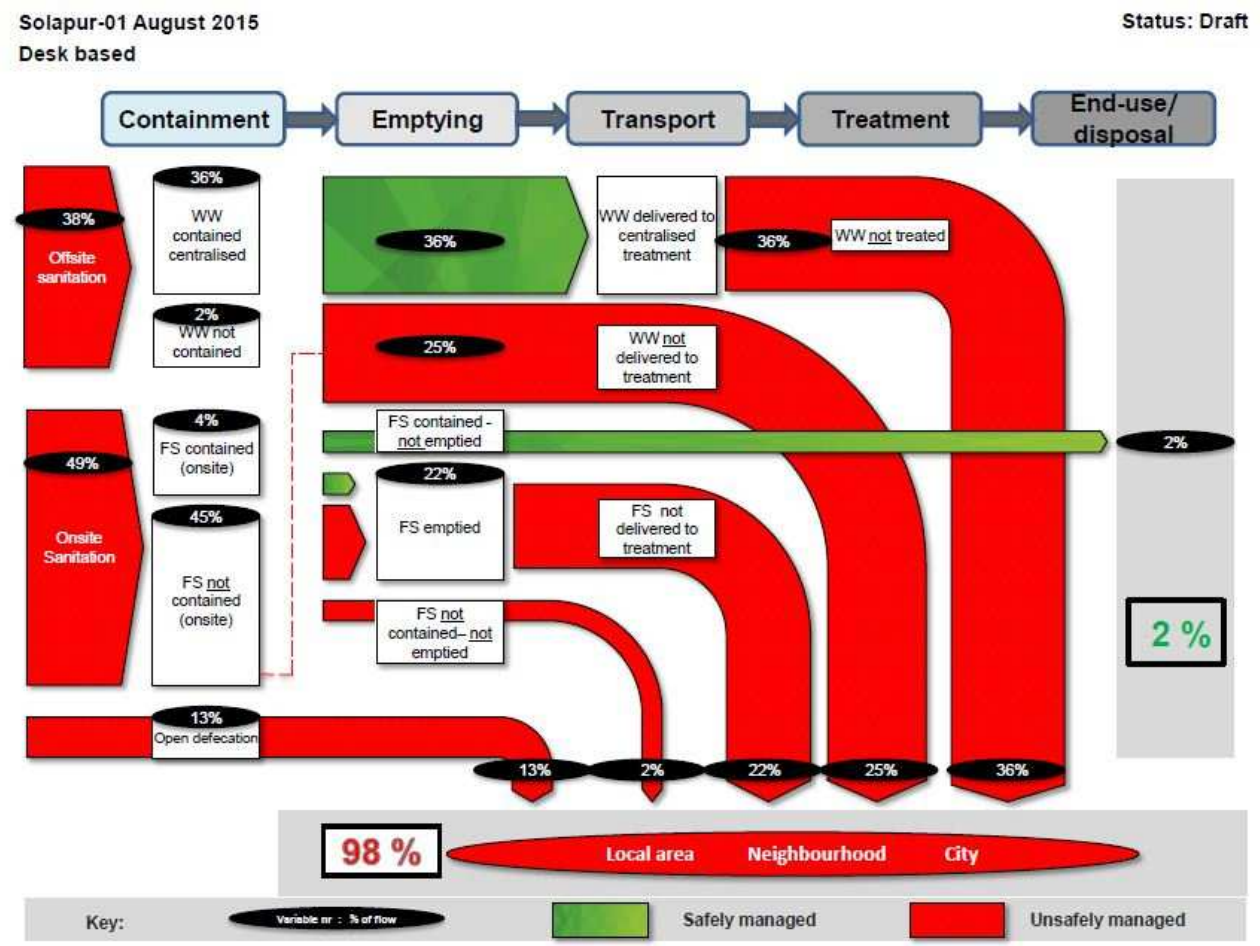
## 1. The Diagram




## 2. Diagram information

**Desk or field based:**
This is a desk based SFD

**Produced by:**
Centre for Science and Environment (CSE), New Delhi.

**Status:**
This is a draft SFD

**Date of production:**
01/08/2015

## 3. General city information

Solapur is situated on the south-eastern border of Maharashtra state adjoining Karnataka. It is 550 km away from Mumbai and 300 km away from Hyderabad. It is known for textile production such as bed sheets, blankets, towels, etc. (CSP, 2011).

