cost of proposed improvement options

*Outcome from Stage 3:* The outcome from Stage 3 will be a clear understanding on what types of system are appropriate to serve different parts of the city with a well-developed plan for collecting, treating and reusing the residual waste streams. The cost implications and arrangements for operation and maintenance should also be defined.

### Delineate zones for system development

To provide sanitation services for the city as a whole invariably requires a mixture of sanitation systems, which are appropriate for different parts of the city and can be implemented at different scales. It is unlikely that the same model of service delivery will be appropriate for all areas and therefore a city-wide sanitation plan is likely to consist of several components designed to meet the specific conditions in different parts of the city. It is therefore necessary to characterise the city into sanitation zones or clusters based on aspects such as topography, population density, user preferences, existing

systems, water availability *etc.*); taking into account both the existing situation and expected changes due to urbanization. This will help to determine where on-site or off-site, networked or non-networked, dry or wet systems are most appropriate in the short and longer term. Box 7 provides a good example from South Africa of how the municipality eThekweni approached this situation.

#### **Box 7: Experiences from eThekweni, South Africa**

A mapping of sanitary conditions by eThekweni Water and Sanitation, a unit of the eThekweni municipality, is a good example of how a utility has met the demands of services from all types of customers, from informal settlements to rural areas to high-end full paying customers, with a variety of technologies and management systems. What makes the eThekweni experience particularly relevant is the contextualised decentralised approach, which divided the city into management units depending on incentives and technical feasibility. The approach allows for different elements of the system to be developed independently in response to prioritization based on i) health related incidences ii) technical feasibility and iii) availability of funds. In many situations in peri-urban areas, community based solutions which are not connected to the centralised system are easier to implement particularly as smaller amounts of finance are required. This enables an incremental development approach such as the addition of treatment to sewer networks developed by the community or the upgrading of shared facilities to household facilities at a later date.

### **Consider appropriate toilet facilities**

Many sanitation master plans focus greatest attention on downstream infrastructure whilst paying insufficient attention to the most important component of the urban sanitation system; the toilet. In middle and high-income communities, improvements to toilet facilities are not generally required, but there will be a need to include a component in the sanitation plan for improving facilities in low-income and informal settlements.

The design of this component needs to consider aspects related to availability of space (especially relevant in dense urban slums), land tenure and access into the settlement with desludging equipment. Due to these constraints, it is often not possible for every household to have a separate toilet for their own private

use. Communal toilets combined with washing facilities may be an appropriate improvement option in this situation.

Technological advances offer an increasing range of options that provide more efficient and sustainable solutions for sanitation service delivery. It is important to consider the benefits of different types of solutions but although more sophisticated solutions may appear to be more attractive, these technologies may be more expensive and are more likely to fail as a result of increased operational and maintenance requirements.

### **Develop strategy for treatment, disposal or reuse**

It is important to consider the final destination for the waste considering the following questions:

- Where and how will it be collected/transported?
- What level of treatment is required? and,
- Is there a potential for reuse of the water and nutrients and or recovery of energy contained in the residuals from sanitation systems?

Technological advances for wastewater treatment, reuse and recovery of water, nutrients and energy resources open up a wider range of options than has been traditionally available. The economic viability for reuse in agriculture, or for energy production or as a low-grade source of water is becoming increasingly attractive due to reduced availability and rising costs of natural resources.

With adequate treatment, wastewater can meet specific needs and purposes, as long as concerns about reuse of wastewater due to potential health risks can be overcome. Treatment technologies make it possible to reuse wastewater for a variety of industrial uses such production of paper or for various non-potable purposes e.g. toilet flushing in business or commercial premises, car washing, garden watering, park irrigation or firefighting. Using treated wastewater may also provide a more reliable source of water than from other sources, which is important where industrial processes require continuity of supply.

Integrated sanitation systems have a high potential to recover energy in the form of fuel (biogas or biomass) which may be used directly or to produce electricity or direct heat recovery. However, as these systems rely upon a highly concentrated organic waste stream, it may be necessary to supplement with other sources of organic load. As the concentration of the

waste is a key factor, sanitation systems that separate waste streams at source open up more opportunities for reuse. Examples where this has been put into practice include the collection of urine and dry faeces in Ouagadougou and El Alto and the reuse of faecal sludge in northern Ghana.

## **Collection and transportation of wastewater and faecal sludge**

Systems for collection and transportation of toilet waste are influenced strongly by the type of toilet utilised because these determine the volumes and characteristics of the wastewater, septage of faecal sludge to be collected and treated. For instance, the water closet uses a lot of water for flushing and requires a sewerage connection or full size septic tank. But the most common forms of toilet only use a small amount of water for flushing or no water at all. In these situations, a sewerage system is likely to be inappropriate and the focus of attention needs to be upon improving the arrangements for collection and transportation of septage and faecal sludge.

