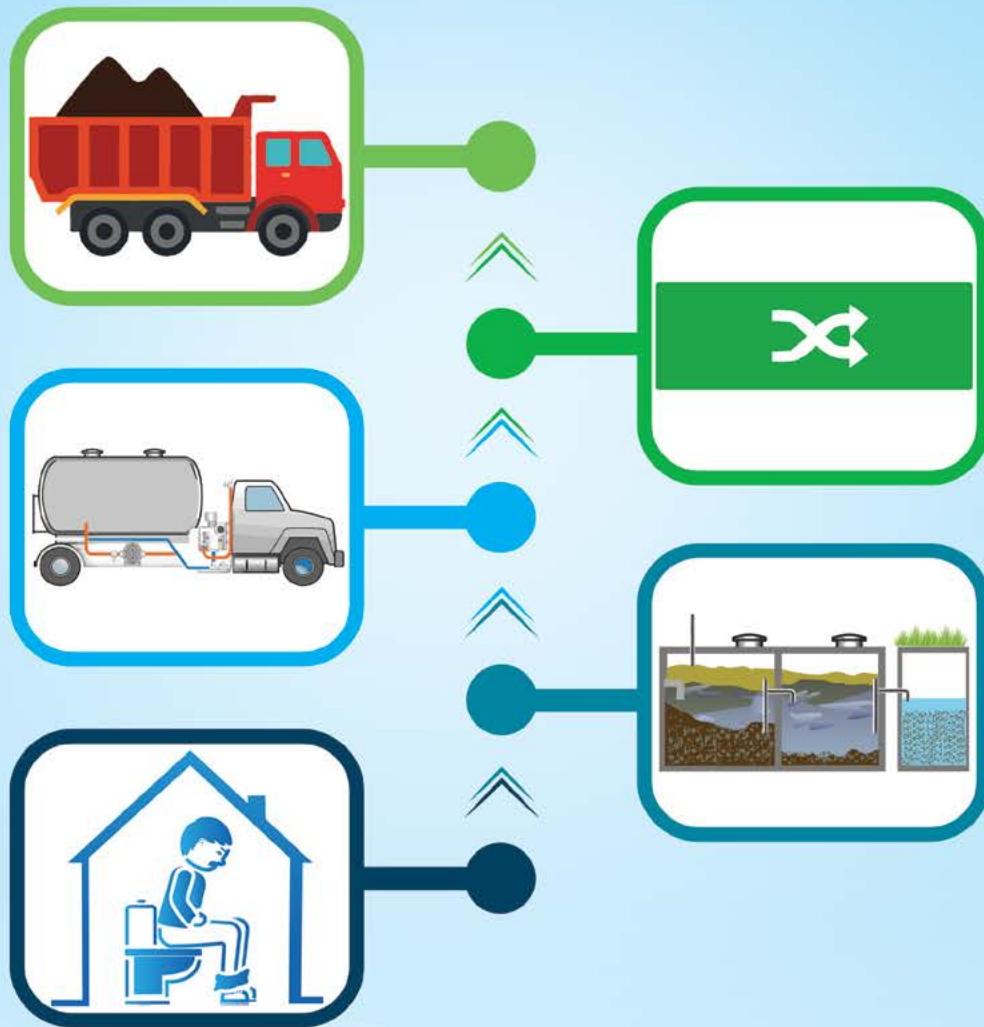


Municipal Sanitation Synopsis of Gandaki Province, Nepal -2024



Municipalities Network Advocacy on Sanitation in South Asia Phase II (MuNASS-II)

Published by : Environment and Public Health Organization (ENPHO)

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Study Team

Rajendra Shrestha, Program Director, ENPHO

Jagam Shrestha, Senior Research Officer, ENPHO

Buddha Bajracharya, Program Coordinator, ENPHO

Rupak Shrestha, Sanitation Engineer, ENPHO

Sabuna Gamal, Asst. Project Officer, ENPHO

Anita Bhujju, Asst. Project Officer, ENPHO

Asmita Shrestha, Asst. Project Officer, ENPHO

Muskan Shrestha, Sanitation Advocacy Specialist, MuAN

Editorial Review

Bhawana Sharma, Executive Director, ENPHO

Kalanidhi Devkota, Executive Director, MuAN

Shamim Ahsan Chowdhury, Project Manager, UCLG ASPAC

Disclaimer: The content presented in the Municipal Sanitation Synopsis relies on the data available (on the date of the survey) and further validated with respective municipalities. Please note that the information and suggestions may be revised due to dynamic circumstances, updated surveys, or alterations in municipal policies. It is recommended that readers validate and compare the data with the most recent sources to ensure precision and accuracy. While the overviews strive to offer a broad perspective and recommendations, it is important to recognize that specific local conditions can differ, and stakeholders are encouraged to undertake additional research or seek guidance from local authorities for thorough decision-making.

ACKNOWLEDGEMENT

We extend our sincere gratitude to Mr. Dhana Raj Acharya, Mayor of Pokhara Metropolitan City; Mr. Basanta Kumar Shrestha, Mayor of Baglung Municipality; Mr. Surat KC, Mayor of Beni Municipality; Mr. Guman Singh Aryal, Mayor of Besishahar Municipality; Mr. Madan Bhakta Adhikari, Mayor of Gaidakot Municipality; Mr. Krisna Bahadur Rana Magar, Mayor of Gorkha Municipality; Mr. Baikuntha Neupane, Mayor of Vyas Municipality, along with all deputy mayors, ward chairpersons, and municipal staffs, for their unwavering support and valuable feedback throughout the study. Special thanks to respective Chief Administrative Officers (CAO), for efficiently coordinating and mobilizing team during the study.

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Furthermore, we are thankful to Mr. Bhim Prashad Dhungana, President of Municipal Association of Nepal (MuAN) for the gracious support.