The population of city, as per Census 2011 is 951,118 persons. The density of city is 5,329 persons per sq.km which is very high when compared to state average of 365 persons per sq.km. Total slum population is 218,757 persons which constitutes 23% of the total population (MoUD, 2013).

Municipal boundary has been chosen for the current study. It comprises an area of 178.57 sq.km (MoUD, 2013).

## 4. Service delivery context

In 2008, the Ministry of Urban Development (MoUD) issued the National Urban Sanitation Policy (NUSP). The policy aims to: raise awareness, promote behaviour change; achieve open defecation free cities; develop citywide sanitation plans; and provide 100% safe confinement, transport, treatment and disposal of human excreta and liquid wastes. The NUSP mandates states to develop state urban sanitation strategies and work with cities to develop City Sanitation Plans (CSPs). Furthermore, it explicitly states that cities and states must issue policies and technical solutions that address onsite sanitation, including the safe confinement of faecal sludge (USAID, 2010).

The objectives of NUSP are to be realized through CSPs and state sanitation strategies. As of now there are very few cities which have finalized their CSPs, and those plans are also not implemented. This remains a major drawback in implementation of NUSP.

The advisory note on septage management in urban India, issued by MoUD in 2013, recommends supplementing CSPs with Septage Management Sub-Plan (SMP). Still septage management in India is not prominent due to lack of knowledge, consideration of septage management as an interim solution, lack of sufficient funding and many other socio-political issues.

There are no specific legal provisions relating to septage management, but there are a number of provisions relating to sanitation services and environmental regulations, which majorly stems from, The Environment (Protection) Act, 1986 and the Water (Prevention and Control of Pollution) Acts. Municipal acts and regulations usually refer to management of solid and liquidwastes but may not provide detailed rules for septage management (MoUD, 2013).Despite of no specific provisions for septage management, Solapur Municipal Corporation (SMC) provides emptying services at affordable prices, though they are disposing septage in solid waste dump yard.

## 5. Service outcomes

Overview on technologies and methods used for different sanitation systems through the sanitation service chain is as follows:

Containment: There issewerage network which covers less than half of the population.Rest of the city is majorly dependent on septic tanks which are generally not adhering to design prescribed by Bureau of Indian Standards (BIS). The effluent from the septic tank flows into open drains. Some households are also connected to pits. Around one-fifth of city's population depends on public toilets. No standard size for septic tanks. The size of septic tank depends upon the availability of space at the time of construction.

**Figure 1: Emptying process of septage from community toilet (Source: Rahul/CSE, 2015)**

**Figure 2: Vacuum tanker emptying septage from community toilet (Source: Rahul/CSE, 2015)**

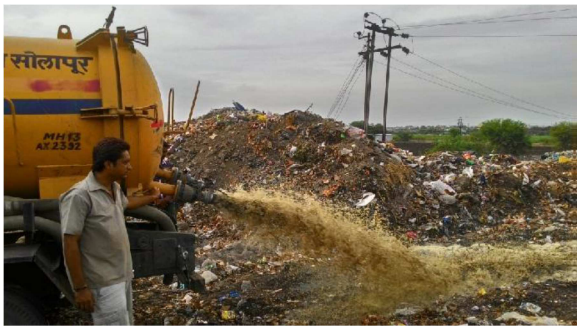



**Figure 3: Disposal of Septage in solid waste dump yard (Source: Rahul/CSE, 2015)**

Emptying: SMC is responsible for septage management. SMC owns four vacuum tankers with capacity of 3000 litres each. Citizens are required to submit an application form and pay 12 USD as emptying fees to avail the service. Septic tanks of community toilets are being emptied twice a week. On an average, 32 – 40 septic tanks are emptied per day. Income from septage emptying is approximately 4,688 to 6,251 USD annually. Apart from SMC there are

two private emptiers providing services in the city with two vacuum tankers of 3000 litres capacity each. They charge 18 to 23 USD as emptying fees.

Transport: Septage is transported by truck mounted vacuum tankers to disposal sites.

Treatment: Sewage treatment plant (STP) is not operational, hence sewage is disposed in open channels/ drains. No treatment facility for septage.

End-use/Disposal: Sewage is used for irrigation extensively. Septage collected by SMC is disposed into solid waste dump yard, whereas that collected by private emptiers is dumped in open drains.

According to Census, 38% of Solapur is dependent on offsite sanitation, population connected to sewer line is 36% and user interface discharging directly to open drain is only 2%. For 6 years the sewage treatment plant has not been functional, hence no treatment of wastewater.

