



Platform for
INTEGRATED SANITATION INVESTMENT PLANNING

Proof-of-Concept

Review of Decision Support Resources
Compendium



December 2013



Introduction

Effective decision-making support systems help decision makers in identifying, evaluating and choosing a technology that best suits context/conditions of a city/area/ward. In order to develop a tool which is of use to decision-makers, an evaluation of the existing support resources was considered necessary to identify challenges/gaps pertaining to content, design and usefulness of the resource in question.

Centre for Study of Science, Technology and Policy (CSTEP) evaluated existing support resources for decision making, which include the following:

- **Benchmarks:** Benchmarks allow cities to understand and assess their performance. Through the use of sanitation indicators, cities are able to identify areas of strengths and weaknesses, shedding light on what can be improved, thereby allowing informed decision making.
- **Case Studies:** Case studies are important sources of information that cover various aspects of a technology during implementation, such as the community willingness to accept technology, socio-economic aspects that need to be considered and also adaptation/improvisation of a technology suited for local needs. These provide examples which can influence the decision-making process. This is mostly India specific.

Guidebooks and Manuals: These documents provide guidance on advantages of sanitation technology design, construction, implementation and evaluation, either covering specific parts or the entire sanitation value chain.

This research, based on which this compendium has been compiled, was predominantly based on an online search combined with inputs from stakeholders on various relevant resources. The major sources of information are listed below:

- Sustainable Sanitation Alliance (SUSanA): www.susana.org
- National Environmental Engineering and Research Institute (NEERI): www.neeri.res.in
- Central Public Health and Environmental Organisation (CPHEEO): <http://cpheeo.nic.in/>
- Ministry of Urban Development (MoUD): <http://moud.gov.in/>
- Eawag: <http://www.sswm.info/>
- Akvo: <http://waste-dev.akvo.org/dst/sanitation/technologies/>

Each of these sites were investigated with a specific focus on identifying benchmarks, case studies, guidelines and manuals which showcase sanitation systems in urban India. The focus was to highlight cases which presented technologies covering the sanitation value chain. Once documents were identified, an analysis was carried out to highlight the purpose of these documents, the context in which the information provided can be applied, and the group of stakeholders the resource it is intended for.

- **Evaluation Tools (for decision support):** Different evaluation tools, ranging from modelling of project costs (the capital, and operation and maintenance costs) with respect to technology, to more integrated costing (like life-cycle costing) and also planning tools that integrated project costs to municipal finances have been included in this compendium. The sanitation evaluation tools discovered/reviewed so far are predominantly open source and are freely available on the web. Some of the tools from Emergent Ventures and Boston Consulting Group (BCG), NewSAN, etc., for which resources were not available online, the organisation/person in charge was contacted in order to understand the tool. The “Sanitation Hackathon” website was referred to have innovative solutions to a variety of sanitation related problems (Sanitation Hackathon, n.d.). The decision support tools identified, try to recommend appropriate sanitation technologies based on the input situation. The mapping and data collection tools are mostly crowd sourced, where citizens are the primary data collectors.

The research undertaken resulted in the following number of support resources (see Table 1):

- Benchmarks- 3
- Manuals/Guidebooks – 30
- Case Studies – 12
- Evaluation tools – 32

A bibliography of the above mentioned types of resources is included in this compendium. It is to be noted that resources that are locally (specific to a city/ULB) available, and/or not available online are not included.

Table 1: Summary of Support Resources Reviewed

Type of Resources	Number	Topics covered/aspects	For whom
Benchmarks	3	Awareness of benchmarking, Service Level Benchmarks for wastewater, sanitation, municipal solid waste, storm and drainage and water supply	For planners and decision makers
Guidebooks/ Manuals	30	Maintenance, Community Led Total Sanitation, ECOSAN, Technology overviews, Design Construction and operation, City Sanitation Planning, Financing, Pollution	For planners and decision makers
Case studies	12	Decentralised treatment, Reuse, ECOSAN, Toilets/storage, treatment, onsite, financing	For planners, designers, engineers, NGOs.
Evaluation Tools	32	Sewerage modelling/planning, capacity building/training, financing, data collection/scheduling/monitoring, transport, decision-support tools	For planners, engineers, service delivery management

The bibliography of support resources contained in this compendium has been organised and segregated based on type of resource, namely Benchmarks, Guidebooks and Manuals, and Case Studies. Additionally, the support resources have also been placed in colour coded boxes to denote the context they address/pertain to as follows:

Colour	Context
	Urban
	Rural and Urban
	Rural, Peri Urban and Urban
	Not Specified

The support resources under the category of Evaluation Tools have been presented in a tabular form in pages 15-28.