Orientation program to conduct household survey for the enumerators appointed by the respective municipalities during SFD survey



Enumerator practicing using mobile application to conduct household survey



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Conducting key informant interview with Mayors, Deputy Mayors and municipal staffs



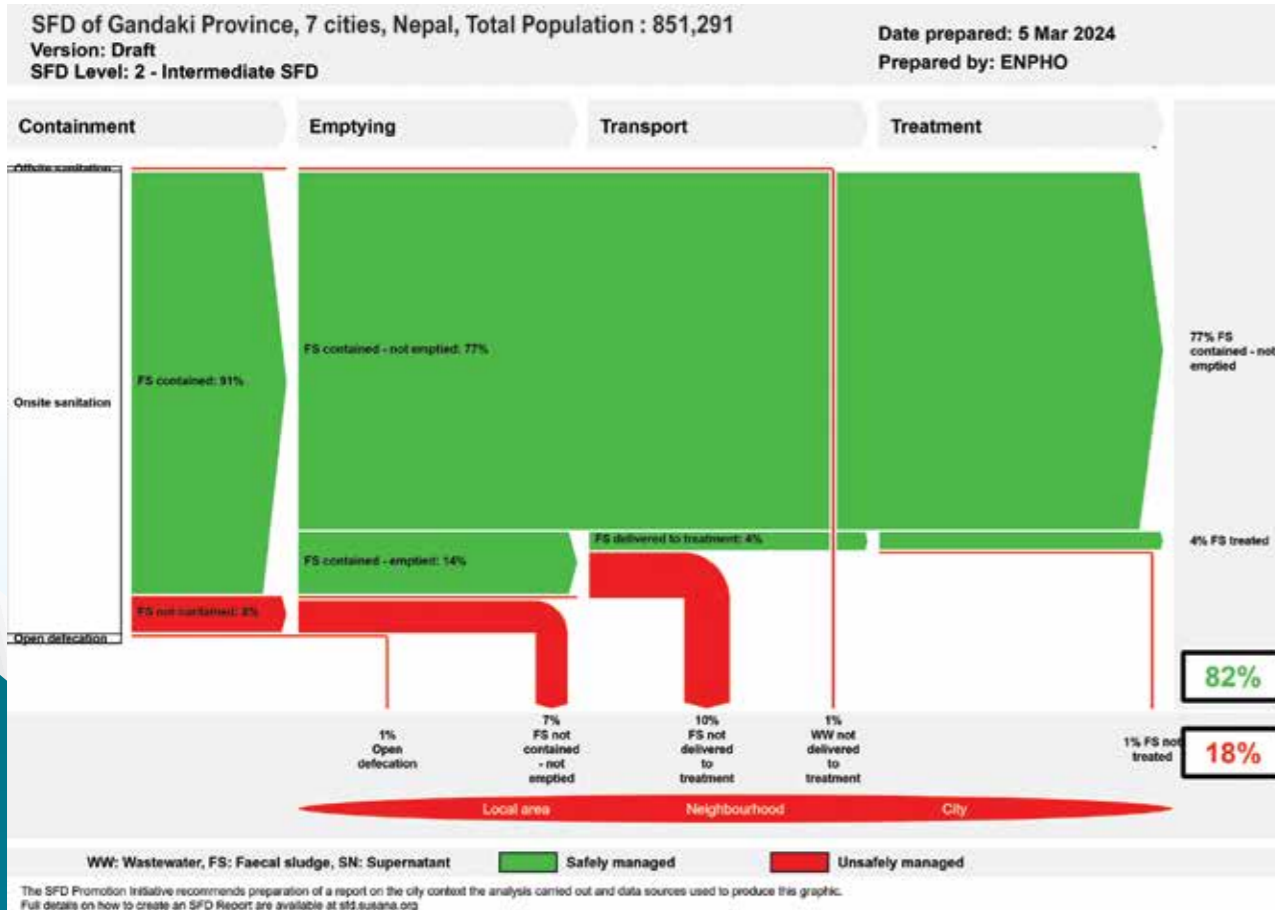
Municipal council members and stakeholders participating in SFD validation workshop to review and discuss findings.



SHIT FLOW DIAGRAM (SFD)

The shit flow diagram (SFD) of Gandaki Province represents the sanitation status of the province across the sanitation value chain. FS generated by 82% of the population is safely managed (Green). Initially, 91% of FS is safely contained. However, the percentage decreases to 77% when FS generated by 14% is emptied. Only 4% of the emptied FS is considered treated primarily by biogas digesters. This implies that 77% of FS are considered safely managed and remain safe until emptied. The emptied FS remains safe depending on the emptying mechanism and the available treatment options/facilities.

Further, FS generated by 18% of the population is unsafely managed (Red). This includes 1% of WW not delivered to treatment plant, 7% of FS neither safely contained nor emptied which possess the increased environmental risks. Additionally, 10% FS is emptied (9% FS-contained and 1% FS-not contained) but not transported for treatment and 1% of the population still practices open defecation, exacerbating sanitation challenges. These findings highlight critical gaps that must be addressed to mitigate environmental contamination and public health risks associated with inadequate FS management practices.



SANITATION SYNOPSIS OF GANDAKI PROVINCE, NEPAL -2024



DEMOGRAPHICS

AREA : 21,733 KM²



HOUSEHOLDS (HHs) : 662,480



POPULATION : 2,466,427
MALE : 1,170,833
FEMALE : 1,295,594



MUNICIPALITIES : 26
METROPOLITAN : 1



POPULATION GROWTH RATE : 0.25%



STUDIED MUNICIPALITIES : 7



SOURCE: CENSUS, 2021

ABOUT

A study on faecal sludge management is being conducted in 65 municipalities of Nepal as part of the Municipalities Network Advocacy on Sanitation in South Asia II (MuNASS II) program. The study was carried out in seven municipalities i.e. Baglung, Beni, Besishahar, Gaidakot, Gorkha, Vyas including Pokhara Metropolitan city of Gandaki Province.

OBJECTIVE OF THE STUDY

The study aims to assess the sanitation conditions with a focus on the faecal sludge management (FSM) and develop Shit Flow Diagram (SFD) for these 65 municipalities in Nepal.

