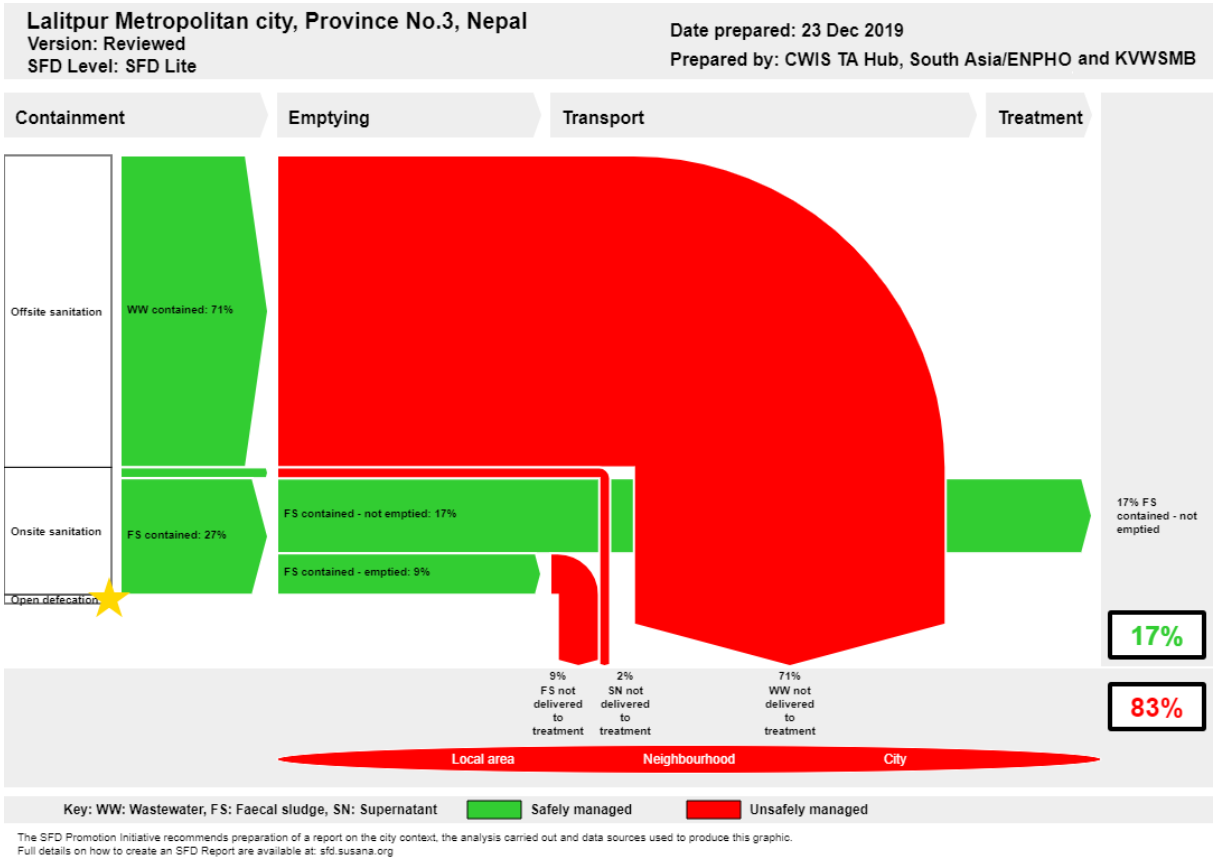
SFD Lite Report

Lalitpur Metropolitan city 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: 27/02/2020

1 The SFD Graphic



2 SFD Lite information

Produced by:

- The Shit Flow Diagram for Lalitpur Metropolitan city 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

Lalitpur Metropolitan city which literary means 'the city of fine arts' is located in Lalitpur district of Province no.3 of Nepal. The city is extremely rich in its arts & architecture and boasts on the largest community of artisans, especially metal and wood workers; It consist of Patan Durbar Square which has been registered in the World Heritage Site. The municipality is bounded by Kritipur Municipality in the west, Kathmandu Metropolitan city in the north, Mahalaxmi Municipality in the east and Daksinkail Municipality in the south (Figure 1). The city consist of 29 wards with the total population of 284,922 people residing in 70,256 households and covering an area of 36.12 km^2 (Municipality Profile, 2019).

Lalitpur Metropolitan city lies at the average height of 1,280 metres above mean sea level. The main sources of drinking water in the city are taps (municipal water supply), tap water (bore water) and wells (KII1, 2019).