Benchmarking Tools

Handbook on Service Level Benchmarking

Source: <http://www.urbanindia.nic.in/programme/uwss/slb/handbook.pdf>

Purpose: By focussing on performance monitoring in urban India, this 'Handbook' has been compiled to enable systematic and sustained monitoring of services using standardised indicators.

End User: Primarily Planners and decision makers

Context: Urban

Case Study: The Water and Sanitation program (WSP¹) collected data for 13 utilities in 23 cities and towns in 2 phases. Data collection enabled cities to undertake an honest self appraisal of their performance from a service point of view. By carrying out a performance gap analysis using the data collected, proposals have been submitted to the MoUD for information systems improvement.

Case Study Source: http://www-wds.worldbank.org/external/default/WDSContentServer/WDSP/IB/2011/03/10/000356161_20110310031719/Rendered/INDEX/600560WSP1naga10BOX358307B01PUBLIC1.txt

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¹ The Water and Sanitation Program (WSP) is a multi-donor partnership administered by the [World Bank](#) to support poor people in obtaining affordable, safe and sustainable access to water and sanitation services.

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www.cstep.in

The International Benchmarking Network for Water and Sanitation Utilities (IBNET) Indicators

Source: http://www.ib-net.org/en/texts.php?folder_id=96&mat_id=78&L=1&S=1&ss=6

Purpose: This database of water and sanitation utilities provides financial, technical and process indicators capturing the institutional context in which the utilities are operating for the assessment of utility performance in the provision of water and sewerage services in an urban context.

End User: Water and Sanitation (WATSAN) utilities

Case Study: WSP used IBNET performance indicators in Bangladesh India and Pakistan (Phase I – 2003-04) to create awareness on benchmarking, developing methodology and collecting and analyzing data on an initial sample of WSS utilities. Phase II was build upon the key learnings from Phase I; work with a selected set of WSS utilities to collect fresh data and scale up the exercise to promote the concept amongst a larger number of WSS utilities across India through targeted dissemination and advocacy.

Case Study Source:

Phase I: http://www.wsp.org/sites/wsp.org/files/publications/WSP_benchmarking.pdf Phase II: http://www.wsp.org/sites/wsp.org/files/publications/Benchmarking_Report.pdf

Performance Assessment system (PAS)

Source:

http://www.pas.org.in/Portal/document/PerformanceAssessmentDoc/pdf/List%20and%20Definition%20of%20LAs_Jan%2018%202011.pdf

Purpose: This list of indicators and definitions provides information on water and sanitation performance indicators and benchmarks which facilitate reporting, monitoring, planning, budgeting and investing in water and sanitation services in the urban context.

End User: Decision makers and planners

Case Study: Gujarat and Maharashtra

Case Study Source:

http://www.pas.org.in/web/ceptpas/performance?p_p_id=SLBPerformanceAssessment_WAR_Portal&p_p_lifecycle=1&p_p_state=normal&p_p_mode=view&p_p_col_id=column-1&p_p_col_count=2&actionVal=GetScreen&tabId=4

Guidelines and Manuals

How to Select Appropriate Technical Solutions for Sanitation

Source:

http://www.sswm.info/sites/default/files/reference_attachments/MONVOIS%20et%20al%202010%20How%20to%20Select%20Appropriate%20Technical%20Solutions%20for%20Sanitation-ENGLISH_0.pdf

Purpose: This guide provides technology choices by identifying the best suited sanitation technologies that are suited to the different contexts existing within towns located in urban areas of developing countries.

End User: Local decision makers, planners

Sanitation Systems and Technologies

Source:

http://www.sswm.info/sites/default/files/reference_attachments/EAWAG_SANDEC%20Sanitation%20Systems%20&%20Technologies_0.pdf

Purpose: This training module provides technology choices by comparing different technological approaches of sanitation management which are available in urban settings of developing countries.

End User: Sanitation Practitioners

National Urban Sanitation Policy

Source: http://www.susana.org/docs_ccbk/susana_download/2-1584-giz-nusp-fact-sheet-1.pdf

End User: Policy makers, planners

Purpose: This policy document provides guidelines on areas which should be emphasised in state sanitation strategies and city sanitation plans in India.

www.cstep.in

Community-based Technologies for Domestic Wastewater Treatment

Source: http://www.sswm.info/sites/default/files/reference_attachments/Rose%201999%20Community-Based%20Technologies%20for%20Domestic%20Wastewater%20Treatment%20and%20Reuse-%20options%20for%20urban%20agriculture.pdf

End User: Designers and decision makers

Purpose: This report presents a review of global low cost technologies in wastewater treatment.

Faecal Sludge (FS) Management - Review of Practices, Problems and Initiatives

Source:

http://www.sswm.info/sites/default/files/reference_attachments/STRAUSS%20MONTANGERO%20FS%202002%20Management%20Review%20of%20Practices%20Problems%20Initiatives.pdf

Purpose: This report provides management and institutional aspects regarding the challenges and possible improvements in managing FS.