Although there is likely to be a need to expand upon and strengthen conventional desludging operations, there is often a need for an alternative system for desludging pits in areas that are inaccessible by larger desludging trucks. In addition, there is often a need for some form of localized collection facility (transfer station) where the sludge can be discharged and stored prior to collection and transportation to the municipal processing facility. This is an area of rapid research and development and therefore it is important to consider new technologies that may be on the market during the planning process<sup>1</sup>.

## **Consider operational and maintenance requirements**

Operational and maintenance requirements for different technologies are important factors that need to be taken into account whilst reviewing alternative approaches for system improvement. Energy for electrical equipment such as for pumping needs to be considered due to the cost implications and especially in cities which are subject to power failures. The lack of availability of spare parts is another common reason why systems may fail. Therefore, although imported technologies may bring about a step change in operational performance, there should be careful deliberation if they are dependent upon foreign supply chains for spare parts. It is therefore generally better to use simpler technologies wherever possible and only resort to higher-technology solutions where the low-tech solutions are considered not to

achieve the desired service level. In all cases, the key issue for sustainable operation and maintenance is the need for a commercially viable service delivery model that provides the necessary financial incentives to attract the suitably qualified managerial and technical staff to operate the service and also finance for capital investment in new facilities and equipment.

## **Assess costs of proposed improvement options**

This activity involves an estimation of the approximate costs of each of the proposed solutions. Technologies should be costed in terms of their investment costs for construction, as well as operation and routine maintenance costs and capacity building costs. It is important to recognise that the least-cost option may not be the most appropriate solution as more affluent households may be willing to pay more for an improved level of service that they perceive to be significantly better than the current level of service.

This is often a necessary activity to be able to demonstrate to the financing institution that there is a sound business case in financial terms or to show that the investment has a positive internal rate of return to justify the project in economic terms. Thus, a realistic estimate of the cost implications and revenue streams from new or improved services over a period of time should be factored into the financial comparison of proposed interventions. These only need to be accurate enough for budgeting decisions to strategize implementation. More detailed cost estimates will need to be done by feasibility studies as part of project preparation.

As summarized in Table 4, the costing should also take into account costs associated with promotion and management, as well as hardware costs. These costs may then be used as the basis for a life-cycle assessment for each option in order to identify the most cost-effective option in the long term. The costing should also take into account the depreciation of assets and the need to ensure that capital maintenance costs are included. These are expenditures that are required for refurbishment of equipment that are often omitted in financial calculations because they are only required every few years.

As well as capital costs, the revenue from new or improved services should therefore be factored into the assessment of each technology to evaluate its financial viability. The most significant revenue stream is likely to be from service charges/tariffs or taxes/levies, but additional revenue may be derived from the sale of treated wastewater or sludge, which can be used for various purposes.

<sup>1</sup> Some of these new technologies are described in the 'Sanitation Compendium' published by Eawag-Sandec (See Annex on 'Further Information')

**Table 4:** Types of cost associated with sanitation systems (from Schuen and Parkinson, 2009)

	<b>Household or institutional cost</b>	<b>Capital costs</b>	<b>Operational and maintenance</b>
<b>Latrine</b>	Costs of toilet facilities are incurred either by the household or landlord	Earthworks, construction pits or tanks, superstructure, septic tanks or connections to sewerage	Desludging costs (including cleaning materials) and cost of water for flushing (if used)
<b>Off-site waste management facilities</b>	Capital investment costs are institutional costs but tariffs for O+M are household costs	Construction of sewerage and treatment facilities, desludging trucks and other equipment	Operational costs of sewerage and treatment facilities, desludging trucks and other equipment
<b>Management</b>	Institutional costs	Project management, supervision and salaries of engineers	Labour and materials for operation, maintenance costs for desludging
<b>Promotion and capacity building</b>	Institutional costs	Sanitation promotion and training	Support for operation and maintenance arrangements

Financial tools are used to identify the most cost-effective sanitation solutions on the basis of life-cycle analysis, taking into account all costs incurred and revenues generated over the total lifespan of an investment. As described in Box 8, assessing the overall life-cycle costs to upgrade sanitation services is a necessary activity to develop a better understanding of the financial viability of the various options. This is important as options that are initially cheaper to install may turn out to be more expensive in the long term if they have high operational and maintenance costs. The outcomes of the analysis for each solution will be a better idea about how much users need to pay for services, what up-front capital investments are required and whether there is a need for a subsidy.

**Box 8: Application of life-cycle analysis for financial assessment of sanitation service delivery options**

In Dhaka, Water and Sanitation for the Urban Poor (WSUP) worked with Dhaka Water and Sewerage Authority (DWASA) and Dhaka City Corporation (DCC) to compare the long-term costs associated with networked and non-networked sanitation solutions as part of a sanitation planning activity in the District of Mirpur. A financial model was developed to compare the costs to improved transport and treatment components assuming that any investments to improve household facilities would be borne by the households. Using the Dhaka model as the starting point, WSUP has proceeded to adapt and develop the model for application in other locations to compare the costs associated with a range of sanitation systems, and taking into account alternative tariff structures and subsidy mechanisms.