Rest of the 49% of city is dependent on onsite sanitation systems, out of which 45% is dependent on septic tanks and 4% on pits. The public latrines are connected to septic tanks and hence are incorporated in onsite systems. Faecal sludge is not contained as the septic tanks are connected to open drains and pits may be polluting the groundwater.

There is no clear differentiation between percentage of effluent and septage generated from septic tanks, it's assumed to be 50% each. Therefore, 23% of faecal sludge which is effluent goes into open drain and rest is emptied from tanks whenever full. Some FS is always left in the tanks and is assumed to be 2%.Since there is no treatment of wastewater and septage, excreta of 98% of city is not safely managed, which includes 13% of city which defecating in open.

## 6. Overview of stakeholders

The 74th Constitutional Amendment Act of 1992 reformed the sector by transferring responsibility for domestic, industrial, and commercial water supply and sewerage (WSS) from state agencies, such as Departments of Public Health Engineering and State Water Boards, to Urban Local Bodies (ULBs). This transfer has resulted in a variety of implementation models, as well as lack of clarity in allocation of roles and responsibilities between state and local agencies, which sometimes results in large gaps in implementation (USAID, 2010).

The following stakeholders are responsible for sanitation service delivery in Solapur:

| Key Stakeholders | Institutions / Organizations |
|---|---|
| Public Institutions | Solapur Municipal Corporation(SMC), Maharashtra Jeevan Pradhikaran (MJP),State Pollution Control Board (SPCB) |
| Private Sector | Private emptiers |

**Table 1:Key stakeholders (Source: Compiled by CSE, 2015)**

SMC is responsible for planning, designing, construction, operation and maintenance of sewerage network. A public health engineer is deputed from the state parastatal agency, Maharashtra Jeevan Pradhikaran (MJP), due to lack of qualified staff at the corporation level (MoUD, 2013).

Public health and sanitation is delivered by SMC through the health department of the corporation which is headed by the health officer. Septage management is also the responsibility of the same department of SMC.

SPCB is responsible for monitoring and evaluation of STPs.

Private emptiers are also responsible for septage management. They are providing services within and around the city.

## 7. Credibility of data

Two key sources of data are used; Census of India, 2011 and draft of CSP, 2011. Most of the data is then updated by Key Informant Interviews (KIIs). Four KIIs have been conducted with different stakeholders.

Data on containment is available in Census. Data on emptying and transport is collected by KII's. However most of the data is qualitative.

Some of the issues and challenges are listed below:

- Data insufficiency and non availability:
  - No data available on how many septic tanks are connected to open drains
  - No data on waste water generated from commercial hubs, institutions etc.
- Accuracy: Discrepancy observed between Census data and actual ground situation
- Data available at different time lines
- Limited data available on reuse (formal / informal)

Assumptions followed for preparing SFDs:

- Data provided by Census, 2011 is correct
- Septic tanks and sewer connections on ground are as per septic tanks & sewer connections defined in Census
- Volume of waste water generated is 80 % of water supplied
- 90% of the people get their tanks emptied when full

## 8. Process of SFD development

Data is collected through secondary sources, and then a visit to the city is done to conduct KIIs with relevant stakeholders, to fill in the gaps in data and to crosscheck the data collected.

To start with, a relationship between sanitation technologies defined in Census of India and the ones defined in project is established.

The data is fed into the calculation tool to calculate the excreta flow in terms of percentage of population.

Excreta of 98% of the city is not managed safely, as there is no treatment of septage and waste water, only 2% of excreta which is contained in pits is only managed safely.

Limitations of SFD:
It's dependent on secondary data and true picture of the city may differ.

The data available is at different timelines, for example data on containment is from census 2011, and data on emptying and transportation is collected through KIIs conducted in 2015.

Whether excreta is safely managed or not is dependent on whether the system is contained or not, and not on whether waste is safely handled.

## 9. List of data sources

Below is the list of data sources used for the production of SFD.

- Published reports and books:
  - Census of India 2011, Houselisting and Housing data, Government of India
  - CSP of Solapur, SMC, 2011
  - Service levels in water and sanitation sector, MoUD, 2012
  - Excreta Matters- volume 2, Centre for Science and Environment, 2012
  - A Rapid Assessment of Septage Management in Asia, USAID,2010
- KIIs with representatives from
  - Government agencies: SMC
  - Service providers: Private emptiers
- Websites/web links: http://moud.gov.in/cityplan

Solapur, India, 2015

Produced by:
Centre for Science and Environment (CSE), New Delhi.



This document is available from:
www.sfd.susana.org