End User: Planners

Technology Options for Urban Sanitation – A Guide to Decision Making

Source: http://moud.gov.in/sites/upload_files/moud/files/Urban_Sanitation.pdf

Purpose: This guide presents the various technology options for provision of access, operation and management, and disposal arrangements related to sanitation services.

End User: Planners and Engineers

Communal Toilets in Urban Poverty Pockets

Source: <http://www.wateraid.org/~media/Publications/communal-toilets-user-satisfaction-bhopal-india-report.pdf>

Purpose: This report provides an evaluation of communal latrines by presenting the operational issues related to waste collection

End User: General public

Global Experiences on Expanding Services to the Urban Poor

Source: http://www.wsp.org/sites/wsp.org/files/publications/SA_GUIDANCENOTES_globaleg.pdf

Purpose: This report presents technology choices by providing a review of various global initiatives which seek to improve service delivery.

End User: General public

Case Study Source: Section 1

http://www.wsp.org/sites/wsp.org/files/publications/SA_GUIDANCENOTES_globaleg.pdf

Guidance notes on Services for the Urban Poor

Source: http://www.wsp.org/sites/wsp.org/files/publications/Main_Global_Guidance_Note.pdf

Purpose: This report identifies barriers to service delivery for poor people living in urban areas in Africa, East and South Asia, and Latin America and recommends practical solutions to overcome them. It includes a compilation of 19 case studies from 12 countries as well as consultations with urban poor communities to analyse similar barriers and proposes solutions.

End User: General public

www.cstep.in

Compendium of Sanitation System Technologies

Source:

http://www.sswm.info/sites/default/files/reference_attachments/TILLEY%202008%20Compendium%20of%20Sanitation%20Systems%20and%20Technologies_0.pdf

Purpose: This compendium provides an overview of different sanitation systems and technologies and describes a wide range of available low-cost sanitation technologies with advantages and disadvantages which can be used in India and other developing countries, both in the rural and urban contexts.

End User: Designers/Engineers and planners

How to Manage Toilets and Showers

Source:

http://www.sswm.info/sites/default/files/reference_attachments/TOUBKISS%202010%20How%20to%20Manage%20Public%20Toilets%20and%20Showers-ENGLISH.pdf

Purpose: This guide provides practical advice and recommendations for managing toilet blocks situated in public places which can be applied to the situation in Indian and other developing countries, both in the rural and urban contexts.

End User: Decision makers, planners and managers

Handbook on Community led Total Sanitation

Source: http://www.susana.org/docs_ccbk/susana_download/2-1814-clts-hand-bookenglish.pdf

Purpose: This 'handbook' provides guidelines on implementation of Community led total sanitation – planning, implementation and follow-up which can be used in India and other developing countries, both in the rural and urban contexts.

End User: Particularly field staff, trainers and facilitators

A Guide to Development of On-site Sanitation

Source:

http://www.sswm.info/sites/default/files/reference_attachments/WHO%201992%20A%20Guide%20to%20the%20development%20of%20on-site%20sanitation.pdf

Purpose: This guide presents appropriate technologies for sanitation highlighting socio-economic aspects of planning and implementing so as to enable its end users to make technology choices in developing countries, both in the urban and rural contexts.

End User: Designers, planners

Manual on design, construction and maintenance of low cost pour flush water seal latrines in India

Source: http://www.susana.org/docs_ccbk/susana_download/2-1411-manual-on-the-design-construction-and-maintenance-of-low-cost-pour-flush-waterseal-latrines-in-india.pdf

Purpose: This construction and operational manual provides the salient features of design, construction, maintenance and administration of low-cost pour flush water seal latrines with off-set twin pits for rural and urban conditions.

End User: Designers and Contractors

Composting Toilets – The Future of Sanitation?

Source:

http://www.sswm.info/sites/default/files/reference_attachments/VISHWANATH%20and%20VISHWANATH%20ny%20Comp%20sting%20Toilets%20%E2%80%93%20The%20Future%20of%20Sanitation.pdf

Purpose: This paper describes the principle of ECOSAN and dry composting toilets and the process of ECOSAN applied to rural and urban in developing countries household.

End User: Designers

Case Study: India

Case Study Source: http://www.susana.org/docs_ccbk/susana_download/2-252-waffler-et-al-2006-indian-case-studies-en.pdf

www.cstep.in

Operation and Maintenance of DTS at Adarsh College, Kukgaon, Badlapur

Source: http://www.susana.org/docs_ccbk/susana_download/2-1263-l-barreto-adarsh-college-badlapur-om-manual-dtspdf-onlage.pdf

Purpose: This manual presents the ECOSAN process by providing the associated activities needed to be performed and the frequency in which they need to be carried out, set in the Indian context.

