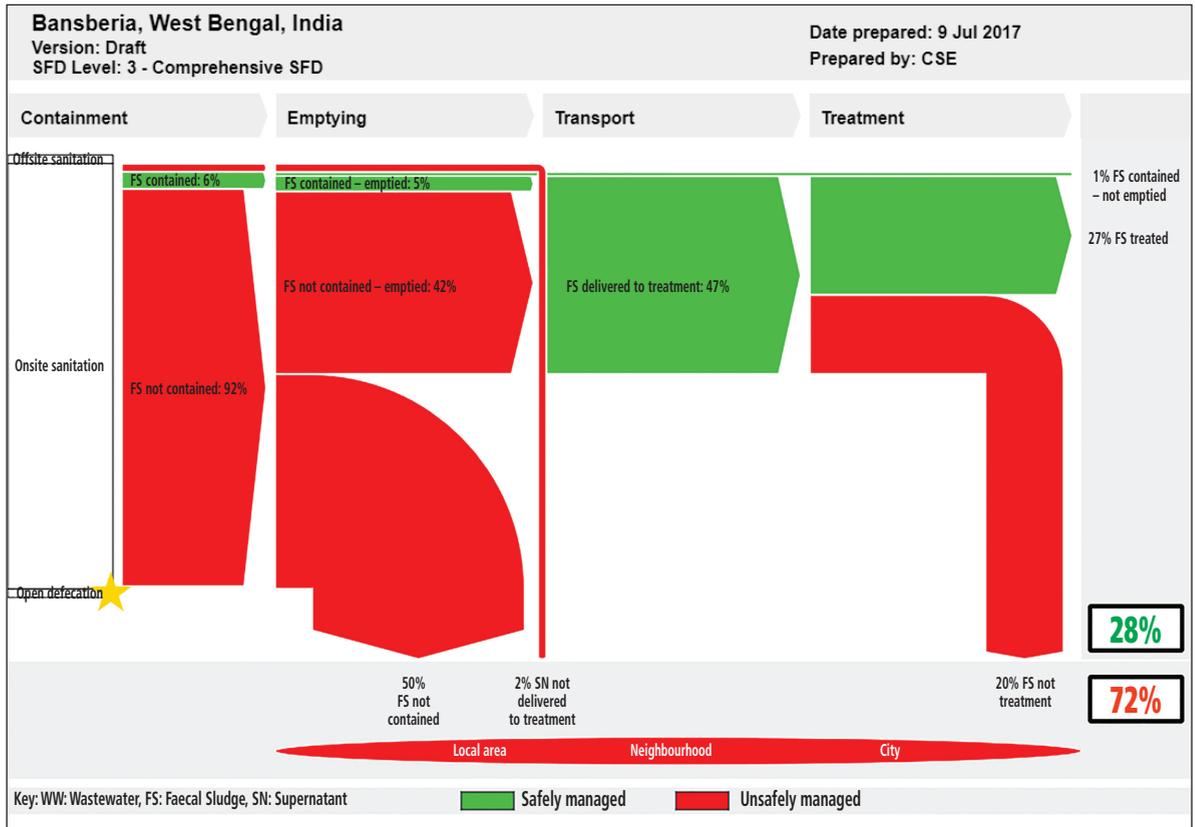




SHIT FLOW DIAGRAM (SFD)

Centre for Science and Environment
 41, Tughlakabad Institutional Area, New Delhi 110 062, INDIA
 Ph: +91-11-29956110 - 5124 - 6394- 6399 Fax: +91-11-29955879
 E-mail: cse@cseindia.org Website: www.cseindia.org



SFD Description

A Sanitation (or Shit) Flow diagram presents a clear picture of how excreta flows are managed within the city. The diagram clearly depicts how excreta flows from user interface to the final disposal. It has the following stages:

Containment

- Total population within municipality is dependent on onsite sanitation systems
- The containment systems in Bansberia mainly comprise of septic tanks and pits
- Most of the septic tanks do not adhere to the standards prescribed by the Bureau of Indian Standards (BIS)
- There are 4 main types of containment systems found in Bansberia
 - Septic tank connected to soak pit (20% population)
 - Septic tank connected to open drain (4% population)
 - Fully lined tank connected with no outlet (4% population)
- Lined pit with semi permeable walls and open bottom with no outlet (72% population)
- The most common containment system found in the city is the 2-pit system with semi-permeable walls and open bottom. The diameter of the pit ranges from 2.5ft to 3ft and the depth ranges from 8 ft to 15 ft
- The size of the septic tank ranges from having a depth of 6ft to 15ft
- Due to no clear differentiation between the volume of the effluent and solid FS generated from the containment, it is assumed to be 50% each to reduce maximum error
- FS contained or not is dependent on the system polluting the groundwater. Depth of groundwater table <10m from the sanitation system is considered to pose a significant risk
- FS contained is attributed to 6% population. This 6% includes 4% population who use fully lined tank and the remaining 2% population use septic tank connected to open drain
- FS not contained is attributed to 92%. It

