



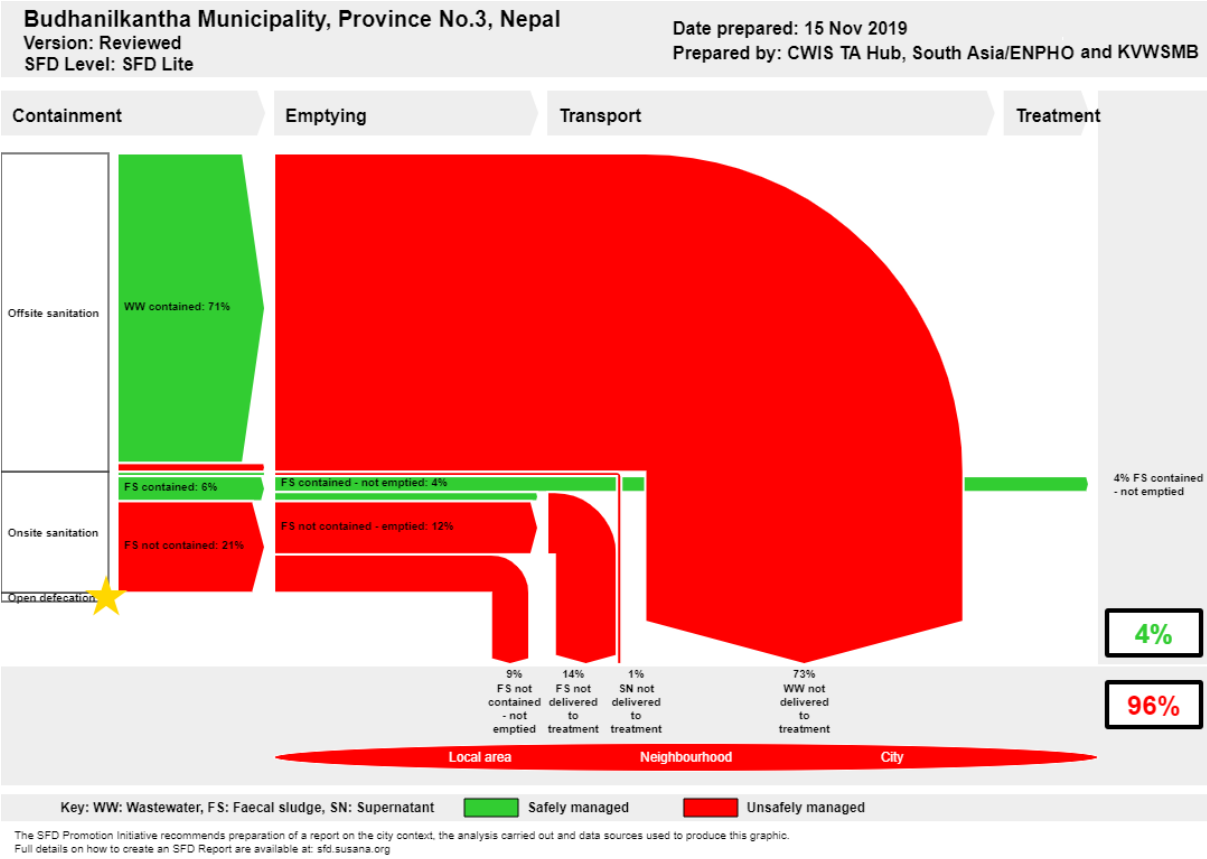
SFD Lite Report

Budhanilkantha 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: 15/11/2019

1 The SFD Graphic



2 SFD Lite information

Produced by:

- The Shit Flow Diagram for Budhanilkantha 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

Date of production: 15/11/2019

3 General city information

Budhanilkantha Municipality is located in Kathmandu District in Province No. 3 of Nepal. It was established in 2014 (2071 B.S in Nepali calendar) by merging the former village development committees Khadga Bhadrakali, Chapali Bhadrakali, Mahankal, Bishnu, Chunikhel and Kapan. The municipality is bounded by Kathmandu metropolitan in the south, Tokha Municipality in the west, Gokarneshwar Municipality in the east and Shvapuri watershed and wildlife reserve in the north. The municipality consist of 13 wards with a total population of 153,303 people residing in 32,039 households and covering an area of 34.80 km² (Annual Municipal Development plan, 2019).

The temperature ranges from an average minimum of 3°C to a maximum of 28°C with an altitude ranging from 1,289 m to 2,699 m above mean sea level (Annual Municipal Development plan, 2019). The main sources of drinking water in Budanilkantha Municipality are public taps, household bores and wells. More than half of the households are dependent on their own sources such as tap water (bore water) and wells. The remaining 30% of the households are dependent on public water supply (KII2, 2019).

