



SFD Lite Report

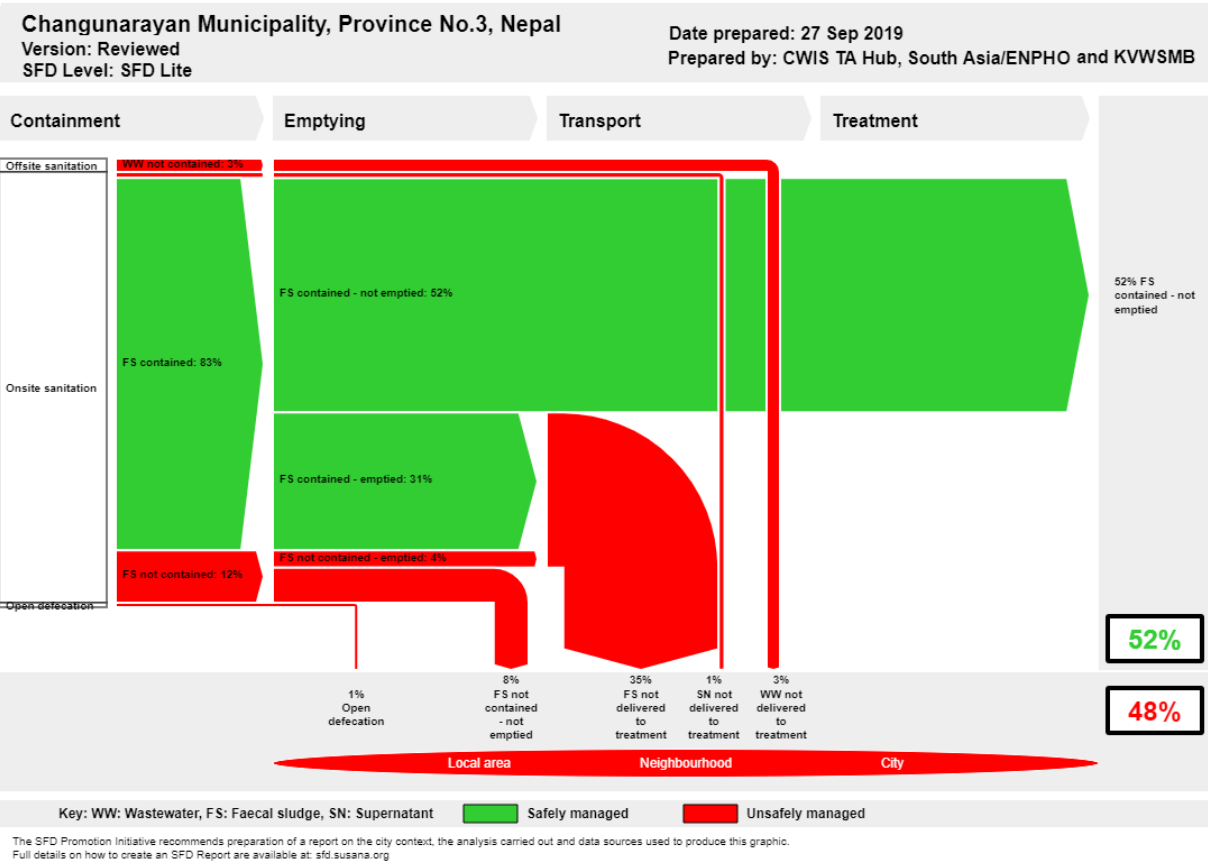
Changunarayan Municipality Nepal

This SFD Lite Report was prepared by City-Wide Inclusive Sanitation Technical Assistance Hub, South Asia (CWIS TA Hub, South Asia)/Environment and Public Health Organization (ENPHO) and Kathmandu Valley Water Supply Management Board (KVWSMB).

Date of production: 27/09/2019

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1 The SFD Graphic



2 SFD Lite information

Produced by:

- The Shit Flow Diagram for Changunarayan Municipality was created by City-Wide Inclusive Sanitation Technical Assistance Hub, South Asia (CWIS TA Hub, South Asia)/Environment and Public Health Organization (ENPHO) and Kathmandu Valley Water Supply Management Board (KVWSMB) with the SFD graphic generator available on the SuSanA website.