Source: WSUP, 2013

## Stage 4: Develop models for service delivery

The aim of this stage in the planning process is to formulate the most appropriate management arrangements for implementing sanitation improvement strategies in line with the improvement options defined in Stage 3. Agreement between stakeholders on the proposed institutional and regulatory framework is critical to the success of the proposed sanitation strategy. A consideration of their financial costs in relation to the capital investment requirements is very necessary, but most importantly for sustainable service delivery are the arrangements for cost recovery and management of finances.

### Activities in Stage 4 of the planning process include:

- Develop appropriate management arrangements
- Derive cost-recovery mechanisms
- Strengthen financing mechanisms
- Develop arrangements for monitoring and regulation

*Outcome from Stage 4:* The outcome from Stage 4 should be a number of defined service delivery models that can be adopted by the city to upgrade sanitation services throughout the city. These service delivery models should utilise the agreed technologies for upgrade defined in Stage 3 providing the necessary details to describe the arrangements for management, financing and cost recovery. The service delivery models should be linked to the institutional arrangements for monitoring and regulation to ensure that service providers meet the agreed service level improvements.

### Develop appropriate management arrangements

All facilities along the sanitation service chain need to be managed effectively for the system to function as a whole. Due to the failure of the traditional institutional set up in the majority of situation instances, some form of public-private partnership is likely to be the most effective means to ensure sustainable and affordable sanitation services. These partnerships have a potential to bring in resources and technical expertise, and can be an effective means to achieve more efficient service provision by fostering market competition. Contracting out operation and maintenance to private sector operators can provide a means to bridge some of the deficiencies in the public institutional setting and provide a better quality of service delivery. This does not mean that the local authority

loses control to the private sector, as assets can be owned by the state or local government or joint ownership.

Neighbourhood and city-level infrastructure may require different types of management arrangements (see Table 5). Larger cities are often divided into a number of administrative areas which have a dedicated organisation responsible for operating and maintaining services. This may be a sub-division of the main organisation responsible for service provision – generally a public or private utility – or services may be provided under a delegated management model. The management arrangements for servicing on-site sanitation is generally more complex than that for sewerage because various organizations from the public or private sector need to play a role in operating and maintaining different components of the sanitation chain. Successful implementation with various actors is dependent upon clearly defined responsibilities and lines of accountability in contractual terms. Ambiguities in the contracts and a lack of transparency will mean that the benefits of engaging with the private sector are likely to be lost.

### Derive cost-recovery mechanisms

For ongoing operation and maintenance costs, the main source of revenue should be service charges from households and institutional/commercial customers. Matching customer aspirations with the proposed level of service and the respective charges associated with different options will be important; especially because improved services generally result in higher costs. Recovering costs for sanitation services associated with operation and maintenance of sewerage and wastewater treatment plants generally poses a greater challenge than for other municipal services, notably for water supply. Where sewerage is proposed the operational costs are substantial and there is a significant risk that insufficient numbers of households will connect and become paying users of the service. This ends up in the situation that sewerage systems often need to be subsidized whereas the costs of on-site systems are paid directly by the users themselves. Treatment costs are generally not perceived to be of direct benefit to the user and there is generally a lack of willingness to pay for these costs. This may be overcome by the utility including additional sanitation charges in the water supply charges or potentially introducing a municipal sanitation tax.

**Table 5:** Service provider options for contracting out operation and maintenance requirements at different levels

Level of infrastructure /service	Operation and maintenance activity	Management option
<b>Household level Management</b>	<ul style="list-style-type: none"> <li>• Emptying of pits/septic tanks.</li> <li>• Collection and transportation of excreta.</li> <li>• Operation of holding tanks/transfer stations.</li> <li>• Unblocking of household connections.</li> </ul>	<ul style="list-style-type: none"> <li>• Small-scale service providers (operated either by a small-scale private operator or an NGO).</li> </ul>
<b>Lane and neighbourhood level services</b>	<ul style="list-style-type: none"> <li>• Emptying and repairing communal septic tanks, toilet blocks, and lane sewers.</li> <li>• Maintenance of decentralised treatment plants.</li> </ul>	<ul style="list-style-type: none"> <li>• Small or medium scale enterprise, CBOs, non-profit company, or non-governmental organization</li> </ul>
<b>City level - Primary infrastructure and services</b>	<ul style="list-style-type: none"> <li>• Maintenance of trunk sewers</li> <li>• Operation of pumping stations.</li> <li>• Management of facilities for faecal sludge / excreta / wastewater treatment and reuse.</li> </ul>	<ul style="list-style-type: none"> <li>• Utility (public or private), concession to private company.</li> </ul>