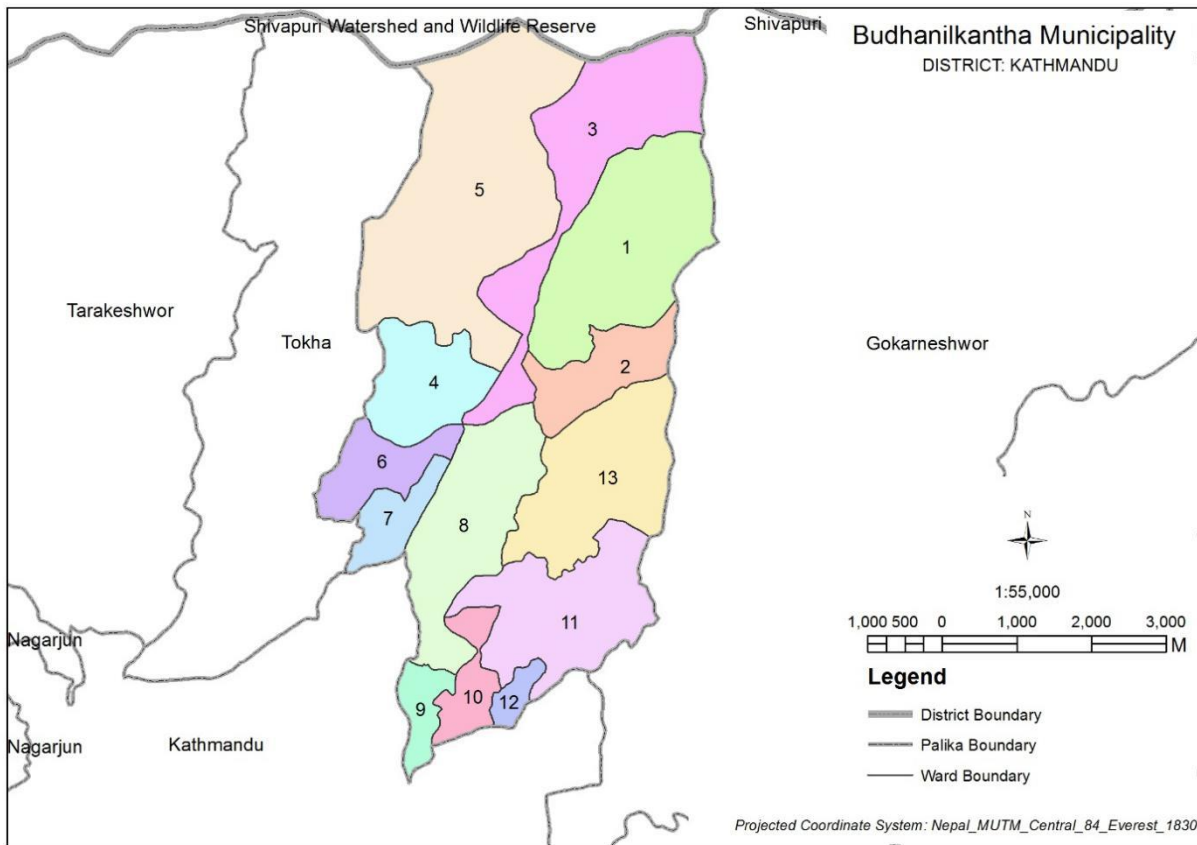


Figure 1: Map of Budanilkantha Municipality (Source: Ministry of Federal Affairs and General Administration).

4 Service outcomes

Table 1: SFD Matrix for Budhanilkantha Municipality.

Budhanilkantha Municipality, Province No.3, Nepal, 15 Nov 2019. SFD Level: SFD Lite

Population: 153303

Proportion of tanks: septic tanks: 75%, fully lined tanks: 100%, 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	71.0	0.0	0.0							
T1A1C6 Toilet discharges directly to open drain or storm sewer	2.0			0.0	0.0					
T1A2C2 Septic tank connected to a centralised foul/separate sewer	1.0					0.0	0.0	0.0	0.0	0.0
T1A3C10 Fully lined tank (sealed), no outlet or overflow	5.0					42.0	0.0	0.0		
T1A3C8 Fully lined tank (sealed) connected to open ground	1.0					25.0	0.0	0.0		
T1A3C9 Fully lined tank (sealed) connected to 'don't know where'	5.0					70.0	0.0	0.0		
T1A4C8 Lined tank with impermeable walls and open bottom, connected to open ground	1.0					25.0	0.0	0.0		
T2A2C5 Septic tank connected to soak pit, where there is a 'significant risk' of groundwater pollution	1.0					59.0	0.0	0.0		
T2A3C5 Fully lined tank (sealed) connected to a soak pit, where there is a 'significant risk' of groundwater pollution	9.0					59.0	0.0	0.0		
T2A4C10 Lined tank with impermeable walls and open bottom, no outlet or overflow, where there is a 'significant risk' of groundwater pollution	2.0					42.0	0.0	0.0		
T2A4C5 Lined tank with impermeable walls and open bottom, connected to a soak pit, where there is a 'significant risk' of groundwater pollution	1.0					59.0	0.0	0.0		
T2A5C10 Lined pit with semi-permeable walls and open bottom, no outlet or overflow, where there is a 'significant risk' of groundwater pollution	1.0					100.0	0.0	0.0		