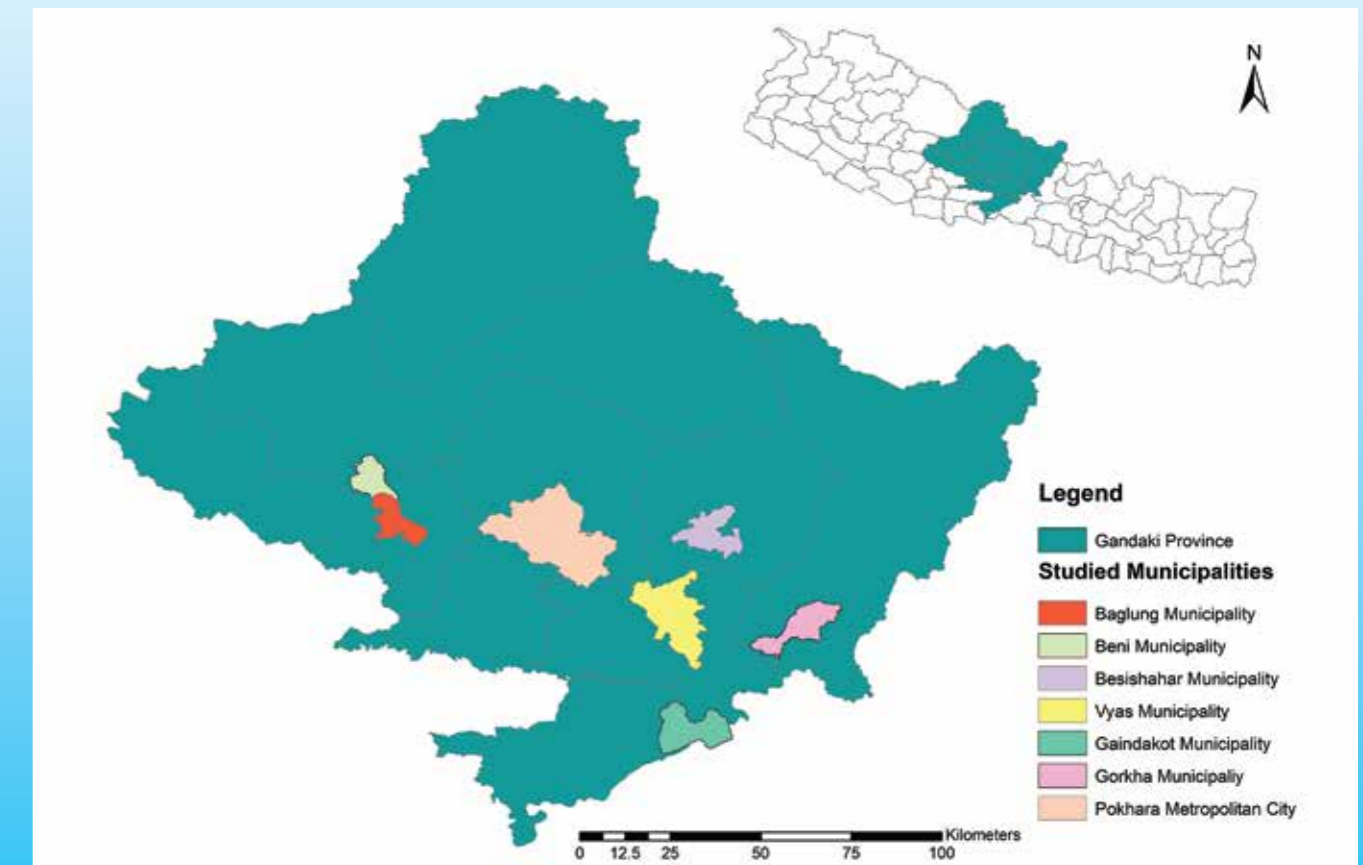
METHODOLOGY OF THE STUDY

The methodology involved conducting a random questionnaire survey using the KOBO mobile application. Proportionate stratified random sampling was employed to determine the sample size of the households. Local enumerators selected by respective municipalities were mobilized for the survey. The enumerators, trained intensively for two days, were deployed by respective municipalities to collect survey data. Additionally, the Key Informant Interview (KII) was done with concerned stakeholders of the municipalities. Analysis included computing frequency distributions, means and cross tabulations.

PROVINCE PROFILE

Gandaki province covers an area of 21,733 sq.km, comprising of 14.75% of the total area of the country. It lies between 27°26'15" and 29°12'01" North latitude and 82°52'45" and 85°12'01" East longitude. It is bordered by Bagmati Province in the east, and Lumbini Province in the west, while big mountains towards China segregate the north side, and Lumbini Province and India in the south.

MAP LOCATING STUDIED MUNICIPALITIES IN GANDAKI PROVINCE



RECOMMENDATIONS

Infrastructure Upgrade

- Replace and retrofit the unsafe containment to safe techniques and technologies such as septic tanks, and biogas digester.

Mechanical Desludging

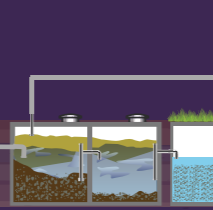
- Advocate for providing desludging services within the municipality, along with its formal registration and proper regulation.

Service Regulation

- Promote regular emptying of containment systems, ideally at least once every 3 to 5 years, to prevent overflow and ensure proper functioning.
- Formulate and enforce policies and regulations mandating the use of safe sanitation technologies in new construction or renovations.
- Proper operation and maintenance of existing FSTP, and establishment of new ones in municipalities where they are not available.



संकलन
(User Interface)



भण्डारण
(Containment)



रिचार्जने र ढुवानी
(Emptying & Transportation)



प्रशोधन
(Treatment)



पुनः प्रयोग वा सुरक्षित विसर्जन
(Re-use or Safe Disposal)



The Sanitation Service Chain (SSC) is a comprehensive service framework delineating the sequential stages

of faecal sludge management from excreta generation to safe disposal. It encompasses five key phases:

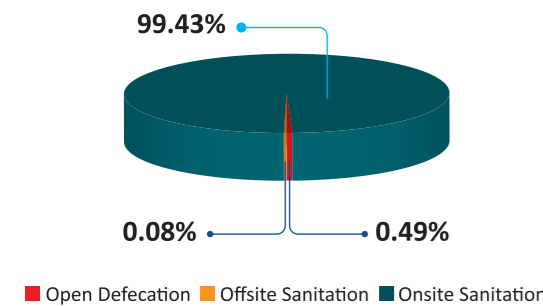
collection, containment, emptying and transportation, treatment, and reuse/safe disposal.

