

Shit flow Diagram: A decision support tool in City Sanitation Planning

Summary:

Faecal sludge management (FSM) represents a growing challenge, generating significant negative public health and environmental risks in poor and rapidly growing cities (Hawkins, Blackett, & Heymans, 2014). The faecal waste needs to be safely managed along the citywide sanitation chain. The safe management of the human waste is crucial in improving the sanitation services in any given city irrespective of the population variance.

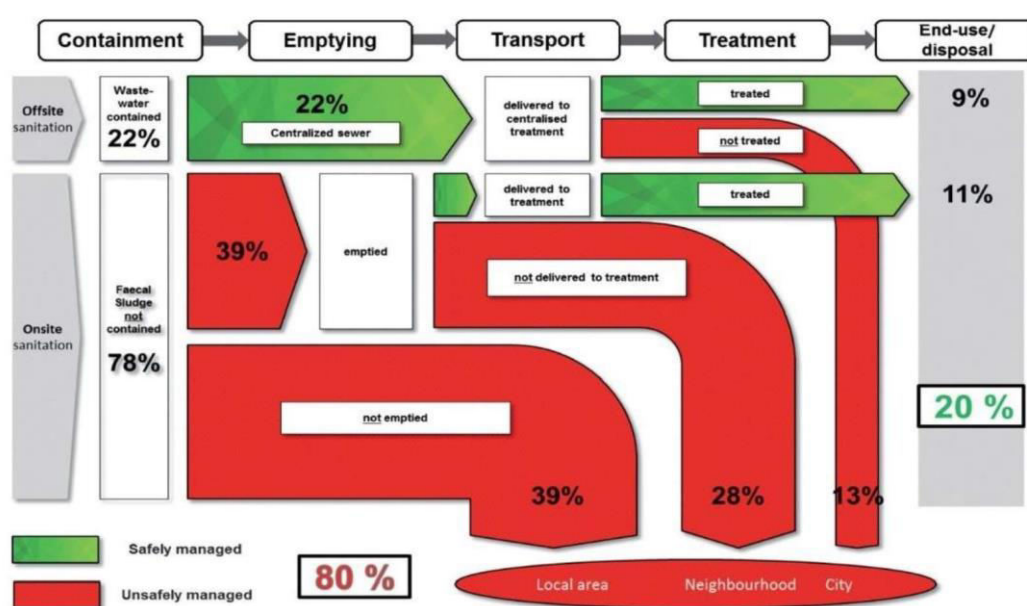
A Shit Flow Diagram, also referred as 'SFD' is a visualisation tool which can be instrumental in understanding and communicating how faecal waste (both faecal sludge and wastewater) flows along the sanitation service chain in the city (Hawkins, Blackett, & Heymans, 2014). SFDs help map where the shit is going after it is flushed out. National level KII's emphasised the use of SFD as a prerequisite tool to achieve holistic city sanitation planning to look beyond the asset creation of toilets.

"Every city should prepare a shit flow diagram which maps the issue on-site and off-site and prepare a citywide sanitation plan. This means that small or low-income settlements are taken care (of). Citywide sanitation planning was not there before, it was only for assets." – National Level KII.

Objectives of SFD:

The proportion of faecal waste that is effectively managed continues as a green arrow, while any proportion getting ineffectively managed comes out as red arrow as shown in the figure below. The SFD maps the following stages in the urban sanitation chain:

- **Containment:** SFD identifies the various sanitation options according to where the waste goes, like sewer, on-site containment, off-site sanitation and open defecation, as containment systems in households.
- **Emptying:** Desludging services are categorised under emptying. Vacuum tankers or suction machineries are commonly used emptying services. Air leakage during suction from the hose pipe due to lack of proper maintenance and non-availability of spare parts of suction machine is a major challenge in emptying.
- **Transportation:** In this stage, the Faecal Sludge collected from the various containment systems is transported for treatment to the outskirts of the city or town.
- **Treatment and Disposal:** This is the final stage where the Faecal Sludge is treated and disposed (Centre for Science and Environment, 2017)



Source: (SFD Promotion Initiative, 2016)

Key Stakeholders:

- SFD Promotion Initiative
- Sustainable Sanitation Alliance (SuSanA) under Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ)
- Center for Science and Environment
- Bill & Melinda Gates Foundation
- Government decision-makers
- Development organisations
- Service providers/utilities
- City/Municipal authorities

Implementation strategy:

- The SFD Promotion Initiative has developed a methodology and tools to enable the easy production of standardized SFDs by city stakeholders, development agencies and non-governmental organizations.
- The SFD graphic generator is a quick and simple tool that allows the production of SFD graphics in three steps. One can generate the SFD graphic and download the results for reports and publications with the data available for the city (SFD Promotion Initiative, 2016).
- SFDs prepare different scenarios by highlighting issues in current sanitation system to help the authorities consider alternatives to large and expensive sewers which would serve only a handful of better-off residents.
- SFDs measure current progress and help improvements take off, following the enactment of a national policy on faecal sludge management.
- SFDs link international companies to their local counterparts to understand the effectiveness of current sanitation situation (Kaupp, 2019).

Resource Utilization:

From 2014 to 2018 the SFD Promotion Initiative has been managed by GIZ under the umbrella of the Sustainable Sanitation Alliance (SuSanA), supported by the Bill & Melinda Gates Foundation through two grants (2014-2015 and 2016-2018). Phase III of the SFD Promotion Initiative is being managed by the University of Leeds and the Center for Science and Environment, supported by the Bill & Melinda Gates Foundation through two additional grants. The secretariat of the SFD Web portal and Helpdesk are remaining with GIZ as part of the SuSanA secretariat (SFD Promotion Initiative, 2016).

Impact/ Outcomes:

- SFD can visualize a city's sanitation challenges to inform city-wide sanitation planning.
- SFD represents where faecal waste goes, what proportion is managed and where the unmanaged portion ends up (Hawkins, Blackett, & Heymans, 2014).
- SFD visualizes how faecal waste (both faecal sludge and wastewater) flows along the sanitation service chain at the municipal level.

Challenges/ Lessons Learnt:

- A shit flow diagram is an effective tool to understand and interpret the urban sanitation service chain, but it can be an intimidating one to produce.
- SFD has the potential to serve as a decision support tool to improve the existing urban faecal sludge management services by engaging government decision-makers, development organisations, service providers/utilities, and city/municipal authorities in the process.

Replicability & Sustainability:

There are SFD Manuals prepared by SFD Promotion Initiative which describes the process followed to produce SFD graphics and reports. SFD manuals can guide on data collection and analysis on how to use the SFD graphic generator. along with the definitions of terms and variables. This can be utilised to generate SFD for any desired city.

Fact Sheet:

Thematic area	City wide sanitation planning
First-year of the program	2014
Responsible institution	SFD Promotion Initiative and City stakeholders
Target audience	Service providers/utilities and City/Municipal Authorities
Coverage	International and National Cities