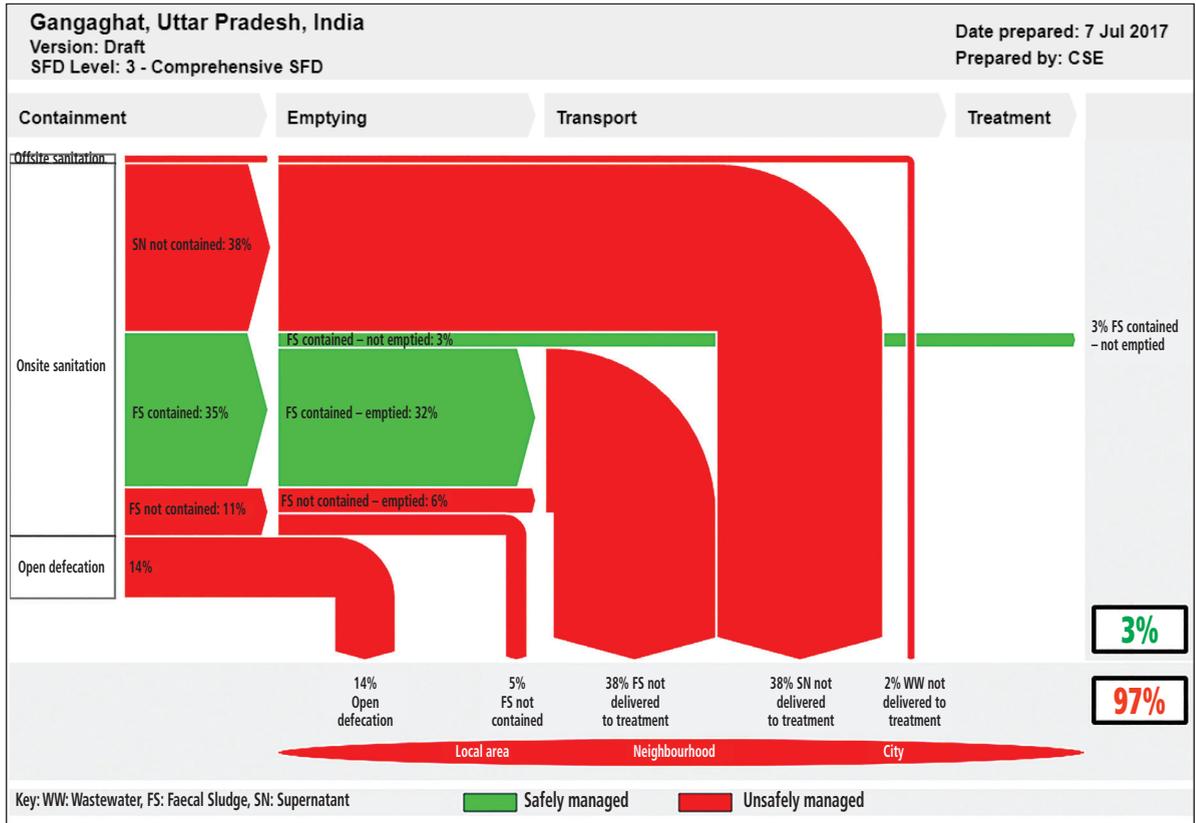




# SHIT FLOW DIAGRAM (SFD)

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

## GANGAGHAT, UTTAR PRADESH



## 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

- The city has no underground drainage network, but a DPR for UGD has been prepared by the Jal Nigam, Uttar Pradesh for the city
- Types of containment systems observed in the city:
- Containment systems of 74% population in the city is connected to septic tanks. Of this 74%, 2% septic tanks are connected to soak pit, 70% septic tanks are connected to open drain and 2% septic tanks are connected to the riparian of Ganga. 6% population is dependent on lined tanks with impermeable walls and open bottom connected to an open drain
- The septic tanks are actually rudimentary design of septic tanks without adhering to BIS standards
- 14% population practice open defecation. As per the survey, it was observed that such practice is being performed mostly near the river or at the river bed

- 4% population is dependent on lined pit with semipermeable walls and open bottom with no outlet or overflow
- Faecal sludge of 2% population is directly discharged on to the river bed
- Few households of the settlements at the river bed have dilapidated containment systems
- 80% septic tanks are double chambered while 20% septic tanks are three chambered (KII with mason)
- Containment systems do not have a depth below 10 ft, due to availability of water near to 25 ft below ground level
- Volume of septic tanks varies from 1100 litres to 34000 litres, while volume of lined tanks/pits varies from 1100 litres to 12000 litres
- 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

### Emptying

- No vacuum tanker is owned by municipality, neither any local private emptier exist within the municipal boundary. Private owned tractor mounted vacuum tankers are called for emptying



Figure 1: Direct Waste Water discharge at river bed.