BANSBERIA





Figure 1: Septic tank connected to soakpit

includes the FS present in the lined pit with semi permeable walls and the FS present in the septic tank connected to soakpit

Emptying

- Emptying service of the containment of on-site sanitation systems is delivered by Bansberia Municipality only
- There are two emptying vehicles in municipality and there are no private operators
- The capacity of each emptying tanker is 2000 litres and the fees for emptying starts from Rs.400.
- Frequency of desludging per household is once in 5 years for houses having septic tanks and once in 2 years for houses having pits as containment systems
- The rate of desludging depends on the type of system (tank or pit), length of extraction pipe and the volume of FS to be desludged. A pit latrine with 15 rings, would cost around Rs. 400 per emptying. For an increase in pipe length by 50ft, would mean an additional Rs.50. For a septic tank

with a capacity of 250cubic feet, Rs 500 is charged. If volume of septic tank is more than 250 cubic feet, additional charge of Rs. 100 is applicable per 100 cubic feet

- The time taken to empty a septic tank ranges from 40 minutes to 1 hr
- There is no use of safety gears while emptying thereby causing high risk of health issues
- FS of 42% is not contained and emptied (9% FS from septic tank connected to open drain and 33% FS from lined pit with semi permeable walls with open bottom)
- FS not contained not emptied is attributed to be from 50% population. This FS includes the FS which infiltrates into the ground and the FS which remains in the containment systems and is never emptied(1% FS and 10% infiltrate from septic tank connected to open drain and 3% FS and 36% infiltrate from lined pit with semi permeable walls and open bottom)



Figure 2: 2-pit containment system.

Transportation

- Supernatant (SN) of 2% population is transported via open drains to Hoogly river.
- FS of 47% population is delivered to the treatment plant
- There is a total of two desludging vehicles, each having a capacity of 4000 litres. Price of one vehicle is around 15 lakhs
- Tractor mounted with 2 tankers of 2000 liters capacity is used for desludging of septage from different containment systems
- The vehicles used for emptying are purchased and assembled at Chandannagar which is situated at a distance of 20 kms from the city



Figure 3: Desludging of 2-pit system

- A 5HP pump is used for suction and it has a head of 20ft.
- Generally, the emptier does three trips per day that includes desludging of 1 septic tank and 2 pits. The average distance travelled per trip is 5 km

- all the septage generated within municipality area and also from outside. It's a PPP project
- A joint venture project of Bansberia Municipality. The Greenery bio-compost and animal study Pvt. Ltd. is a private organization in Bansberia which converts faecal and poultry waste into Bio-compost. According to the director of this organization, almost 100% of the faecal waste generated in the city is composted

Treatment

- There is a treatment plant in town that receives

Table 1: Key features of the plant

Name	Greenery biocompost and animal farming Pvt Ltd
Area	2.70 Hectares
Capacity	1500 metric tons per year
Septage received per year (2015-2016)	300 tons
Technology	Sludge Drying beds
Operational since	2006
Handover from 1st party	2010



Figure 4: Attached 5 HP pump used to suck FS



Figure 5: Tractor mounted vacuum tanker.



Figure 6: Disposal of septage at FSTP facility

- Land is given by the municipality on lease
- FS of 28% population is treated and safely managed whereas FS of 72% population is unsafely managed

Disposal

- 100% of the septage emptied each day is disposed in treatment plant only. Serious action is taken by municipality if septage is discharged anywhere else
- Supernatant(SN) from septic tank to open

drains is discouraged, official notification from municipality issued if someone found doing so and punished as per norms. (Sanitary Inspector, Bansberia Municipality)

- There is no separate treatment of liquid at treatment plant, this liquid gets evaporated as per KII with FSTP's director
- As per our observations there might be some seepage of liquid component coming out from the sludge drying beds which find its way into Hoogly river which passes just behind the plant



Figure 7: Disposal of wastewater ends up in Hooglyriver via major channels of drains

SFD Promotion Initiative



Sandec
 Sanitation, Water and
 Solid Waste for Development