End User: Planners

Sustainable Sanitation in India

Source: http://www.susana.org/docs_ccbk/susana_download/2-1136-en-ecosan-india-20081.pdf

Purpose: This publication showcases case studies as examples from an Indo-German cooperation project on sustainable sanitation in India.

End User: Planners

Ecological Sanitation

Source:

http://www.sswm.info/sites/default/files/reference_attachments/ESREY%20et%20al%201998%20Ecological%20Sanitation.pdf

Purpose: This report documents different options of ECOSAN based on dehydrating and composting toilets in use around the world.

End User: Planners

Waterless Urinals for Sustainable Resource and Environmental Management

Source: http://www.susana.org/docs_ccbk/susana_download/2-737-iiwaterlessurinalmanuscript.pdf

Purpose: This report showcases designs of waterless urinals and hence provides designers with waterless urinals technology choices.

End User: Designers

Decentralized Wastewater Treatment Methods for Developing Countries

Source:

http://www.sswm.info/sites/default/files/reference_attachments/NATURGERECHTE%20TBW%202001%20Decentralised%20wastewater%20treatment%20methods%20for%20developing%20countries.pdf

Purpose: This article presents operation and maintenance options with respect to sustainable plant operation, and use of local resources, knowledge and manpower by describing DEWATS technology for developing countries.

End User: Planners

Grey water management in low and middle income countries, review of different treatment systems for household or neighbourhood.

Source:

http://www.sswm.info/sites/default/files/reference_attachments/MOREL%20and%20DIENER%202006%20Grey%20water%20Management.pdf

Purpose: This report presents a list of systems that vary significantly in terms of complexity, performance and costs and range from simple to complex systems thereby providing treatment technology choices.

End User: Designers and decision makers

Water Pollution Control – A Guide to The Use of Water Quality Management Principles

Source:

http://www.sswm.info/sites/default/files/reference_attachments/HELMER%20and%20HESPANHOL%20Eds%201997%20Water%20pollution%20control%20guide.pdf

Purpose: This guide discusses regulatory, financial and technical aspects of water pollution control which are illustrated with an extensive collection of case studies.

End User: Planners

The Manual on the Right to Water and Sanitation

Source: <http://indiasanitationportal.org/24>

Purpose: This manual aims at strategy development for WATSAN by presenting a tool to develop strategies for implementing the human right to water and sanitation.

End User: Policy makers and Practitioners

www.cstep.in

Linking Technology Choice with Operation and Maintenance in the context of community water supply and sanitation

Source:

http://www.sswm.info/sites/default/files/reference_attachments/BRIKKE%202003%20Linking%20technology%20choice%20with%20operation%20and%20maintenance%20in%20the%20context%20of%20community%20water%20supply%20and%20sanitation.pdf

Purpose: This reference document for planners and water project staff provides the main steps involved in choice selection of technologies for water supply, purification and water treatment at household and community level in developing countries.

End User: Planners and staff of water programmes

Central Public Health and Environmental Engineering Organisation (CPHEEO) Manual

Source: http://urbanindia.nic.in/programme/uwss/Draft_Manual_SST%28Engg%29.pdf

Purpose: This manual provides system design considerations for wastewater collection, treatment and disposal in India.

End User: Designers

Marketing Compost - A Guide for Compost Producers in Low and Middle Income Countries

Source:

http://www.sswm.info/sites/default/files/reference_attachments/ROUSE%20et%20al%202008%20Marketing%20Compost.pdf

Purpose: This guide provides a step by step manual on how to initiate and operate small-scale composting facilities in developing countries to turn waste into jobs and food security.

End User: Engineers, designers and local authorities

Handbook on Technical Options for Onsite Sanitation

Source: <http://indiasanitationportal.org/16933>

Purpose: This 'handbook' provides sustainable technology options for onsite sanitation in different hydro-geological conditions in India.

End User: Planners

Construction of Ecological Sanitation Latrine

Source:

http://www.sswm.info/sites/default/files/reference_attachments/WATER%20AID%202011%20Construction%20of%20Ecological%20Sanitation%20Latrine.pdf

Purpose: This construction and operation manual sets out principles for adopting an ecological sanitation approach and provides guidance on constructing and operating ECOSAN latrines in Nepal and other developing countries.