USER INTERFACE FACILITY

The sanitation facility, commonly referred to as toilet, serves as collection points for human waste and directs it to either offsite or onsite sanitation system.

In Gandaki province, 0.49% of HHs lacks access to improved sanitation facilities, resorting to open defecation. Meanwhile, 99.43% of the households (HHs) toilets are connected to onsite sanitation systems. Notably, there is no sewerage system and despite laws prohibiting the direct connection of blackwater to stormwater/open drains, 0.08% of toilets have such illegal connections.

Sanitation Facilities

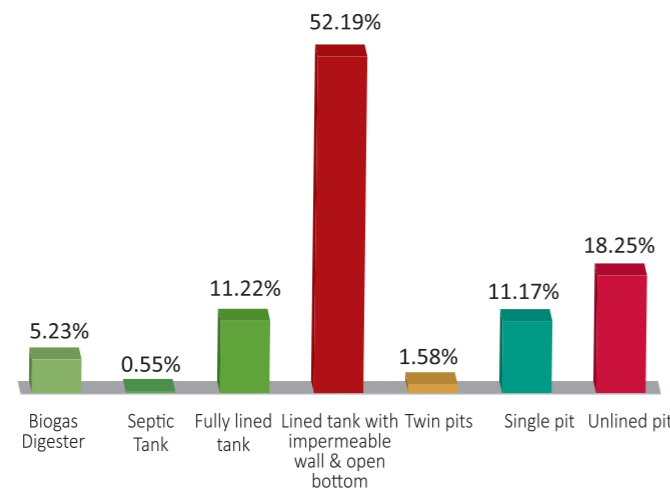


CONTAINMENT

The human waste collected from toilet is stored in different types of tanks for certain time period, known as containment, and the accumulated human waste in it is termed as faecal sludge (FS).

In the province, the majority of HH have built lined tanks with impermeable walls and open bottoms, followed by unlined pit and single pit which are considered unsafe. It poses high risk of groundwater contamination due to leachate percolation through their permeable bases. Only a small proportion of HHs have installed safe containment, such as septic tanks, biogas, and twin pit.

Types of Containments

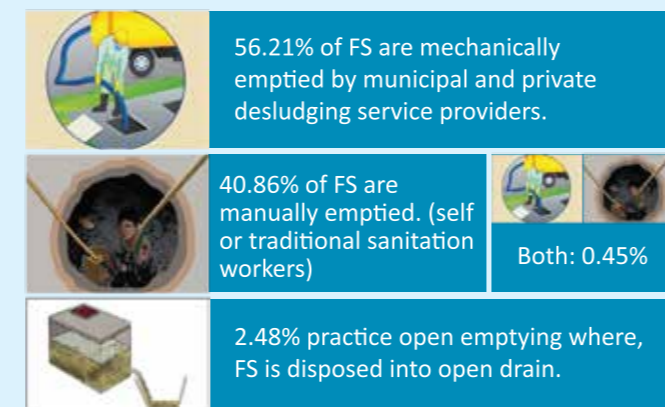
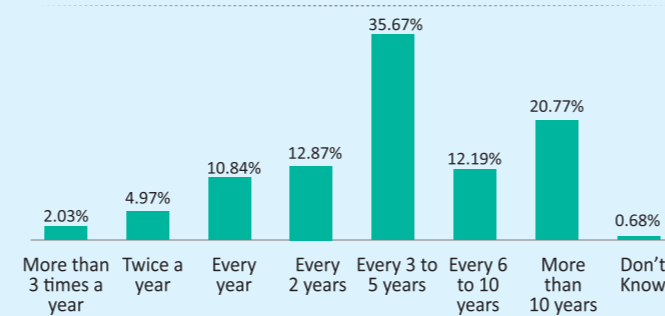


EMPTYING AND TRANSPORTATION

Regular emptying is essential for maintaining the functionality of these containments. The survey reveals that only 12.73% of the HHs have emptied their containments at least once since installation.

The containments are being emptied in different time intervals, where 35.67% are emptied in an interval of 3 to 5 years. The emptying mechanism of the containment is shown in the graph

Emptying Interval



The private desludging service is available in Besishahar Municipality, Gaidakot Municipality, Pokhara Metropolitan city, and Baglung Municipality, whereas in Vyas Municipality the desludging service is provided by municipality itself.

Status of desludging services in surveyed municipalities

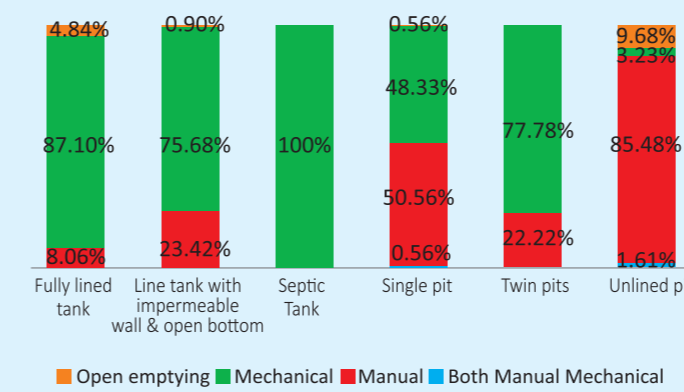
Service Provider	Municipality	Private
No. of service provider	1	8
No. of vehicles	1	12 (10-functional during study period)
Capacity of vehicles (litres)	5,000	4,000-5,000
Average number of trips per day per vehicle	1	1
Service charge per trip (NPR)	7,000	4,000-9,000

TREATMENT

Biogas digesters, if functioning properly, are regarded as safe and considered capable of treating faecal sludge. However, FS stored in other types of containments requires treatment. Pokhara Metropolitan City, Gaidakot Municipality, and Vyas Municipality each have faecal sludge treatment plants (FSTPs), but the one in Pokhara has been demolished. During the study period, it was informed that mechanically collected FS by private desludgers of Pokhara metropolitan city is taken to Gandaki Urja private limited for biogas production. Similarly, the construction of FSTP in Vyas municipality is incomplete and in meantime mechanically collected FS by municipal desludging vehicle is taken to biogas digester operated by the municipality itself. Additionally, during the study period, it was found that FSTP in Gaidakot remains nonfunctional, and other studied municipalities don't have any form of treatment plant.



