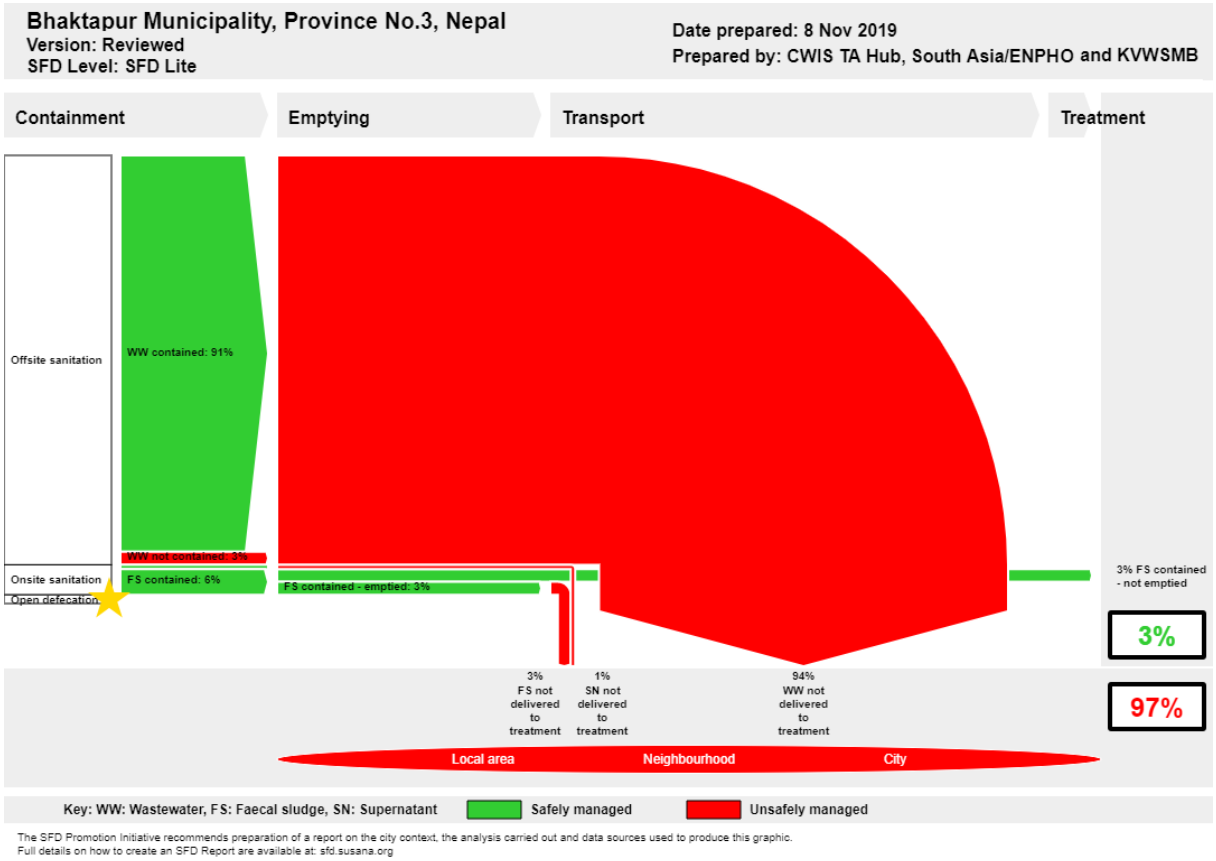
SFD Lite Report

Bhaktapur 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/ last update: 08/11/2019

1 The SFD Graphic



The SFD Promotion Initiative recommends preparation of a report on the city context, the analysis carried out and data sources used to produce this graphic.
Full details on how to create an SFD Report are available at: sfd.susana.org

2 SFD Lite information

Produced by:

- The Shit Flow Diagram for Bhaktapur 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 tool available on the SuSanA Website.

Collaborating partners:

- Eco- Concern Pvt. Ltd.
- DevCon

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3 General city information

Bhaktapur Municipality, blessed with rich cultural and historical heritage, is located in Bhaktapur district of Province no.3 of Nepal surrounded by Changunarayan Municipality in the north and east, Madhyapur Thimi in the west and Suryabinayak Municipality in the South (Figure 1). The total area of Bhaktapur Municipality is 6.88 km^2, consists of 10 wards and lies at 1,401 meters above sea level (Municipality profile, 2019).