End User: Practitioners interested in promoting Ecological Sanitation (ECOSAN)

Applying Life Cycle Costs Approach to Sanitation

Source: [http://www.sswm.info/sites/default/files/reference_attachments/Briefing%20Note%203%20-%20Applying life-cycle costs approach sanitation.pdf](http://www.sswm.info/sites/default/files/reference_attachments/Briefing%20Note%203%20-%20Applying%20life-cycle%20costs%20approach%20sanitation.pdf)

Purpose: This briefing note explains an application of the life-cycle costs approach (LCCA) to sanitation in rural and peri-urban areas in four different countries India, Burkina Faso, Ghana and Mozambique.

End User: Designers

Decentralized Wastewater Management at Adarsh College, Badlapur, Maharashtra, India

Source: http://www.susana.org/docs_ccbk/susana_download/2-38-en-susana-cs-india-badlapur-adarshschoolfinal.pdf

Purpose: This study seeks to evaluate the decentralised wastewater treatment system at Adarsh Vidyaprasarak Sanstha's College of Arts and Commerce, India.

End User: Planners and decision makers

Improved Traditional Composting Toilets with Urine Diversion, Leh, Jammu and Kashmir, India

Source: http://www.susana.org/docs_ccbk/susana_download/2-42-en-susana-cs-india-leh-composting-toilet-2009.pdf

Purpose: This case study addresses waste collection through composting toilets by introducing the traditional Ladhak sanitation system and the reuse of waste through composting.

End User: Designers and Engineers

UASB Technology For Sewage Treatment In India: Experience, Economic Evaluation and Its Potential in Other Developing Countries

Source: http://www.sswm.info/sites/default/files/reference_attachments/KHALIL%202008%20Uasb%20Technology%20For%20Sewage%20Treatment%20In%20India.pdf

Purpose: This case study presents a review of the overall implications of UASB (Upflow Anaerobic Sludge Blanket) technology in India. It introduces institutional and technical aspects with special reference to the Yamuna Action Plan (YAP) and includes the potential of UASB technology in other developing countries.

End User: Designers and planners

www.cstep.in

Logistic Aspects of Ecological Sanitation in Urban Areas

Source: http://www.susana.org/docs_ccbk/susana_download/2-452-slob-2005-logistic-ecosan-waste-en.pdf

Purpose: A transportation system is presented for the collection and transport of excreta from households in a specific Indian urban community to farmers outside the specific city thereby presenting an ECOSAN methodology.

End User: Designers and planners

Ecological Sanitation and Reuse of Wastewater

Source:

http://www.sswm.info/sites/default/files/reference_attachments/JENSSEN%202004%20Ecological%20Sanitation%20and%20Reuse%20of%20Wastewater.pdf

Purpose: This paper introduces ECOSAN and provides its advantages and disadvantages, describes ECOSAN in practice, and discusses dimensions of culture, gender and poverty as well as health aspects.

End User: Planners and decision makers

Decentralised Composting lessons Learnt and Future Potentials for Meeting the Millennium Development Goals

Source:

http://www.sswm.info/sites/default/files/reference_attachments/DRESCHER%202006%20Decentralized%20Composting.pdf

Purpose: This case study presents a research programme on decentralised composting. It includes strengths and weaknesses of such a system of reuse and provides indicators for sustainable decentralised composting schemes.

End User: Planners and municipal authorities

Technical and Economic Analysis of Compost Enterprises in Bangalore, India

Source:

http://www.sswm.info/sites/default/files/reference_attachments/ZURBRUGG%20et%20al%202002%20Decentralized%20Composting%20India.pdf

Purpose: This paper addresses technical and economic aspects of waste reuse by presenting two case studies of compost plants in Bangalore, India.

End User: Municipal officers and decision makers

Financing On-site Sanitation for the Urban Poor

Source: http://www.wsp.org/sites/wsp.org/files/publications/financing_analysis.pdf

Purpose: This paper presents a review of onsite sanitation financing in six case studies.

End User: Planners

Case Study Source: http://www.wsp.org/sites/wsp.org/files/publications/financing_analysis.pdf

www.cstep.in

Sewage Fed Aquaculture Systems of Kolkata - A Century-old Innovation of Farmers

Source:

http://www.sswm.info/sites/default/files/reference_attachments/RAYCHAUDHURI%202008%20Traditional%20Aquaculture%20Practice%20at%20East%20Calcutta%20Wetland.pdf

Purpose: This case study documents the waste reuse methods that have been used in eastern Calcutta, India by creating fishponds in sewage-fed lagoons.

End User: Planners

Waste-fed Fisheries in Peri-urban Kolkata

Source: http://www.sswm.info/sites/default/files/reference_attachments/MUKHERJEE%202003%20Waste-Fed%20Fisheries%20in%20Periurban%20Kolkata.pdf

Purpose: This article provides a study on one of the largest wastewater fed aquaculture practices in India.

End User: Planners

Wastewater Irrigation in Gujarat: An Exploratory Study.