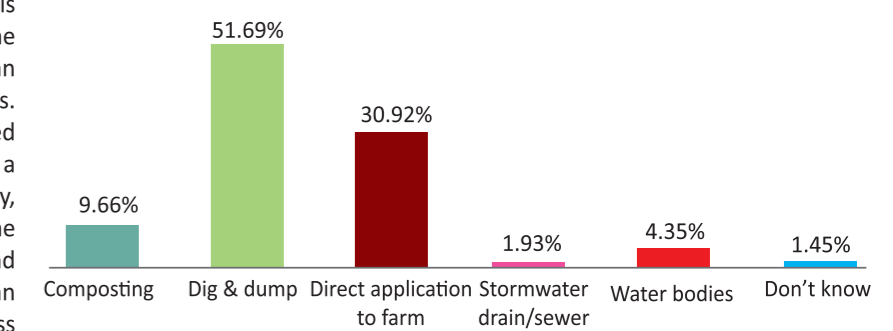
Emptying Mechanism



SAFE DISPOSAL OR REUSE

In the municipalities where the FSTP is nonfunctional or not available, the mechanically collected FS is disposed in an open environment or water bodies. Meanwhile, the majority of manually emptied FS is disposed by dig and dump practice, and a few HH practice composting. Additionally, some HH apply it directly to farms and some illegally dispose of the FS into open drains and water bodies. These practices of disposal in an open environment and water bodies possess a risk to the environment and public health.

Disposal practice of FS after manual emptying



ESTIMATION OF FAECAL SLUDGE

The estimation of faecal sludge production in the Gandaki province was derived based on containment volume and average emptying frequency. Notably, faecal sludge from biogas digesters, which does not require emptying like other containments, was excluded from the calculation.

Total estimated volume of FS generation in the 27 municipalities of Gandaki Province: 4,49,809 m³ per year which is 1,232.4 m³ per day

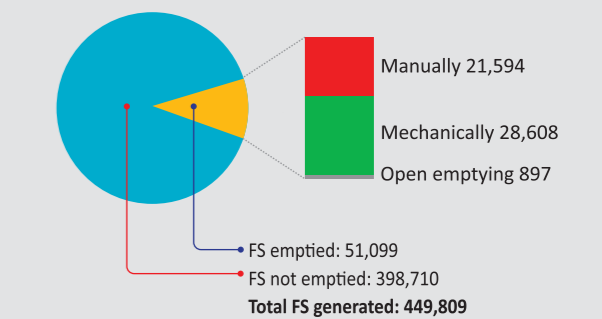
Total estimated volume of FS emptied: 51,099 m³ per year which is 140.0 m³ per day.

Total estimated volume of mechanically emptied FS: 28,608 m³ per year which is 78.3 m³ per day.

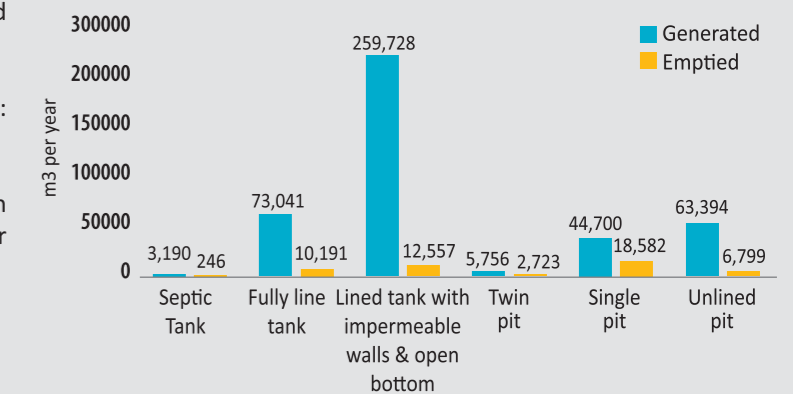
Total estimated volume of manually emptied FS: 21,594 m³ per year which is 59.2 m³ per day.

Total estimated volume of FS emptied by open emptying: 897 m³ per year which is 2.5 m³ per day.

Summary on faecal sludge produced, emptied, and transported in Gandaki province (cubic metre)



FS Generated and Emptied



BAGLUNG MUNICIPALITY

Municipal Sanitation Synopsis, Study Year-2023

Baglung Kalika Temple

CITY PROFILE

Baglung Municipality is in Baglung District of Gandaki Province in Nepal. It spans from 28°16'00" N to 28°27'00"N latitude and 83°35'00" E to 83°58'00"E longitude. The municipality's elevation ranges approximately from 450 metres to 1910 meters above sea level.

DEMOGRAPHICS



Area : 98.01 km²



POPULATION : 56,102

Male : 26,080

Female : 30,022



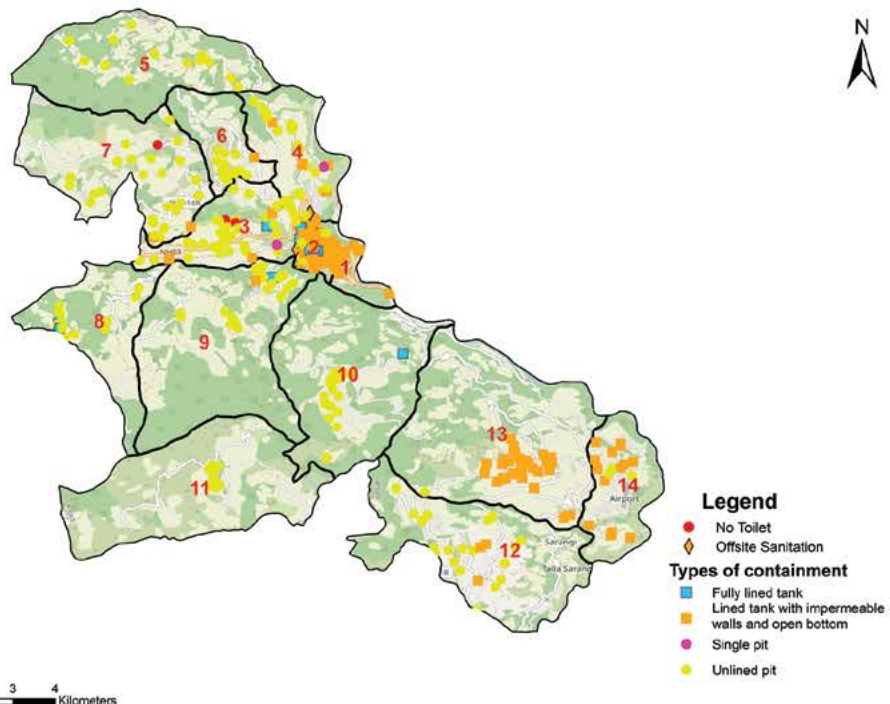
Household : 15,924



Wards : 14

Source: Census 2021

Sanitation technologies installed at household level in Baglung Municipality





संकलन
(User Interface)