## Strengthen financing mechanisms

For development projects, funding for capital investment often comes from international financing institutions (e.g. bilateral or multilateral donors or development banks), or from central government. The type of financing mechanism and ability to mobilize funds will relate to the fiscal strength of the urban utility or municipal authority and may require the agreement from central government to accept liability for repayment if the borrowing agency defaults. In most situations, there is a need to 'ring-fence' the finances for sanitation services to ensure that there is no utilisation of funds in another sectors. Different types of financing instrument may be more appropriate for different points in the sanitation chain and for different purposes. The most obvious differentiation is between grants and loans but there are a range of financing instruments that may be utilised. For example, output based aid and the application of performance-based contracts is increasingly being utilised as a means to provide the incentives to improve the quality of service delivery. Examples of output indicators to trigger payment for performance based subsidies are described in Table 6.

### Box 9: Performance based subsidies to improve sanitation service delivery

A few national governments have adopted output-based approaches to delivering subsidies for sanitation. Examples of such programs include the Improved Latrine Program, which started in Mozambique in the late 1980s and supported the development of a network of latrine-building workshops throughout the country's main cities via subsidies based on latrine sales. In Morocco, the World Bank (through the Global Partnership for Output Based Aid (GPOBA) provided a US\$7 million grant to three service providers (both public and private) to extend water and sewerage services into unplanned urban settlements which were formerly excluded from regular service provision.

In Senegal, another GPOBA project provided subsidies for on-site sanitation facilities in poor urban and peri-urban areas of Dakar, the capital city. The project faced challenges related to the economic crisis which significantly affected Senegalese households to pay for improved sanitation and many households were expect to pay the full amount of their upfront contribution before the construction starts. To overcome these challenges, a micro-finance institution (PAMECAS) was introduced to overcome the constraint related to the up-front contributions.

Source: Trémolet and Evans, 2011

**Table 6: Examples of output indicators to trigger payment for performance based subsidies**

(Source: Tremolet and Evans 2011)

Value chain	Services	Output Indicators
<b>Demand promotion</b>	<ul style="list-style-type: none"> <li>Sanitation marketing</li> <li>Social mobilisation, triggering</li> </ul>	<ul style="list-style-type: none"> <li>Number of households who build/rehabilitate a latrine following demand promotion</li> <li>Number of communities becoming open-defecation free areas</li> </ul>
<b>Collection/Access</b>	<ul style="list-style-type: none"> <li>Build on-site sanitation facilities</li> <li>Build and operate community or public toilets</li> </ul>	<ul style="list-style-type: none"> <li>Number of facilities built and still operating x-months down the line</li> <li>Number of toilet blocks in disadvantaged areas (used/ paid for)</li> </ul>
<b>Transport</b>	<ul style="list-style-type: none"> <li>Transport pit waste to designated points</li> <li>Build and operate waste transfer stations</li> </ul>	<ul style="list-style-type: none"> <li>Volume of waste transported to and disposed in designated locations</li> <li>Number of waste transfer stations built and functioning x-years down the line</li> </ul>
<b>Treatment</b>	<ul style="list-style-type: none"> <li>Build, maintain and operate wastewater treatment plants</li> </ul>	<ul style="list-style-type: none"> <li>Volume of waste collected and treated to required standard</li> </ul>
<b>Disposal/re-use</b>	<ul style="list-style-type: none"> <li>Build and maintain facilities which convert waste to agricultural inputs or biogas</li> </ul>	<ul style="list-style-type: none"> <li>Volume of productive agricultural input generated and sold to farmers or gas created (and sold)</li> </ul>

### Develop arrangements for monitoring and regulation

Service providers need to be accountable to their customers and provide services according to an agreed set of performance and service delivery standards that can be measured by an independent body. The role of civil society will be crucial in terms of organizing civil society dialogue and engage them from beginning of the project. NGOs may also play an important role; offering specific resources that are unavailable within government agencies and a way to more effectively engage with households and communities.

Without effective monitoring which is open to public scrutiny, there is little incentive for city authorities to comply with the plan/commitments. There is a need to agree upon a monitoring plan for implementation of the city sanitation plan in order to ensure accountability of the different institutions involved in service delivery. Development of regulatory instruments should not only be focused on indicators suitable for sewerage. Monitoring according to an agreed set of performance indicators allows for improvements or deteriorations in service

delivery to be tracked and this information can then be used to inform decisions where to target investments for remedial action to enhance services (see Box 10).

The sanitation plan should also support the establishment of a register of on-site sanitation systems in order to keep a record of site visits by Environmental health officers who may look for evidence where septic tank overflows have been directly discharged into adjacent surface drains. As part of this, service providers responsible for septic tank cleaning should be registered and their disposal and occupational health practices should be monitored.