Collaborating partners:

- Eco Concern Pvt.Ltd.
- DevCon.

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3 General city information

Changunarayan Municipality is one of the historical places located in Bhaktapur district in Province no. 3 of Nepal. The municipality carries historical and archaeological significance and was named from the ancient temple of Nepal i.e. Changunarayan temple, enlisted in World Heritage site (Figure 1). The municipality was formed in 2017 (2073) by merging former Village Development Committees (Changunarayan, Chhaling, Duwakot and Jaukhel) consisting of nine wards covering an area of 62.18 km². The municipality is bounded by Kathmandu district in the north and west, Kavrepalanchok district in the east and Bhaktapur district in the west (Total sanitation strategic plan, 2018).

The total population of the municipality is 54,551 residing in 11,627 households (Total sanitation strategic plan, 2018). The average temperature of the municipality is 20°C to 25°C with an average rainfall of 56 mm (Changunarayan Municipality Policy and Program, 2017-18). The main sources of drinking water in Changunarayan Municipality are public taps, household bores and wells. The majority of the people in Changunarayan Municipality rely on public water supply (42%) and remaining 58% of households are dependent on their own sources such as tap water, wells, etc. (Total sanitation strategic plan, 2018).

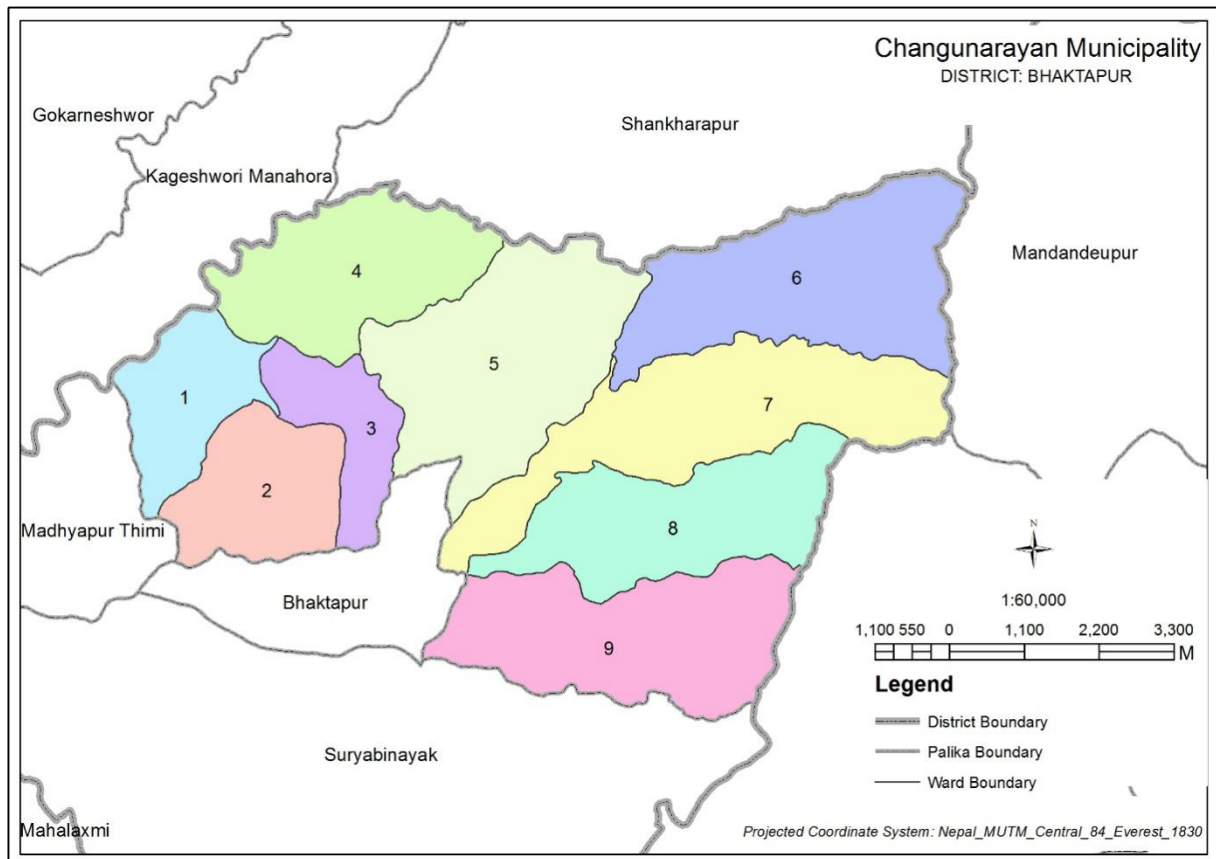


Figure 1: Map of Changunarayan Municipality (Source: Ministry of Federal Affairs and General Administration).

4 Service outcomes

Table 1: SFD Matrix for Changunarayan Municipality.

Changunarayan Municipality, Province No.3, Nepal, 27 Sep 2019. SFD Level: not set
Population: 54551
Proportion of tanks: septic tanks: 83%, fully lined tanks: 100%, lined, open bottom tanks: 92%

System label	Pop	W4c	W5c	F3	F4	F5	S4e	S5e