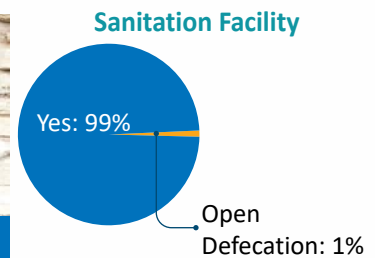
अण्डारण
(Containment)



रिचार्जने र ढुवानी
(Emptying & Transportation)

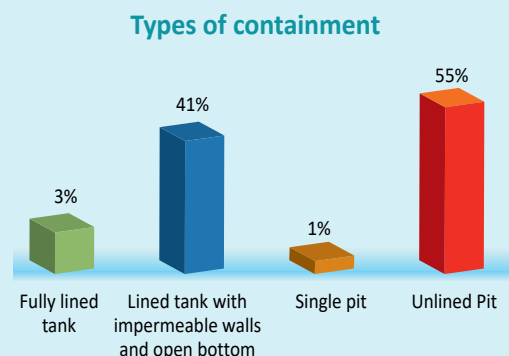
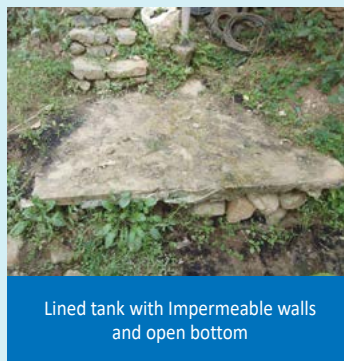
USER INTERFACE FACILITY

Baglung Municipality attained Open Defecation Free (ODF) status on 30 January 2014. However, the household survey reveals that 1% of HH still practice open defecation. Additionally, 1% of HH have illegally connected their toilets to open drain, and 98% have connected their toilets to containments.




CONTAINMENT

The majority of HHs rely on unlined pits followed by lined tanks with impermeable walls and open bottoms. Also, few HHs rely on single pits. These containments have open bottoms, allowing leachate percolation and possessing a risk to groundwater contamination. Moreover, significantly low HHs have opted for fully lined tanks.




EMPTYING AND TRANSPORTATION



According to the survey, only 11% of the HHs have emptied their containment at least once since installation. The majority of HHs have emptied their containment in an interval of more than 10 years. Some containments are also being emptied at an interval of every 3 to 5 years.



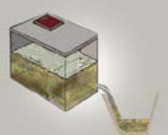
19% of containments are mechanically emptied by private desludging service providers.



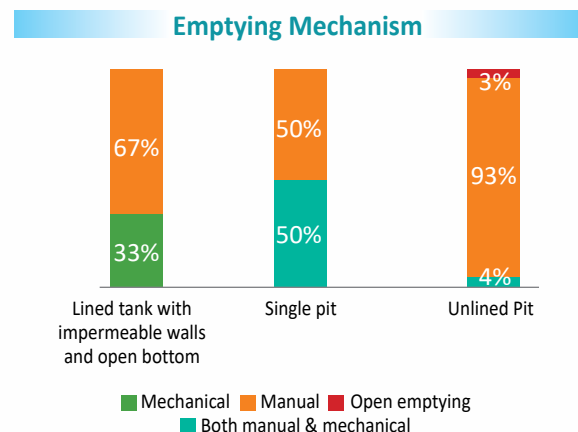
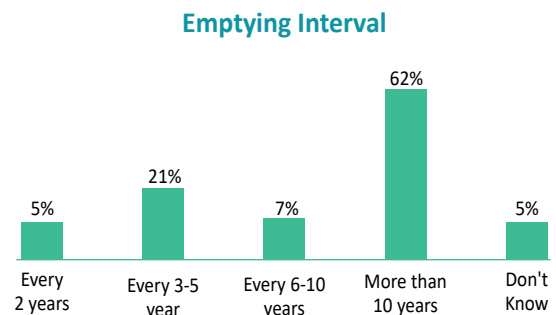
74% of containments are manually emptied either by self or traditional sanitation workers.

5% Both Manual and Mechanical



2% of HHs practice open emptying



Details of desludging service provider

Service Provider	Private
No. of service provider	1
No. of vehicles	1
Capacity of vehicle (Litres)	4,000
Average number of trips per week per vehicle	2
Average Service Charge (NPR) per trip	18,000



प्रशोधन
(Treatment)

पुनः प्रयोग वा सुरक्षित विसर्जन
(Re-use or Safe Disposal)

ESTIMATION OF FAECAL SLUDGE

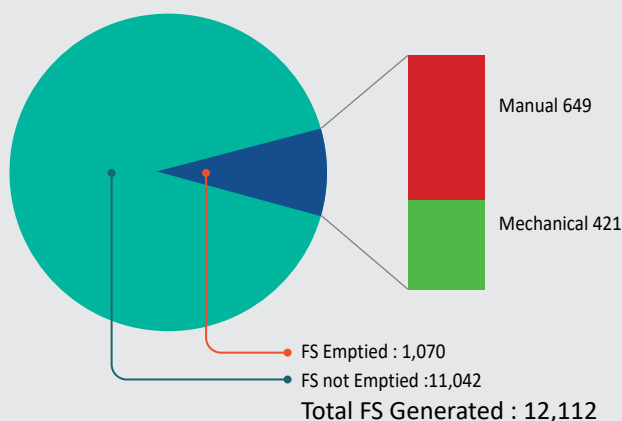
Total estimated volume of FS generation in the municipality: 12,112 m³ per year which is 53.15 m³ per day

Total volume of FS emptied in the municipality: 1,070 m³ per year which is 2.9 m³ per day.