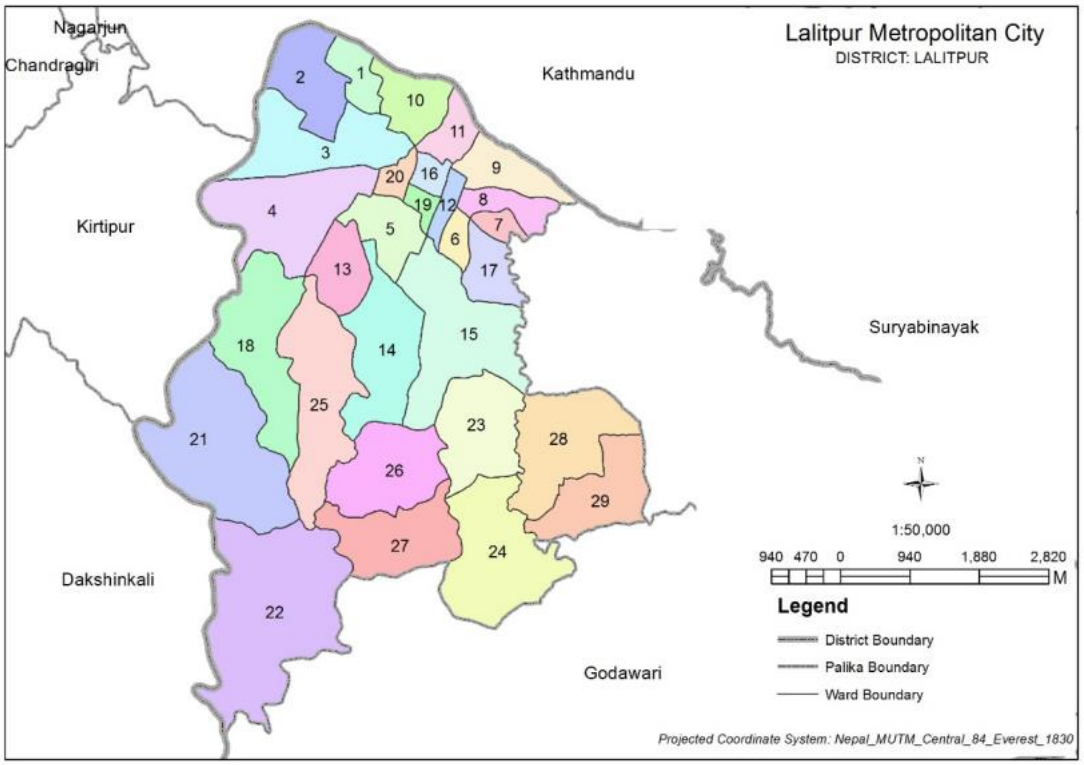

Figure 1: Map of Lalitpur Metropolitan city (Source: Ministry of Federal Affairs and General Administration).

4 Service outcomes

Table 1: SFD Matrix for Lalitpur Metropolitan city.

Lalitpur Metropolitan city, Province No.3, Nepal, 23 Dec 2019. SFD Level: SFD Lite
Population: 284922
Proportion of tanks: septic tanks: 100%, fully lined tanks: 69%, lined, open bottom tanks: 100%

System label	Pop	W4a	W5a	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 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					
T1A3C1 Fully lined tank (sealed) connected to a centralised combined sewer	8.0			0.0	0.0	0.0	0.0	0.0
T1A3C10 Fully lined tank (sealed), no outlet or overflow	3.0			45.0	0.0	0.0		
T1A3C5 Fully lined tank (sealed) connected to a soak pit	2.0			64.0	0.0	0.0		
T1A4C10 Lined tank with impermeable walls and open bottom, no outlet or overflow	16.0			45.0	0.0	0.0		

4.1 Containment

Majority of the population of Lalitpur Metropolitan city are dependent on the sewer system (T1A1C1, 71%), followed by lined tanks with impermeable walls and open bottom (T1A4C10, 16%) and fully lined tanks (T1A3C1, 8%; T1A3C10, 3% and T1A3C5, 2%). Especially, the population of the major core area of the city are those dependent on the sewer system (KII1, 2019). As per the household survey (2019), the average volume of containment in Lalitpur Metropolitan city is 13 m^3.

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

4.2 Emptying and transportation

Since there is no standard design guidelines for the construction of containment in Lalitpur Metropolitan city, the desludging frequency is not uniform for even the same type of containment (KII1, 2019). Hence, the proportion of emptied faecal sludge for different types of containments connected to different technologies (variable F3) was estimated on the basis of the data collected from the household survey and Key Informant Interviews.

Figure 3: KII with Municipal staffs of Lalitpur Metropolitan city.

The study reveals that the mechanical emptying (72%) accounts for the majority of emptying while manual emptying accounts for a smaller proportion (28%). The manually emptied faecal sludge is disposed by the household members and labours in the household premises and the mechanical emptying and transportation is carried out by a private desludging vehicle, consisting of a tank equipped with movable centrifugal pump on a truck (KII2, 2019). The wastewater and supernatant are transported through the sewer system.

4.3 Treatment

Despite of huge coverage of the sewer system in Lalitpur Metropolitan city, the municipality does not have any treatment facilities.

4.4 Reuse and Disposal

The wastewater, supernatant and emptied faecal sludge gets finally discharged in Bagmati River untreated.

4.5 SFD Graphic

The SFD graphic shows that 17% of the excreta is safely managed resulting from faecal sludge contained in the technology which is not emptied from tanks and pits. 71% of the population's excreta discharges directly to sewers and eventually gets dumped in the environment without any treatment. A further 2% of the population's excreta is first contained in lined tanks, then discharged to the sewer system and eventually gets discharged into the environment untreated.

Even though 100% of the excreta produced is considered to be safely contained in different containment technologies, due to the lack of treatment facility, the wastewater and emptied faecal sludge gets disposed in an open environment without treatment. So, the city should focused on treatment stage of sanitation value chain for the safe management of wastewater and faecal sludge produced in the city.

4.6 Groundwater Contamination

There are no published data available regarding groundwater table and soil profile of Lalitpur Metropolitan city. So, the information was collected from KII1 (2019). Less than 25% of the population relies on underground sources of water such as protected boreholes or protected dug wells, extracted within a depth of 10 metres and consisting of fine sand, slit and clay in unsaturated zone. The lateral separation between sanitation facilities and groundwater sources with less than 10 metres is considered less 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 low risk of groundwater pollution in Lalitpur Metropolitan city.

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 Lalitpur Metropolitan city.

The proportions of faecal sludge in septic tanks, fully lined tanks and lined tanks with impermeable walls and open bottom were set to 100%, 69% and 100%, respectively according to the relative proportions of the systems in the Metropolitan city, 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

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

SFD Lalitpur Metropolitan city, Nepal, 2019

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This Executive Summary and the SFD Report are available from:

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SFD Promotion Initiative