System description	Proportion of population using this type of system	Proportion of wastewater in open sewer or storm drain system, which is delivered to treatment plants	Proportion of wastewater delivered to treatment plants, which is treated	Proportion of this type of system from which faecal sludge is emptied	Proportion of faecal sludge emptied, which is delivered to treatment plants	Proportion of faecal sludge delivered to treatment plants, which is treated	Proportion of supernatant in open drain or storm sewer system, which is delivered to treatment plants	Proportion of supernatant in open drain or storm sewer system that is delivered to treatment plants, which is treated
T1A1C6 User interface discharges directly to open drain or storm sewer	3.0	0.0	0.0					
T1A2C5 Septic tank connected to soak pit	6.0			17.0	0.0	0.0		
T1A2C6 Septic tank connected to open drain or storm sewer	3.0			33.0	0.0	0.0	0.0	0.0
T1A3C5 Fully lined tank (sealed) connected to a soak pit	5.0			17.0	0.0	0.0		
T1A3C10 Fully lined tank (sealed), no outlet or overflow	15.0			44.0	0.0	0.0		
T1A4C5 Lined tank with impermeable walls and open bottom, connected to a soak pit	6.0			17.0	0.0	0.0		
T1A4C6 Lined tank with impermeable walls and open bottom, connected to an open drain or storm sewer	10.0			33.0	0.0	0.0	0.0	0.0
T1A4C10 Lined tank with impermeable walls and open bottom, no outlet or overflow	44.0			44.0	0.0	0.0		
T1A5C10 Lined pit with semi-permeable walls and open bottom, no outlet or overflow	3.0			50.0	0.0	0.0		
T1A6C10 Unlined pit, no outlet or overflow	4.0			63.0	0.0	0.0		
T1B11 C7 TO C9 Open defecation	1.0							

4.1 Containment

Sewerage facilities are under construction in Changunarayan Municipality, so all households are dependent on onsite sanitation systems. As presented in Table 1, majority of the population use lined tank with impermeable walls and open bottom (T1A4C5, 6%; T1A4C6, 10%; and T1A4C10, 44%), followed by fully lined tank (T1A3C5, 5% and T1A3C10, 15%), septic tank (T1A2C5, 6% and T1A2C6, 3%), unlined pit (T1A6C10, 4%), lined pit with semi-permeable walls and open bottom (T1A5C10, 3%) and without onsite container (T1A1C6, 3%). There is no standard design for the construction of septic tank/containment in Changunarayan Municipality (KII1, 2019) and 1% of the population practice open defecation.

