

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.



Sanitation services remain grossly inadequate for millions of people in Dhaka.

Why is this tool necessary?

Planning for sanitation improvements in low-income areas often fails at an early stage: without reliable costings of different possible solutions, service providers tend to assume that improvements are unaffordable, and planning does not even take off. Investments that do go ahead tend to build on existing infrastructure (e.g. sewers), benefiting households which probably already have some sort of sanitation service, and leaving the poorest communities without. There is a clear need for tools that allow planners to compare context-appropriate sanitation service options which are affordable for 100% of households in both low-income (LIC) and non-low-income (non-LIC) areas.

How does the tool work?

In the tool developed by WSUP and partners in Dhaka, the user inputs unit costs and local data (e.g. socio-economic status) into a series of worksheets in Microsoft Excel, and built-in formulas calculate outputs which are viewable in tabular and graphical formats. Before the data-input stage, the user is required to identify and determine the unit costs of different sanitation technologies appropriate for the context.

The Dhaka experience

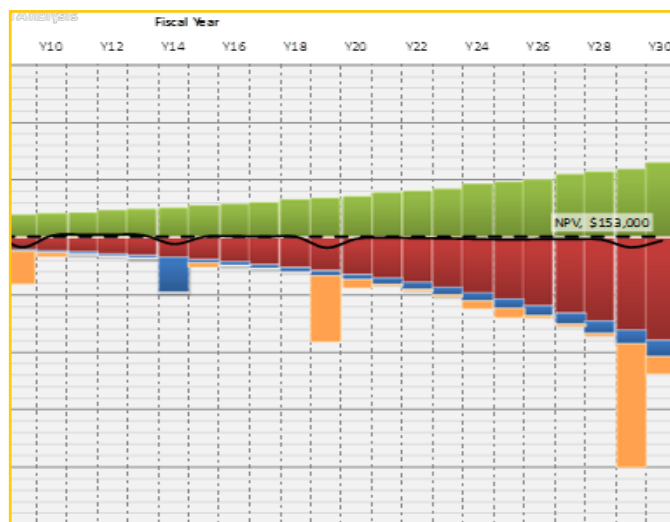
WSUP worked in collaboration with a wide range of institutional, community and academic stakeholders to pilot this tool using data from two wards in the Mirpur district of Dhaka. Local data was gathered through interviews, household surveys and transect walks. Total costs were assessed for five potentially appropriate sanitation options, with each option comprising a combination of specific systems (e.g. Option B = System 1 in LIC areas, System 3 in non-LIC areas; where System 1 = communal toilets connected to septic tanks, with sludge tanker-transported to drying beds; System 3 = low-cost sewerage system with wastewater treatment in stabilisation ponds). The results indicated that 100% sanitation access could be achieved by four of the five options considered. The tool generates full costings for each option, and a break-even tariff to achieve 25-year payback. In addition, a rapid assessment of affordability is obtained for each option, under alternative scenarios such as loan or grant funding of the initial capital expenditure, and/or availability of an annual subsidy.

“ The tool generates a break-even tariff to achieve 25-year payback ”

What does the tool look like?

NAVIGATION BAR:		1. General	2. On-Site	3. Off-Site Transport	4. On-Site Treatment	5. Off-Site Treatment	6. Financing	7. Revenues	8. Subsidies	Exp	
SUMMARY OUTPUT:	NPV	ON-SITE		OFF-SITE		TOTAL		Loans:			
	\$152,866	HHs Served (Y0): 4,600	CapEx (Y0): \$524,000	Total Cost: \$16,090,107	HHs Served (Y0): 33,800	CapEx (Y0): \$19,027,188	Total Cost: \$261,945,332	CapEx (Y0): \$19,551,188	All Costs: \$278,035,438	Grants: \$19,500,000	AAS 1 (25%): \$1,590,56
Ward 2, Mirpur, Dhaka, Bangladesh											
1. GENERAL DATA Section											
1.1 Study Location (Ward, City, Country)		Ward 2, Mirpur, Dhaka, Bangladesh									
1.2 Select Service Delivery Option		Select One <input checked="" type="radio"/> Option A <input type="radio"/> Option B <input type="radio"/> Option C <input type="radio"/> Option D <input type="radio"/> Option E <input type="radio"/> Option F									
1.3 Study Period		30 years									
1.4 Average Household Size		5.0 capita per household									
1.5 Population Density in Y1		619 capita/hectare									
1.6 Annual Inflation Rate		6.3%									
1.7 Discount Rate		10.0%									
2. ON-SITE SANITATION - TRANSPORT & CONTAINMENT SYSTEMS Section											
2.1 Select how many types of on-site systems will be used		Select One <input type="radio"/> None <input type="radio"/> 1 type <input checked="" type="radio"/> 2 types <input type="radio"/> 3 types <input type="radio"/> 4 types									

This screenshot of the top of a typical input worksheet shows the first few input fields, beginning with location and economic data, followed by variables relating to transport and containment systems. In other fields the user can input general population data, and data on financing, revenues, subsidies, etc.



Outputs can be viewed in tabular format or graphically, as shown here. This screenshot shows the results for one of the four combined-system options analysed in Ward 2 of Mirpur. For further screenshots of the model in use, and a full description of the development of this tool in Dhaka, see the WSUP Topic Brief *Financial Analysis for Sanitation Planning: Lessons from Dhaka*, available for download from the WSUP website.

Limitations and challenges

- The quality of the outputs relies on robust input data, including unit costs: in the Dhaka experience, these proved very difficult to obtain, in part because of low capacity of the local engineering sector.
- The tool developed in Dhaka is effective at early planning stages, but would need further development to be useful for detailed design: it is a *preliminary planning* tool.
- The tool developed in Dhaka focuses on the transport and treatment components of the sanitation chain: further work is needed to include the costs of collection and disposal/reuse.
- Local topography and its effect on collection (e.g. the need for pumps) was not an issue in Dhaka, but may be a complicating factor elsewhere.

Adapting and expanding this tool

The strength of this tool lies in its versatility. Input options are extremely flexible with over 200 variables, and the tool can be adapted for areas with different populations; areas with different types of access problem; different and emerging sanitation technologies; and alternative tariff and subsidy structures. The tool can provide governments with better information on costs and tariffs, which will empower them to make larger and more effective investments in sanitation. WSUP and its partners are currently developing the model for use elsewhere in Dhaka and further afield. For more details, see WSUP Topic Brief 10.

Credits: This Practice Note was written by Ruby Cowling drawing from WSUP Topic Brief 10 written by Andy Peal and Georges Mikhael. The tool itself was developed by Georges Mikhael. Review inputs came from Georges Mikhael and Sam Parker. Series Editor: Guy Norman. Coordination: Gemma Bastin. Design: AlexMusson.com. Version 1, May 2013.

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