### **Box 10: Monitoring Service Level Benchmarks (SLBs) to assess sanitation service improvements in India**

The Government of India faced problems in the implementation of a large infrastructure and reform programme called as Jawaharlal Nehru National Urban Renewal Mission (JnNURM 2007-12) as many cities were not able to implement important reforms along with the investments. Therefore a system of indicators was introduced to link the effectiveness of investment through a set of Service Level Benchmarks (SLBs) and the defined baseline and proposed improvements proposed in the City Sanitation Plan. Measuring performance as per set norms and measuring parameters helps the utility and service delivery managers to draw the baseline and set targets to reach the benchmarks established for the particular type of service at the National Level. With this perspective, Ministry of Urban Development has published a Handbook on Service Level Benchmarks covering four sectors i.e Water Supply, Sewerage, Solid Waste Management and Storm Water Drainage to be adopted by the cities in setting service level targets.

#### **For the success of the SLB, there is a need to look at the above issues under three areas:**

- *Comprehensive data management:* The usefulness of SLBs depends upon the availability and reliability of data and information from city level and this feeding into a State and National monitoring system as a means of improvements from a higher level.
- *Knowledge management and capacity development:* To enable sector related staff to feed their relevant information into the monitoring system, enabling them to access and retrieve data for their sectorial requirements.
- *SLBs as a mandatory requirement for all urban/sector related schemes:* All urban and sector related schemes at the Centre and State level should use the SLB as the minimum basic criteria for reporting and performance monitoring.

## **Stage 5 Prepare for implementation**

The final stage focusses on ensuring that the planning process leads to implementation. After the preparation of the final draft of the city-wide sanitation plan, which should be easily to understand and not open to interpretation, there will be a need for a final consultation activity. There should be sufficient time available to complete this satisfactorily before moving forwards to the development of the plan for sanitation promotion and capacity building.

#### **The main activities in Stage 5 of the planning process should entail:**

- Ensure proposals meet expectations for improvement
- Sanitation promotion, advocacy and awareness-raising
- Capacity building

*Outcome from Stage 5:* The outcome from the final stage in the planning process should be the final plan itself and an agreed strategy for financing and implementation of the priority components. This should also include specific target actions to promote sanitation through advocacy and awareness raising combined with a well-developed capacity building strategy to support the implementation of specific components of the plan.

### **Ensure proposals meet expectations for improvement**

This activity involves pulling together the various components of the plan into a structured document which documents the outcome from the planning process. The plan should identify priority areas, propose recommendations for sanitation development, details of service delivery and proposed service level improvements, specify targets and measurable goals (such as number of households served by desludging services or % wastewater treated) to address existing critical issues and future demands (e.g.) due to population expansion. The plan should provide the basis for design but does not need to include details for construction of any new infrastructure. These will be elaborated as funds are made available.

The plan should be used as the basis for final consultation with the various actors and institutional stakeholders to ensure that management and financing arrangements are in line with the objectives for all city residents. Although the previous activities of the planning process should minimise any concerns from

the various stakeholder groups, a formal consultation process is needed as there may be some who may not have been so actively engaged who have yet to respond to the proposals in the strategy.

The key to success in the planning process is therefore good interaction and communication with different stakeholders. To improve communications it may be beneficial to prepare some summary documents e.g. an executive summary for decision-makers and easy to digest brochures to enable non-technical people to access information in an appropriate manner. The following media may be used to disseminate information about the plan and subsequently its implementation (including any updates to the plan):

- Websites of the Local authority, municipal corporation and/or water utility
- Yearbook to document the progress in implementation for a longer period of time
- Local newspapers / Local government newsletters or gazettes
- Community meetings

The feedback from this consultation should also enable the municipality to prepare an appropriate action plan for implementing the selected solutions, including financing plan and capacity building needs. The outcome should be consensus on the preferred options in technical, financial and managerial terms and provide clear definition of the roles and responsibilities for implementation, operation and maintenance.

There needs to be collective agreement between the main stakeholders upon the institutional roles and responsibilities for furthering the plan, details of the management arrangements and regulatory requirements. The agreement needs to be supported by the commercially viable financing and cost-recovery mechanisms, and a transparent presentation of tariffs and any proposed cross-subsidies. The feedback from this consultation should identify any areas or weaknesses in the plan that need to be addressed prior to implementation. It should subsequently be used as the basis for discussing financing with the Ministry of Finance, development banks and other potential funders.