Bhaktapur Durbar Square, one of the main squares of the city has been enlisted as a World Heritage Site. The total number of people is 81,748, living in 17,639 households (Municipality profile, 2019). Majority of the population of Bhaktapur Municipality are dependent on public water supply and their own source such as well and tap water (bore water) (KII2, 2019).

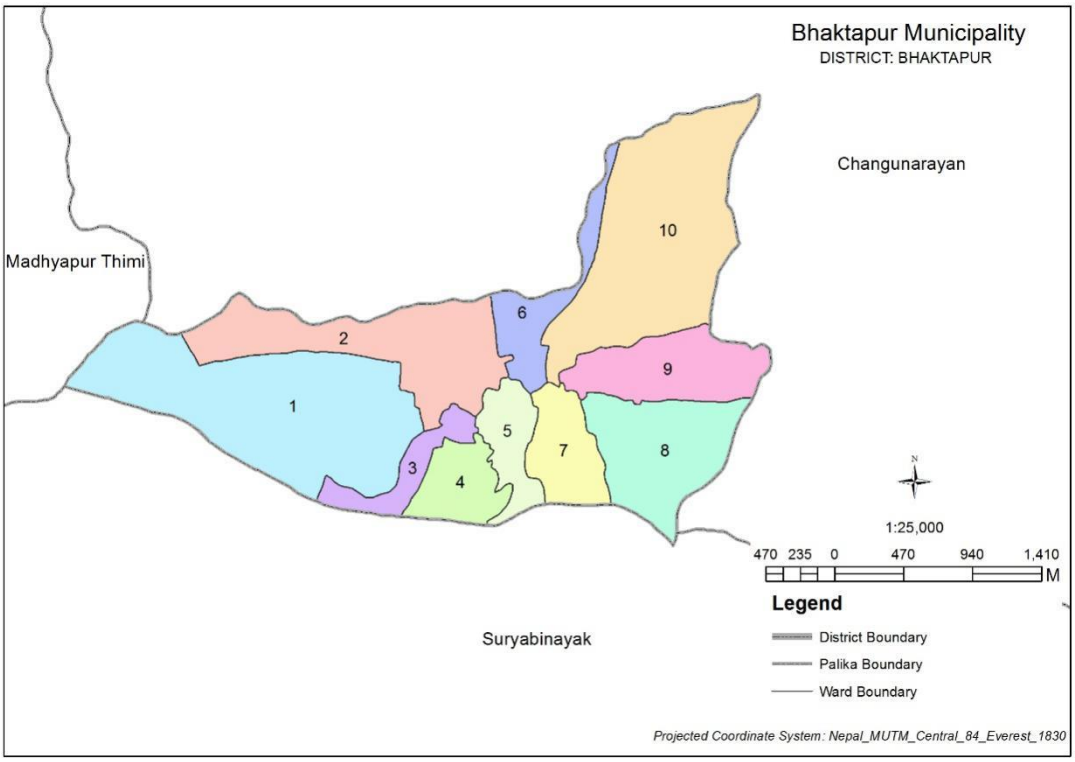

Figure 1: Map of Bhaktapur Municipality (Source: Ministry of Federal Affairs and General Administration).

4 Service outcomes

Table 1: SFD Matrix for Bhaktapur Municipality.

Bhaktapur Municipality, Province No.3, Nepal, 8 Nov 2019. SFD Level: SFD Lite
Population: 81748
Proportion of tanks: septic tanks: 100%, fully lined tanks: 90%, lined, open bottom tanks: 100%

System label	Pop	W4a	W5a	W4c	W5c	F3	F4	F5	S4d	S5d
System description	Proportion of population using this type of system	Proportion of wastewater in sewer system, which is delivered to centralised treatment plants	Proportion of wastewater delivered to centralised treatment plants, which is treated	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 sewer system, which is delivered to treatment plants	Proportion of supernatant in sewer system that is delivered to treatment plants, which is treated
T1A1C1 Toilet discharges directly to a centralised combined sewer	91.0	0.0	0.0							
T1A1C6 Toilet discharges directly to open drain or storm sewer	3.0			0.0	0.0					
T1A3C1 Fully lined tank (sealed) connected to a centralised combined sewer	1.0					0.0	0.0	0.0	0.0	0.0
T1A3C10 Fully lined tank (sealed), no outlet or overflow	4.0					60.0	0.0	0.0		
T1A4C10 Lined tank with impermeable walls and open bottom, no outlet or overflow	1.0					60.0	0.0	0.0		

4.1 Containment

Mostly, the population of Bhaktapur Municipality are dependent on sewer system (T1A1C1, 91%), followed by fully lined tanks (T1A3C1, 1% and T1A3C10, 4%), user interface directly connected to open drain (T1A1C6, 3%) and lined tanks with impermeable walls and open bottom (T1A4C10, 1%). As per the household survey (2019), the average volume of containments in Bhaktapur Municipality is 12 m^3.

