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**

- Three main types of containment systems found in Bodhgaya are:
  1. Lined pit with semi-permeable walls and an open bottom (honeycomb structure) - 13% of the population is attributed to be dependent on such a system
  2. Fully lined tank connected to an open drain is attributed to 25% population
  3. Septic tank connected to an open drain or storm sewer is attributed to 24% population.
  4. 38% population is still practicing open defecation

- The pit latrine with honeycomb structure is mainly observed in the slums. This is open at the base and does not have an outlet

- The structure of fully lined tanks observed during the field survey is cylindrical in shape (refer fig: 1). It is sold in the sets of three. It is locally considered and known as septic tank

- Three fully lined tanks are connected to each other through PVC pipes. The average height of the tank is about 5-6 ft and diameter is around 3 ft. A vent pipe of 10 ft height is attached to the first tank and an outlet pipe is attached to the 3rd tank. The outlet pipe is connected to an open drain which further flows into a bigger drain or open field

- The total cost for installation of the 3 fully lined tanks is around Rs 16,000

- The well-constructed septic tanks are generally found in city's public toilets which are also connected to open drain

- Bodhgaya is a religious site and place of pilgrimage for Buddhists. The floating population is around 10,000 per day which is considered to
be dependent on public toilets and hotels. The containment of such establishments is considered as septic tanks connected to open drains.

➢ Under SBM, 349 toilets have been constructed. The containment system of the toilets provided under this scheme has lined pit with semi-permeable walls and an open bottom (honeycomb structure). During the field research, it was found that the toilets provided under this scheme to urban poor are misused as cattle’s food store room.

➢ There are 23 community toilets built in Bodhgaya and have the containment system of a septic tank connected to an open drain.

➢ 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 not contained is attributed to 13% population which use the containment system of a lined pit with semi permeable walls with an open bottom.

➢ FS contained is attributed to 24% population. This 24% includes 12% population who use septic tank connected to open drain and 12% who use fully lined tank connected to an open drain.
Emptying

- Emptying service of OSS is provided by municipality
- There are two vacuum tankers run by ULB, each having a capacity of 4000 liters, out of which only one tanker is frequently used. The other tank is used only occasionally due to low demand of emptying service
- The total no. of people involved during the emptying operation are 2 laborers, 1 driver, and 1 supervisor
- The emptying charge for making one trip to empty a containment is Rs. 4000. In case the emptying of a containment requires another trip, then it would cost an additional Rs. 4000 for per trip
- In total, around 3-4 trips are generally made in a month by the emptying vehicle
- Sometimes, if the sludge in the containments

Figure 4: Truck mounted tanker used for the emptying operation

Figure 5: Septage getting discharged from tanker
becomes hard to pump out, acid and water are added to dilute the sludge in order to make the emptying process easy

- FS of 22% population is contained and emptied (11% from fully lined tank and 11% from septic tank) and 2% FS is contained and not emptied (1% from fully lined tank and 1% from septic tank is the FS which remains in the tank)

- FS of 6% population is not contained and emptied (6% FS present in the lined pit with semi-permeable walls) and FS of 7% population is not contained and not emptied (includes infiltrate and the FS which remains in the lined pit with semi-permeable walls and never gets emptied)

- Major issue encountered during the process of emptying is the air leakage during suction from the hose pipe due to lack of proper maintenance and non availability of spare parts of suction machine

### Treatment and Disposal

- There is no treatment facility for faecal sludge and wastewater present in Bodhgaya, although, the 2% FS which is left behind in the fully lined tank and the septic tank is considered to be safely managed. The remaining 98% FS is unsafely managed

- Collected faecal sludge from the containment systems is disposed into open fields at Katorba, 2-3 kms away from the municipal area. The sludge mostly flows through the fields and is used for irrigation

- During the field survey, it was observed that many young children work and play in the fields at a small distance from the site of disposal

### Transportation

- A truck (Tata 407) mounted suction machine is used for emptying and transportation of FS

- Collected FS from containment systems are transported 3-4 kms away from the city and disposed at the outskirts of the city

- The SN not contained is attributed to 25% population. This includes 13% SN which flows through the open drain connected to fully lined tank and 12% SN which flows through the open drain connected to the septic tank

**Figure 6: Septage getting discharged into open field**