## Sanitation promotion, advocacy and awareness-raising

There is no point in trying to sell, or even give, a sanitation facility to a household that does not want it. Therefore, there is a need to understand both existing consumer demands and requirements for sanitation, and to stimulate new or latent demand for sanitation. Sanitation services need promotion in the same way that hygiene improvements require promotion, but the “drivers” of demand may be different. Sanitation promotion frequently focuses on the attractiveness, usefulness and convenience of having and using household sanitation facilities.<sup>2</sup>

Peer pressure can be an important element of stimulate demand for improved sanitation services. This is evident with the Community Led Total Sanitation Approach which has been widely adopted for rural sanitation programmes to eliminate open defecation. Although the situation is different in urban areas, social mobilisation through awareness raising can result in communities collectively taking a more proactive role towards improving sanitation in their areas. This may involve individuals taking action to invest in improvements to household level facilities and increase willingness to pay for improved sanitation services or collective action to keep drains clear from solid waste.

Sanitation marketing uses commercial and social marketing techniques on the demand side and market development and facilitation on the supply side to promote uptake and sustained use of improved sanitation<sup>3</sup>. In the urban situation, often the constraint is more on the supply side rather than on the demand side, but there may nevertheless be benefits for a marketing component of a sanitation strategy focussing on promotion of well-defined behaviours and products<sup>4</sup>.

As described below in Box 11, local authorities are important actors to take a lead role in the planning process. Advocacy and awareness-raising is therefore also equally relevant towards city leaders to prompt local authorities to take the necessary action to develop the enabling environment for the various actors to work together to provide better services. In Indonesia, one of the main drivers for encouraging the mayors to see the importance of sanitation in their cities has been the economic benefit.

<sup>2</sup> World Bank Sanitation, Hygiene and Wastewater Resource Guide - <http://water.worldbank.org/shw-resource-guide>

<sup>3</sup> Water and Sanitation Program Sanitation Marketing Toolkit. <http://www.wsp.org/toolkit/what-is-sanitation-marketing>

<sup>4</sup> [http://www.sharerresearch.org/NewsAndEvents/Detail/Gordon\\_McGranahan\\_sanitation\\_marketing](http://www.sharerresearch.org/NewsAndEvents/Detail/Gordon_McGranahan_sanitation_marketing)

### Box 11: Experiences from the ACCESSanitation project in India and the Philippines

In the planning activities supported by ICLEI in India and the Philippines as part of the ACCESSanitation project the focus of the planning was to build the capacity of local authorities to develop strategic sanitation action plans in selected cities and implement a demonstration project providing the basis for scaling up after the project. The project produced a tool comprised of 15 modules specifically designed for local governments to be used to support planning and implementation of sustainable water and sanitation interventions at the local level. The tool includes modules for city sanitation planning, implementation and management, financing and participatory monitoring and evaluation. Each of the participating local governments developed an action plan to improve the sanitation situation in a selected area in their cities. The action plans include the city's priority issues as identified through a stakeholder process, the objectives and targets developed for improving sanitation, the activities foreseen to achieve the planned improvements and a financial and management plan for a pilot activity in the city. The project also encouraged South-South interactions between city authorities to promote learning and experience sharing.

See [www.accessanitation.org](http://www.accessanitation.org) for further information

## Capacity building

Problems of sanitation service delivery frequently stem from management deficiencies and poor cost recovery as well as a lack of sufficient staff with adequate technical capacity. Lack of institutional capacity related to managerial and technical competences to develop and implement strategic plans is a key constraint. It is therefore important to strengthen organizations and institutional capacity to identify, understand and evaluate complex urban environmental problems related to sanitation and to building financial and managerial capabilities for service provision and regulation of non-governmental service providers.

Capacity development is one of the prerequisites for effective planning, and subsequently implementation, which involves various activities for organisational strengthening at all levels and development of human resources within these organisations. Figure 10 illustrates the concept of capacity building in which a local capacity building strategy focuses upon training and skill development, and development of effective

organizations for planning and management. New skills are often required, but for these organisations to be effective, they need to be embedded in/linked to a supportive institutional and legal framework.

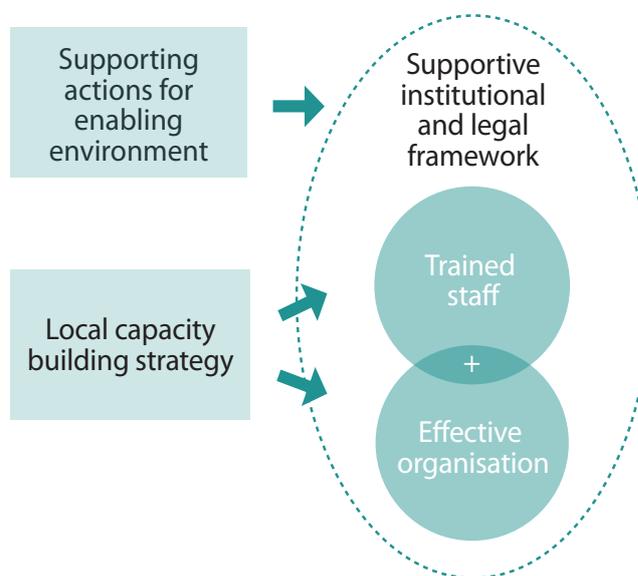


Figure 10: Components of capacity building (Peltenburg et al, 1996)

Sanitation planning and human resource development are intrinsically linked and an iterative process in which the human resource development requirements are identified based on the findings of the sanitation plan is recommended. It starts with the recognition of the skills and capacities that already exist amongst the organisations involved in the planning process and builds upon them. It is important to develop capacities of a larger tier of technicians because they are often transferred to other departments, taking away with them a depth of knowledge acquired and a good institutional memory. As well as the focus on governmental and NGO staff, capacity development is also necessary for local private sector entrepreneurs, engineers and sanitation professionals who may not have knowledge on new innovations on technologies and business models.