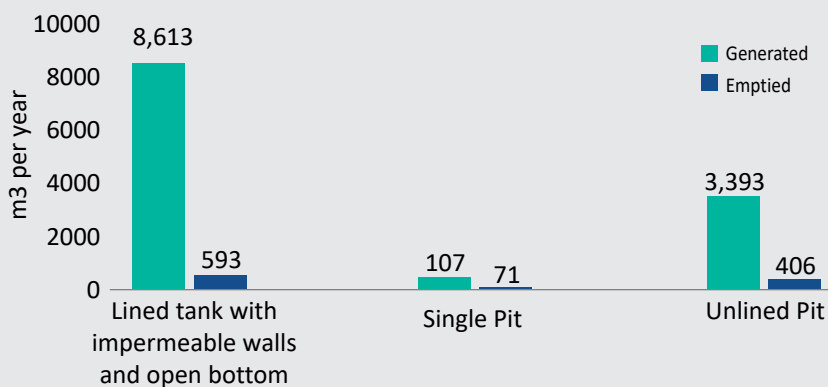
Total volume of manually emptied FS in the municipality: 649 m³ per year which is 1.7 m³ per day

Total volume of mechanically emptied FS in the municipality: 421 m³ per year which is 1.2 m³ per day

Summary of faecal sludge produced, emptied and transported in Baglung Municipality (cubic meter)



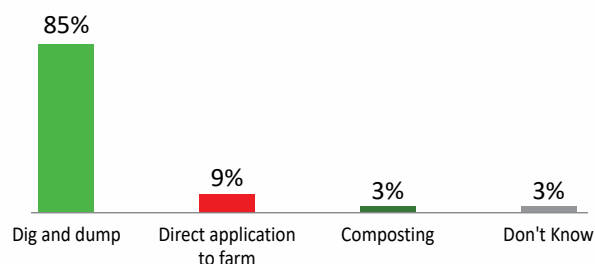
FS Generated and Emptied



SAFE DISPOSAL OR REUSE

The municipality does not have FSTP. Mechanically emptied FS is disposed of in private farmland while majority of manually emptied FS is dig and dump, and some used as compost. Some are directly applied to farms that possess direct risk to the environment and public health.

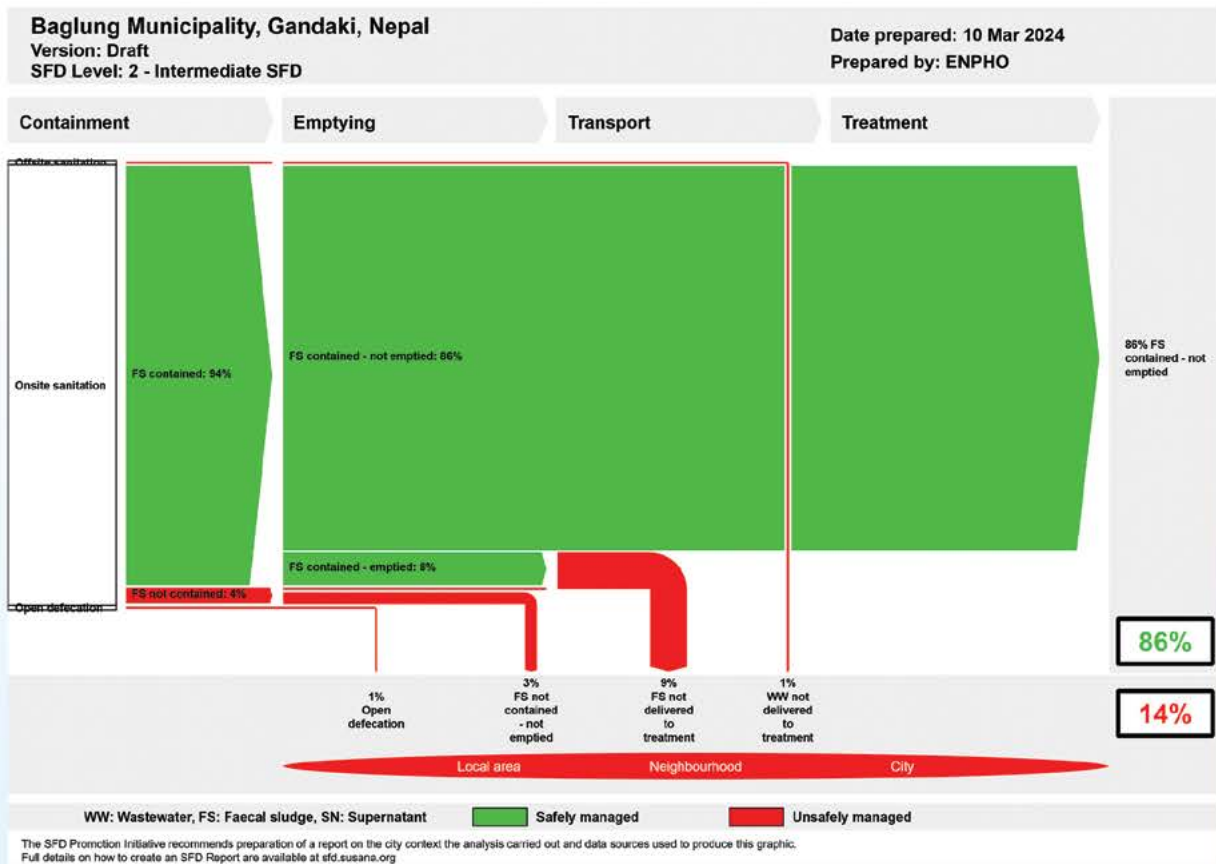
Disposal practice after manual emptying



SHIT FLOW DIAGRAM (SFD)

The SFD of Baglung Municipality visually represents the status of sanitation practices across the entire sanitation value chain. FS generated by 86% of the population is safely managed (Green). Initially, 94% of FS is safely contained. However, this proportion drops to 86% after emptying while considering the unemptied FS is safe. The remaining 8% of FS which is contained and emptied, remains safe depending upon the nature of the emptying mechanism and available treatment facilities. This points out the necessity of proper emptying and treatment of FS.