Figure 2: Containment system (HHs Survey 2019).

4.2 Emptying and transportation

Since there is no standard design guidelines for the construction of containments in Bhaktapur municipality, the desludging frequency is not uniform for even the same type of containment (KII1, 2019). As per the household survey (2019), both manual (50%) and mechanical emptying (50%) were found prevalent in the municipality. The manually emptied faecal sludge is disposed by the household members and labours in the household premises while the mechanically emptied faecal sludge is transported by the private desludging vehicle, a tank equipped with movable centrifugal pump on a truck (KII2, 2019). The wastewater and supernatant are transported through the sewer system.

Figure 3: KII with Municipal staffs of Bhaktapur Municipality.

4.3 Treatment

Despite of the huge coverage of the sewer system in Bhaktapur Municipality, the municipality does not have any treatment facilities at present but a centralized wastewater treatment plant with the total capacity of 14.2 MLD (Million litres per day) is being constructed at Sallaghari in Bhaktapur Municipality.

4.4 Reuse and Disposal

The wastewater, supernatant and emptied faecal sludge get finally disposed in Hanumante River untreated.

4.5 SFD Graphic

According to the SFD graphic, 97% of faecal sludge and wastewater generated have been estimated as unsafely managed while only 3% of faecal sludge is safely managed. The 97% of unsafely managed excreta is distributed as follows: 91% of the wastewater contained in the technology disposed in the open environment untreated; 3% of wastewater not contained in the technology and discharged without any treatment, originating from the user interface directly connected to the open drain; 1% of supernatant released and not treated from the contained technology (fully lined tanks connected to combined centralized sewer) and 3% of the emptied faecal sludge from the contained technology disposed without any treatment. Only 3% of FS contained in the technology is considered as safely managed since it comes from FS not emptied form fully lined tanks.

4.6 Groundwater Contamination

There is no published data available regarding groundwater table and soil profile of Bhaktapur Municipality. So, the information was collected from KII1 (2019). Less than 25% of the population rely on underground sources of water such as protected boreholes and protected dug wells extracted from a depth of greater than 10 metres consisting of sandstone/limestone's fractured rock in unsaturated zone. The lateral separation between sanitation facilities and groundwater sources with less than 10 metres is considered greater than 25%. More than 25% of sanitation facilities are found uphill of ground water sources (KII1, 2019). So, It has been estimated that there is low risk of groundwater pollution in Bhaktapur Municipality.

5 Data and assumptions

The data for the SFD Matrix were estimated using the data collected from the household survey carried out by CWIS TA Hub, South Asia in 2019. The collected data were further discussed and finalized with key informants of Bhaktapur Municipality.

The proportions of FS in septic tanks, fully lined tanks and lined tanks with impermeable walls and open bottom were set to 100%, 90% and 100%, respectively, according to the relative proportions of the systems in the Municipality, as per the guidance given in the Frequently Asked Questions (FAQs) in the Sustainable Sanitation Alliance (SuSanA) website.

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 and Key Informant Interviews.

6 List of data sources

- *Bhaktapur Municipality Profile, 2019.*
- *HHs survey data, 2019, City-Wide Inclusive Sanitation Technical Assistance, South Asia.*
- *MoFALD, 2019, Ministry of Federal Affairs and General Administration.*
- *KII1, October 2019, Coordinator of Environmental Committee, Bhaktapur Municipality.*
- *KII2, October 2019, Interview with Municipal Engineer, Planning Section, Bhaktapur Municipality.*
- *KII3, September 2019, Interview with Private Mechanical desludging service Provider.*

SFD Bhaktapur 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

This Executive Summary and the SFD Report are available from:

www.sfd.susana.org

SFD Promotion Initiative