Source:

http://www.sswm.info/sites/default/files/reference_attachments/PALRECHA%20et%20al.%202012%20Wastewater%20irrigation%20in%20Gujarat.%20An%20exploratory%20study.pdf

Purpose: This study provides recommendations by farmers in Gujarat, India on how to increase the benefits of wastewater irrigation.

End User: Planners

Context: Peri-urban

Pit Latrines and their Impacts on Groundwater Quality - A Systematic Review

Sources: <http://indiasanitationportal.org/sites/default/files/Pit%20Latrines.pdf>

Purpose: After calculating global latrine coverage, this review has been compiled on impact of pit latrines on groundwater quality and an evaluation of latrine standards.

End User: Planners

Tool	Functionality	Technologies	End User	Notes	Tags	Source
SewerGE MS V8i	Urban Sanitary and Combined Sewer Modelling and Management	AutoCAD, ArcGIS, and MicroStation	Aqua America, PA Fort Pierce Utilities Authority, FL	Hydraulic and hydrology tools for sewerage modelling.	Sewer Planning , GIS	http://www.bentley.com/en-US/Products/SewerGEMS/
ICT for Sanitation Planning	Description of ICT Tools is given below:- 1. SAMS (Sanitation Amenities and Management Systems) - To provide spatial representation of the existing situation of sanitation facilities to develop a comprehensive GIS based applications for sanitation. 2. Mapper for participatory planning within a ward. 3. Mobile application for capturing field based sanitation data with location and pictures.	GPS, Java-based web app, MySQL	Four cities of Madhya Pradesh viz. Gwalior, Ashta, Raisen and Khajuraho.	Building a comprehensive GIS-based application for sanitation.	DST, mobile, GIS	http://www.geospatialworld.net/paper/application/ArticleView.aspx?aid=24446

Tool	Functionality	Technologies	End User	Notes	Tags	Source
PAS - Performance Improvement Planning (PIP)	Measure, monitor and improve delivery of water and sanitation services.	Microsoft Excel	Urban Local Bodies (ULBs) in Gujarat and Maharashtra.	The Project has three major components of performance measurement, monitoring and improvement.	Planning, Monitoring	http://www.pas.org.in
Sanitation Window (SAWI)	SAWI connects demand and supply in the sanitation value chain, by offering matchmaking, risk lowering services, tailor-made supportive solutions, local networks and access to finance.		Emerging markets in Africa, Asia and Latin America			http://www.sanitationwindow.com
Sanitation Decision Support tool (AKVO, WASTE)	Helps to explore sanitation systems, based on your own situation.	Open Source, Web application		A total of 54 sanitation options are combined to build a complete system.	DST	http://waste-dev.akvo.org/dst/sanitation/

Tool	Functionality	Technologies	End User	Notes	Tags	Source
MIKE URBAN - modelling water in the city	GIS-based urban water modelling software.	ArcGIS	Boston Water and Sewer Commission, The Stockholm Water Company	Covers all water in the city, including: sewers - combined or separate systems or any combination of these; storm water drainage systems, including 2D overland flow; Water distribution systems.	Sewer/water Planning	http://www.dhissoftware.com/Products/Cities/MIKE_URBAN.aspx
SANSYS	Sanitary Sewerage System Design, Analysis and Management Software	AutoCAD, Spreadsheets			Sewer planning	http://pages.pacificcoast.net/~edc/sansys.html
SANMAP	Sanitation mapping tool	Web application	South and South East Asia and Southern Africa	sanmap.org hosts data to help small scale private sanitation businesses build business plans, choose appropriate technologies and deliver quality sanitation services to low income urban areas.	GIS, Data collection	http://sanmap.org/

Tool	Functionality	Technologies	End User	Notes	Tags	Source
Sustainable Sanitation and Water Management Toolbox (SSWM)	The Sustainable Sanitation and Water Management (SSWM) Toolbox is an integrated tool for capacity development on the local level "Linking up Sustainable Sanitation, Water Management & Agriculture".				Capacity Building, Educational	http://www.sswm.info/
WhichSan	The WhichSan Sanitation Decision Support System has been developed to assist planners and engineers to consider the relative merits and costs of different sanitation options for a given situation.	Microsoft Excel, Adobe Acrobat, Visual Basic		This software is developed on behalf of the Water Research Commission and is distributed at no cost in the public interest.	DST	Branfield, H., & Still, D. (2009, September). User manual for WhichSan - Sanitation decision support system.