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# Sources of further information

## Sustainable Sanitation Alliance

The Sustainable Sanitation Alliance (SuSanA) is an open international network of organisations who share a common vision on sustainable sanitation. The secretariat function is currently held by GIZ (Deutsche Gesellschaft für Internationale Zusammenarbeit) and brings together over 230 organisations from around the world.

SuSanA came into existence in early 2007 and works as a coordination platform, working platform, sounding board, contributor to the policy dialogue on sustainable sanitation and as a “catalyst” for action on the ground. SuSanA was instrumental in building momentum by uniting efforts of partner organisations’ during the UN International Year of Sanitation (IYS) in 2008.

SuSanA also has the largest open source discussion forum with currently over 3600 registered users. Participation in SuSanA is open to all those who want to join and be active in the promotion of sustainable sanitation systems. The SuSanA invites you to join the network, contribute ideas, and to become active partners in the thematic working groups.

The topic of this publication is closely aligned with the activities and thematic discussions of the Cities working group. SuSanA members are encouraged to participate in discussion and exchanges of experiences related to city sanitation planning via the SuSanA forum.

**More information:** [www.susana.org](http://www.susana.org)

**Link to discussion forum:** <http://forum.susana.org/forum>

sustainable  
sanitation  
alliance



**We are a global community!**

## Community-Led Urban Environmental Sanitation Planning (CLUES)

CLUES is a planning process developed by Eawag-Sandec through which community participation is used to address local issues and to develop household level strategies for sanitation. CLUES is particularly appropriate for communities located in areas that are hard to serve and not served by the municipal services. CLUES can also be used as the basis for discussing interventions for areas that need individual, adapted solutions due to their specific physical or geographical characteristics.

### The seven steps of the CLUES approach are:

- Step 1: Process Ignition and Demand Creation
- Step 2: Launch of the Planning Process
- Step 3: Detailed Assessment of the Current Situation
- Step 4: Prioritisation of the Community Problems and Validation
- Step 5: Identification of Service Options
- Step 6: Development of an Action Plan
- Step 7: Implementation of the Action Plan

In addition to the seven generic planning steps, CLUES features three cross-cutting issues that are seen as crucial for a successful planning process in urban contexts: (i) exposure and communication to enable a transparent and communicative process that involves all key stakeholders, (ii) capacity development to build skills needed both at municipal and community levels, and (iii) monitoring and evaluation of the planning and implementation phase.

A separate chapter underlines the importance of the enabling environment – a precondition for the success of any intervention. An explicit consideration of the enabling environment at an early planning stage and, more generally by approaching WaSH issues from a systems perspective make CLUES a state-of-the-art planning tool that ideally complements Sanitation21.

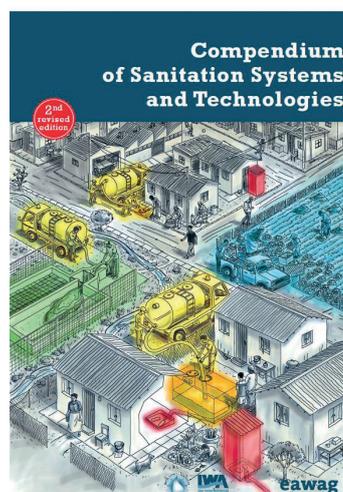
**Download:** [www.sandec.ch/clues](http://www.sandec.ch/clues) (Available in English and Spanish)

## Compendium of Sanitation Systems and Technologies

The compendium gives a systematic overview on different sanitation systems and technologies and describes a wide range of available low-cost sanitation technologies. The Compendium is a guidance document for engineers and planners in low and middle income countries, primarily intended to be used for communicative planning processes involving local communities. It is not intended as a stand-alone document for engineers taking decisions for the community, e.g. expert-driven decision-making. It is also intended for persons/experts who have detailed knowledge about conventional high-end technologies, but not much else.