Figure 2: Containment Systems.



Figure 3: Outlet of Waste water to Open drain.

- service from Kanpur city
- As per KII, private emptiers refuse emptying services to the households located on narrow lanes and inaccessible roads
- Emptiers claimed that there are 2-3 requests on an average per day. Due to the distance to Gangaghat city from their point of assembly is 7 km, emptying services are provided once a week to make the emptying service economical
- Emptiers advertise using distribution of business cards, and pamphlets. Residents have claimed that there are wall paintings advertising emptying services in and around the city
- Emptying frequency differs in the city. Wards towards the river bed have a frequency of 1-2 years of desludging while farther the wards from the river bed, the emptying frequency increases to 10 years. As per KII with private emptiers the depth of septic tank differs with pertinence of location.
- Emptying process is usually carried out by 2 people (1 driver + 1 helper)



Figure 4: Vacuum tankers used for emptying.

- During emptying operation, the emptiers do not use personal protective equipments
- 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 35% population who use septic tank connected to open drain
- FS contained- emptied is attributed to 32% population who use septic tank (assuming 90% of the 35% of system from which faecal sludge is emptied)
- FS contained – not emptied is attributed to 3% population using septic tank connected to open drain. This is the FS which remains in the tank.
- FS not contained is attributed to 11% population (4% from lined tank , 6% from lined pit and 1% each from septic tank connected to water and soak pit)
- FS not contained- emptied is attributed to 6% population (1% from septic tank connected to soak pit, 3% from lined tank with impermeable walls and open bottom and 2% from lined pit with semi permeable walls and open bottom)
- FS not contained not emptied is attributed to 5% population (1% from septic tank connected to soak pit, 2% infiltrate from lined pit with semi permeable walls and open bottom and 2% FS from septic tank connected to water body)

## Transport and Disposal

- Supernatant of 38% population (35% from septic tank connected to open drain and 3% from lined tank with impermeable walls connected to open drain) is carried through open drains to two main points of disposal
  - Chhamak Ganga
  - Railway Khanti
- Faecal sludge collected from household is transported using tractor mounted vacuum tanker
- There are 6 private emptiers running 6 vacuum tankers, each of 5000 litres capacity. The vehicles are assembled in Delhi or Chandigarh, as informed during KII, assembling of tanks has recently started in Kanpur, but the quality of tankers is not so good
- The vehicles travel an average distance of 4 km to dispose the waste at a major drain or directly at Chhamak Ganga
- Apart from these two points of disposal, it was observed in the field based study that the waste water from open drains also dispose at various low lying open grounds
- In total 3% FS is safely managed and 97% FS is unsafely managed

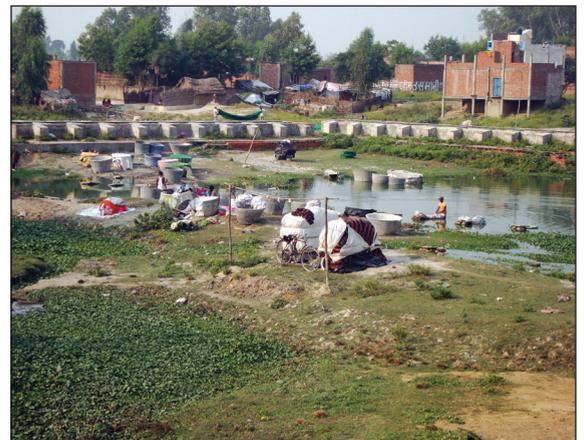


Figure 5: Left: Railway Khanti; Right: Chhamak Ganga.



Figure 6: Vacuum tanker disposing at drain.



Figure 7: Low lying areas where open drains terminate.