4.2 Emptying and transportation

40% of the population have emptied their containment and 60% have never emptied the containment and manual emptying was found dominant (HHs Survey, 2019). Since, there is lack of standard design for the construction of septic tank/containment, the emptying frequency varies for even the same type of containment (KII1, 2019). There is no specific period of time for emptying period of containment. Especially, in rural areas, people have enough space for disposing the emptied faecal sludge, where the manual emptying is prevalent and dispose emptied FS in their own field. The private tanker uses

mechanical emptying and provides service without using any personal protective equipment. Mechanically emptied Faecal Sludge (FS) is transported with the help of vacuum tanker to the disposal area (KII3, 2019).

The proportion of emptied faecal sludge for different types of containment connected to different technologies (variable F3) was estimated on the basis of the data collected from the household survey, Key Informant Interviews and the information provided by private vacuum tanker service provider.

4.3 Treatment

There is no Sewage or Faecal Treatment plant in Changunarayan Municipality.

4.4 Reuse and Disposal

The private tanker service disposes the emptied faecal sludge in various disposal sites on the banks of different rivers such as the Bagmati and Hanumante Rivers (KII3, 2019).

4.5 Groundwater Contamination

There is no published data available regarding ground water table and soil profile of Changunarayan Municipality. So, the information was collected from KII1 (2019). Majority of population rely on underground sources of water which are from protected boreholes extracted from a depth of greater than 10 metres consisting of fine sand, silt and clay in the unsaturated zone. The lateral separation between sanitation facilities and ground water sources with less than 10 meters is considered less than 25% and the percentage of sanitation facilities that are located uphill of groundwater sources was estimated greater than 25% (KII1, 2019). Therefore, it has been estimated that there is low risk of ground water pollution in Changunarayan Municipality.

4.6 SFD Graphic

The SFD graphic has shown that 52% of the excreta produced has been safely managed whereas 48% has not been safely managed. 83% of FS is contained and 12% is not contained in the technology. 52% of FS generated is considered as safely managed since it is contained in the technology and has not been emptied. However, in the medium- to long- term, for example as the population and population density increases, this practise may not be sustainable and improved sanitation management services may be required since those tanks, eventually, will require emptying services. 3% of wastewater not contained in the technology is discharged into the open drain and environment untreated. 35% of contained and not contained FS is emptied and discharged into the environment without treatment. 1% is supernatant not contained and not delivered to treatment from septic tanks.

5 Data and assumptions

The data for the SFD matrix were estimated using the data collected from HHs survey carried out by CWIS TA Hub, South Asia in 2019. The collected data were further discussed and finalized with Key Informant Interviews of the Changunarayan Municipality.

The proportions of FS in septic tanks, fully lined tanks and lined tanks/all types of pits were set to 83%, 100% and 92%, according to the relative proportions of the systems in the city, as in guidance given in the Frequently Asked Questions (FAQs) in the Sustainable Sanitation Alliance (SuSanA) webpage.

The proportion of emptied faecal sludge was estimated based on the data from the household survey and Key Informant Interviews.

6 List of data sources

- *Changunarayan Municipality, 2017-18, Changunarayan Municipality Policy and programme.*
- *HHs survey data, 2019, City-Wide Inclusive Sanitation Technical Assistance, South Asia.*
- *MoFALD 2019, Ministry of Federal Affairs and General Administration Key informant interviews.*
- *Municipality Water Sanitation and Hygiene Coordination Committee, 2019, Total Sanitation Strategic Plan, 2018.*
- *KII1, September 2019, Interview with Environmental Engineer, Changunarayan municipality.*
- *KII2, September 2019, Interview with Coordinator of Bhaktapur District, UN/HABITAT.*
- *KII3, September 2019, Interview with private vacuum tanker service provider, Lalitpur Municipality.*

SFD Promotion Initiative



SFD Changunarayan Municipality, Nepal,
2019

Produced by:

City-Wide Inclusive Technical Assistance Hub,
South Asia (CWIS TA Hub, South Asia), Amrita
Angdembe

Environment and Public Health Organization
(ENPHO)

Kathmandu Valley Water Supply Management
Board (KVWSMB)

Editing:

Eco Concern Pvt.Ltd., Krishna Ram Yendyo

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