Tool	Functionality	Technologies	End User	Notes	Tags	Source
WASHCost India	Aims at effectively and efficiently delivery WASH services by: 1. Developing appropriate methodologies for estimating life-cycle costs for sustainable service delivery; 2. Identifying the life-cycle costs and factors that affect them; 3. Designing a range of decision support tools.		Andhra Pradesh		DST, Financial Assessments	http://www.washcost.info/page/146
WSP Software	City Sanitation Planning (CSP) - Decision Support Tool (DST)			The CSP Decision Support Tool builds investment scenarios for six possible citywide sanitation options. The tool computes investment requirements for three city sanitation components i) Household sanitation arrangements; ii) Wastewater conveyance; iii) Wastewater treatment.	Financial DST	

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NEWSAN Simulator (Simulating Nutrient and Energy Fluxes in Non-networked Sanitation Systems)	Based on material flow analysis to model resource fluxes related to human excreta from household to final disposal/reuse. It allows city engineers to assess the effect of different options of sanitation systems, particularly, new technologies. Special emphasis is laid on non-networked sanitation systems, such as those which are prevalent in Africa.	C#, using Microsoft .NET Version 4, Integrates numerical solvers and integrators		The novelty of this work lies in the adaptation of an existing resource-flux simulator used on networked systems to calculate water, nutrient and energy fluxes specifically for on-site sanitation systems at scale. The model can also evaluate capex and opex expenditure, according to the water operator's cost categories.		http://discovery.ucl.ac.uk/1370877/
EVI - Plug and Play (PnP) Model framework	Basic framework of financial plug & play (PnP) models for resource recovery from FS (Faecal Sludge) using different technologies.	Microsoft excel		Various sizing and capacity estimates of waste water treatment plants, transport vehicles, storage. Calculation for financial indicators (NPV, project IRR, equity IRR, levelized cost) including sensitivity analysis can be done using this model.	Resource Recovery, Financial indicators	

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BCG Transport Options Model	The model provides analysis of various FS transport (Vacuum truck/ Omni-ingestor) and storage options (Septic tank/latrine pit), estimates of truck economics, water business economics, sludge business economics, etc for city specific data.	Microsoft excel	Dhaka, Khulna, Faridpur, Ouagadougou, Bobo Dioulasso, Fada N'Gourma, Phnom, many more.		FS Transport	
SANEX	A Decision Support System for assessing the suitability of sanitation systems in developing Countries	Desktop application - MS Windows		The knowledge base of this software contains more than 80 sanitation alternatives and uses around 50 criteria for their assessment. The costing component employs approximately 50 functions.	DST	http://www.unep.or.jp/ietc/publications/freshwater/sb_summary/16.asp

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COGZ (Sanitation Scheduling Software - Manages your Cleaning Schedule!)	<ul style="list-style-type: none"> - Preventative maintenance; - Cleaning schedule can now be automated. - Budgets and expenditures can be accounted. 	Web based Computerised Maintenance and Management System (CMMS)			Scheduling	http://www.cogz.com/
ASIM (Activated Sludge Simulation Program)	Dynamic simulation of a variety of different biological wastewater treatment systems	Java				http://www.asim.eawag.ch/
NextDrop	<ul style="list-style-type: none"> - Smart water supply message service (water alerts) - Real time information about piped water 	SMS	Hubli, Dharwad. Karnataka		sms, mobile	http://nextdrop.org/index.html
Delhi Jal Board	Sewer Blockage, Missing Manhole Cover, etc.	SMS			sms, mobile	http://www.delhi.gov.in/wps/wcm/connect/D_OIT_DJB/djb/home

Tool	Functionality	Technologies	End User	Notes	Tags	Source
UrSMS (Urban Service Monitoring System)	<ul style="list-style-type: none"> - Monitoring and grievance re-address system - Water supply complaint system - Door to Door Solid waste collection complaint system - Drainage & Sewerage complaints system - Water distribution quality monitoring system Health monitoring system 	SMS			sms, mobile, monitoring	http://www.acccrn.org/resources/documents-and-tools/urban-service-monitoring-system-ursms
Sanitation Mapper	The Sanitation Mapper is a participatory decision-support and monitoring tool which can provide information to inform local planning at district and sub-district levels. It has been designed to provide both area-based mapping, such as improved sanitation coverage at the village level, and point-based mapping, for identifying of the distribution and status of shared latrines in urban areas.	GPS, Spreadsheets , Google Earth/Maps	Dhaka, Bangladesh		GIS, Data Collection , Crowd-Sourced.	http://www.waterpointmapper.org/Sanitation.aspx