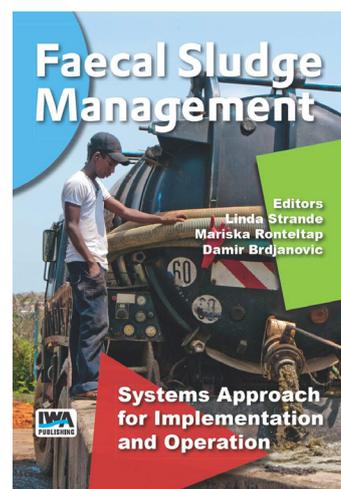
As in the first edition, the Compendium is divided into 2 Parts, (i) the System Templates and a description about how to use them; and (ii) the Technology Information Sheets.

**Download:** [www.sandec.ch/compendium](http://www.sandec.ch/compendium) (available in English, French and Spanish)



## Faecal Sludge Management : Systems Approach for Implementation and Operation (IWA 2014)

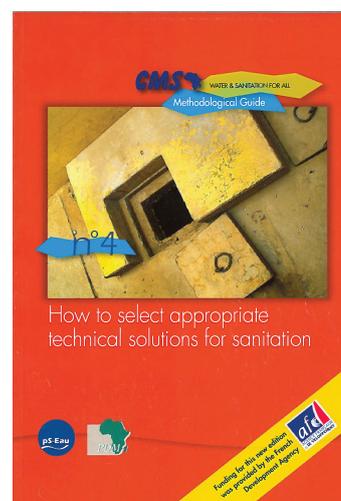
This is the first book dedicated to faecal sludge management. It compiles the current state of knowledge of the rapidly evolving field of faecal sludge management, and presents an integrated approach that includes technology, management, and planning based on Sandec's 20 years of experience in the field. The book addresses the organization of the entire faecal sludge management service chain, from the collection and transport of sludge, and the current state of knowledge of treatment options, to the final end use or disposal of treated sludge. The book also presents important factors to consider when evaluating and upscaling new treatment technology options.



## How to Select Appropriate Technical Solutions for Sanitation

Partenariat pour le Développement Municipal (PDM) and Programme Solidarité Eau (pS-Eau)

The purpose of this guide is to assist local contracting authorities and their partners in identifying those sanitation technologies best suited to the different contexts that exist within their town. The first part of the guide contains a planning process and a set of criteria to be completed; these assist you in characterizing each area of intervention so that you are then in a position to identify the most appropriate technical solutions. The second part of the guide consists of technical factsheets which give a practical overview of the technical and economic characteristics, the operating principle and the pros and cons of the 29 sanitation technology options most commonly used in sub-Saharan Africa.



## Developing Urban Sustainable Sanitation Awareness Raising Campaigns – An Overview ICLEI

Guidance for local governments in developing and implementing adequate awareness raising measures to trigger behavioural change in the cities and/or identified target communities respectively. The process comprises of 4 major phases (assessment, planning, implementation, monitoring) including nine steps.

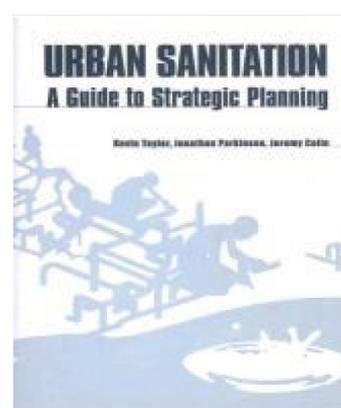
## Development and Implementation of Urban Sustainable Sanitation Awareness Raising Campaigns

A Practical Guideline for Local Governments



## Urban Sanitation: A Guide to Strategic Planning (1999) Tayler, Parkinson and Colin, Practical Action Publishing

The guide explores the action to be undertaken to create an improved context for planning and for initiating improved planning processes at the local level, which may eventually lead to more widespread change and development. The guide includes chapters devoted to key aspects of the planning process, including creating and informing demand, gathering and analysing information, choosing an appropriate technology, and organizing a participatory workshop.





## Stages in the Sanitation 21 planning process

1

### Build institutional commitment and partnership for planning

- Establish planning process leader and city sanitation task force
- Consultation and facilitation of the process
- Assess key priorities and incentives
- Define collective vision and priorities for sanitation improvement
- Agree upon the planning process.

2

### Understand the existing context and define priorities

- Collect and review information about existing services
- Identify constraints to service provision
- Undertake a sanitation market assessment
- Identify priority areas for improvement

3

### Develop systems for sanitation improvement

- Delineate zones for system development
- Consider appropriate toilet technologies
- Develop strategy for treatment, disposal or reuse
- Collection and transportation of wastewater and faecal sludge
- Consider operational and maintenance requirements
- Assess costs of proposed improvement options

4

### Develop models for service delivery

- Develop appropriate management arrangements
- Derive cost-recovery mechanisms
- Strengthen financing mechanisms
- Develop arrangements for monitoring and regulation

5

### Prepare for implementation

- Ensure proposals meet expectations for improvement
- Sanitation promotion, advocacy and awareness-raising  
Capacity building