4.1 Containment

As presented in Table 1, most of the population are dependent on the sewer system (T1A1C1, 71%), followed by fully lined tanks (T2A3C5, 9%; T1A3C8, 1%, T1A3C9, 5% and T1A3C10, 5%), lined tanks with impermeable walls and open bottom (T2A4C5, 1%; T1A4C8, 1% and T2A4C10, 2%), septic tanks (T1A2C2, 1%, T2A2C5, 1%), user interface directly connected to open drain (T1A1C6, 2%) and lined pits with semi-permeable walls and open bottom with no outlet and overflow (T2A5C10, 1%). As per the household survey (2019), the average size of the containments is 7m³.



Figure 2: Containment system with manhole cover (HHs survey, 2019).

4.2 Emptying and transportation

The emptying frequency widely varies since there is no standard design guidelines for the construction of containments in Budhanilkantha Municipality (KII1, 2019). So, the emptying frequency for different types of containment connected to different technology is estimated on the basis of the household survey and key Informant Interviews. Mechanical emptying (96%) provided by a private desludging service provider was found in higher percentage than manual emptying (4%) in Budhanilkantha Municipality (HHs Survey, 2019). The mechanically emptied faecal sludge is transported by a private desludging vehicle, a tank equipped with a movable centrifugal pump on a truck (KII2, 2019). There is no municipal services in the municipality so the municipality relies on a neighbouring municipality. The manual emptying is done by a household member or labour. The wastewater and supernatant are transported through the sewer system.

4.3 Treatment

Despite having a huge coverage of sewer system, the municipality lacks of treatment facilities for treating wastewater.

4.4 Reuse and Disposal

Manually emptied faecal sludge is disposed by the household member or labour themselves in their household premises or in the field. All the wastewater, supernatant and emptied faecal sludge are finally discharged in Bishnumati and Dhobi Rivers, as well as in other rivers of Kathmandu Valley (KII1 and KII4, 2019).



Figure 3: Wastewater and supernatant discharged into Dhobi River untreated.

4.5 SFD Graphic

As shown in SFD graphic, 96% of the excreta generated have been unsafely managed and only 4% of the excreta generated have been safely managed. 71% of the wastewater contained in the technology and 2% of the wastewater discharged from open drains, which is not contained in the technology, gets discharged into the open environment untreated. 1% of the supernatant released from the septic tanks connected to the sewer system is discharged into the environment without any treatment, as well. Out of the 21% of the Faecal Sludge (FS) not contained in the technology, 12% of FS is emptied and discharged in the environment untreated whereas 9% of FS is not emptied but also considered as unsafely managed. 6% of the FS is contained, out of which, 4% corresponds to FS not emptied, which is safely managed, from onsite systems located in areas of low risk of groundwater pollution and 2% corresponds to FS emptied and discharged in the environment without any treatment.

4.6 Groundwater Contamination

There is no published data available regarding groundwater table and soil profile of Budhanilkantha 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 unsaturated zone. The lateral separation between sanitation facilities and groundwater sources with less than 10 metres is considered greater than 25% and the percentage of sanitation facilities that are located uphill of groundwater sources was estimated less than 25% (KII1, 2019). So, It has been estimated that there is high risk of groundwater pollution in Budhanilkantha 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 Budhanilkantha Municipality.

The proportions of FS in septic tanks, fully lined tanks and lined tanks with impermeable walls and open bottom were set to 75%, 100% 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

- *Budhanilkantha Municipality, 2019/2020, Annual Municipal Development plan, 2019.*
- *Household Survey, 2019, City-Wide Inclusive Sanitation Technical Assistance Hub, South Asia.*
- *MoFALD, 2019, Ministry of Federal Affairs and General Administration.*
- *KII1, October 2019, Interview with Municipal Engineer Budhanilkantha Municipality.*
- *KII2, October 2019, Interview with Municipal Engineer Budhanilkantha Municipality.*
- *KII3, October 2019, Interview with Municipal Engineer Budhanilkantha Municipality.*
- *KII4 September 2019, Interview with Private desludging service provider, Lalitpur Metropolitan City.*

SFD Budhanilkantha Municipality, Nepal, 2019

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