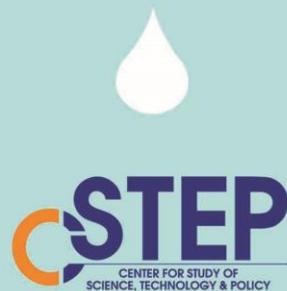
Tool	Functionality	Technologies	End User	Notes	Tags	Source
100% access by design: a financial analysis tool for urban sanitation	Reliably assessing the cost of different sanitation solutions is a key urban planning challenge. This Practice Note describes an Excel-based financial analysis tool which generates reliable costings of different options for achieving 100% sanitation access across low-income and non-low-income areas.	Microsoft Excel	Dhaka, Bangladesh		Financial analysis,	http://www.wsup.com/resource/100-access-by-design-a-financial-analysis-tool-for-urban-sanitation/
AKVO and Water for People's - FLOW	FLOW stands for Field Level Operations Watch. It's a system to collect, manage, analyze, and display geographically-referenced monitoring and evaluation data.	GPS, Web-based, Google Maps/ Google Earth	Since first deploying in 2010, FLOW has been used around the world in 17 countries for monitoring.	Akvo FLOW brings together three elements: 1. Handheld data collection – the FLOW Field Survey application runs on Android phones and devices with integrated GPS, camera, and custom adaptive surveys; 2. A web-based dashboard where users manage and analyze FLOW surveys and data; 3. Visual map-based reporting tools displayed in Google Maps and Google Earth.	GIS, Data collection, mobile, Crowdsourced	http://www.waterforpeople.org/flow-mapping/

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SaniFOAM: a framework to analyze sanitation behaviours to design effective sanitation programs	This conceptual framework is designed to assist program managers and implementers in analyzing sanitation behaviours to better design sanitation programs, such as limited use of latrines, and factors inhabiting or enabling individuals and communities to move up the sanitation ladder.					http://sustainablewash.org/resource/meth-15
Sanitation Investment Tracker (SIT)	The Sanitation Investment Tracker is a suite of applications that can be used to track investment (and associated expenditure) in sanitation at household level.	Android, Windows 8, Internet browser with HTML5 Support (for Geolocation API)	Ghana, Bangui, Central Africa Republic, Tanzania	Who has invested and how much in on-site sanitation is critical for designing, financing and monitoring sanitation programmes as well as providing services to households which have on-site sanitation.	Investment tracker, GIS, mobile	http://www.sanitationhackathon.org/application/sanitation-investment-tracker-sit

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Cablet	Cablet is a service to locate nearest public toilet along with the crowdsourced rating of the sanitation quality.	Android 2.2+ Internet browser with HTML5 Support (for Geolocation API) Python Backend Server	CrowdSourced		GIS, mobile	http://www.sanitationhackathon.org/cablet
AquaMaps	With the objective of generating a versatile tool that supplies concise and real information about the situation of water availability and sanitation.	Android, iPhone app	CrowdSourced	AquaMaps is created an open system that integrates data on water and sanitation from entities such as the World Bank and governments combined with data provided by NGOs and citizens in general.	GIS, Data collection, mobile, Crowdsourced, real time	http://www.sanitationhackathon.org/applications/aquamaps
Taarifa	Taarifa is an application for reporting, monitoring and aggregation, linking governments and organisations with citizens.	Django	CrowdSourced	It allows people to collect and share their own stories using various mediums such as SMS, Web Forms, Email or Twitter, placing these reports into a workflow. Where these reports can be followed up and acted upon, while engaging citizens and communities.	GIS, Data collection, mobile, Crowdsourced, monitoring	http://www.sanitationhackathon.org/taarifa

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Monitoring of Street Cleaning Staff through Mobile	Citizen will report problem related to street cleaning to municipal. They will assign the problem to concern sweeper. He will work on that.	Mobile & Web technologies	Crowdsourced		GIS, Data collection, mobile, Crowdsourced, monitoring	http://www.sanitationhackathon.org/monitoring-street-cleaning-staff-through-mobile
mSewage	mSewage is a new app that helps save lives by addressing the number one way that water sources become contaminated: raw sewage flowing onto the ground and seeping into water sources. mSewage provides a platform to map sewage outflows and sanitation infrastructure. This helps empower communities to identify water sources that are at risk and track efforts to improve the situation.	Mobile & Web technologies	Crowdsourced	This data can be used by governments and local communities to identify high risk areas for diarrheal disease or stop water contamination before outbreaks can occur.	GIS, Data collection, mobile, Crowdsourced, real-time, monitoring	http://www.sanitationhackathon.org/applications/msewage

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SunClean (Sanitation Games)	<p>Awareness on safe sanitation and hygiene remains generally low. To help people understand sanitation and hygiene issues, we have to start by educating children. Most approaches, however, fail to reach and gather children's attention for the topic.</p> <p>SunClean is a game that playfully teaches sanitation and hygiene behaviour.</p>	HTML5, Flash		<p>SunClean, consists of 2 Mini Games:</p> <ol style="list-style-type: none"> 1. Disposal Trash (Identifying organic inorganic wastes) 2. Hand Wash for Kids 	Educational , Games	http://appcircle.com/apps/sunclean-sanitation-games-2



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