Further, FS generated by 14% of the population is unsafely managed (Red). It includes 1% of Wastewater (WW) discharged untreated into the environment, and 9% of FS emptied but not delivered to treatment plant. Additionally, 3% of FS is neither contained nor emptied, and 1% of the population still practices open defecation exacerbating sanitation challenges. These findings highlight the significant gaps that must be addressed to mitigate environmental and public health risks associated with inadequate FS management practices.



RECOMMENDATIONS

- Replace and retrofit existing unsafe containment systems to safe techniques and technologies such as septic tanks, biogas digesters, and twin pits.
- Formalize the available desludging service effectively along with its proper regulation.
- Regulate the high charge imposed by private desludger to ensure affordability and fairness.
- Construct a FSTP to manage FS effectively, reduce environmental pollution, and safeguard public health
- Formulate and enforce sanitation policies and regulations to ensure safe sanitation practices in the municipality.

BENI MUNICIPALITY

Municipal Sanitation Synopsis, Study Year-2023



CITY PROFILE

Beni is an urban municipality located in Myagdi district of Gandaki Province. It is situated in the western region of Nepal at an altitude of 899 metres to 2300 metres above sea level and has geographical coordinates of 28°22'30" N latitude and 83°34'00"E longitude.

DEMOGRAPHICS



Area : 76.25 km²



POPULATION : 32,697

Male : 15,361

Female : 17,336



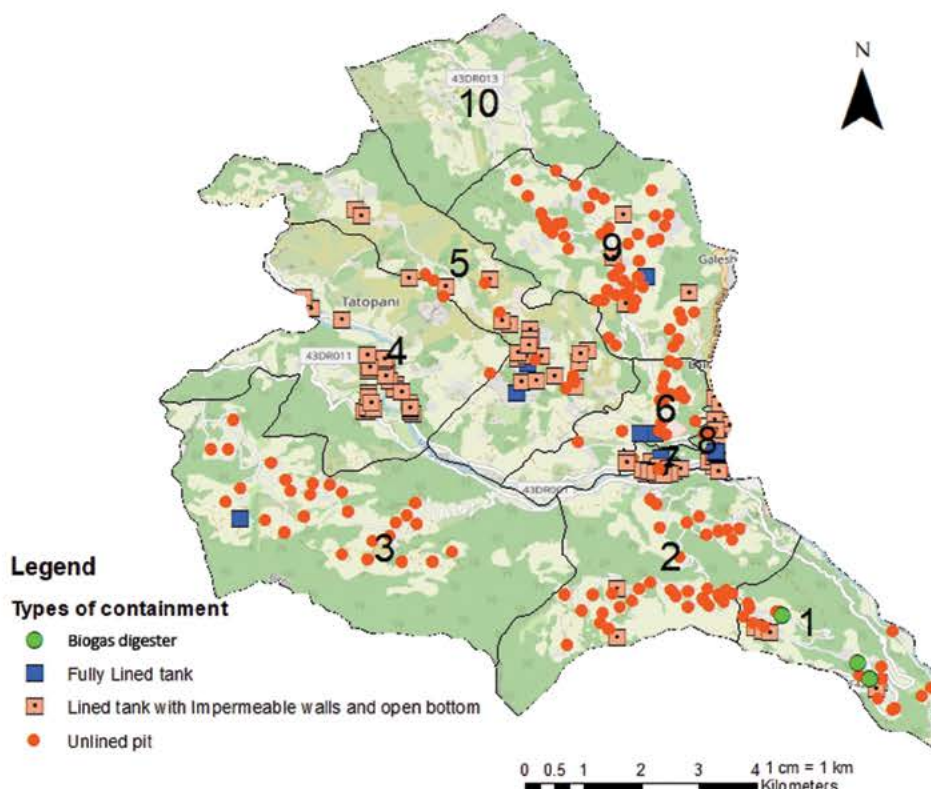
Household : 9,336



Wards : 10

Source: Census 2021

Sanitation technologies installed at household level in Beni Municipality





संकलन
(User Interface)



अण्डारण
(Containment)



रिच्याउने र ढुवानी
(Emptying & Transportation)

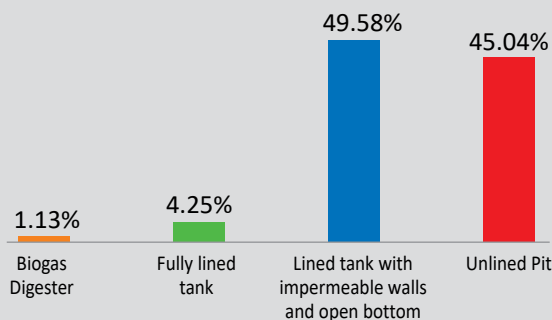
USER INTERFACE FACILITY

Beni Municipality attained ODF status in 2013 A.D, and a HH survey further confirms that all HH have access to toilets, with all relying on onsite sanitation technologies.

CONTAINMENT

The survey shows that almost half of the HH in the municipality have opted for a lined tank with impermeable walls and open bottom, followed by unlined pit. These containments possess high risk of water source contamination due to leachate percolation through their permeable base. Only a small proportion of HHs have constructed fully lined tanks, and biogas. Biogas can be considered safe as it can treat the FS through its anaerobic digestion process, generating biogas as a byproduct.

Types of containment

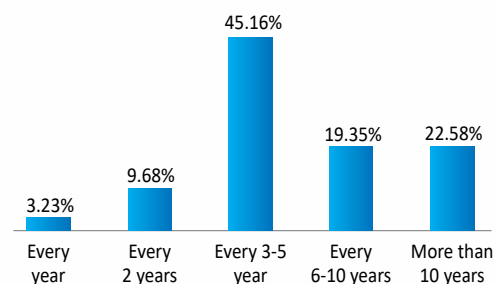


Lined tank with impermeable walls and open bottom

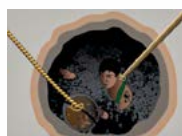
EMPTYING AND TRANSPORTATION

The survey reveals that 8.88% of the HHs have emptied their containments at least once since installation. Usually, containments are emptied at an interval of more than 5 years. About 45.16% of the containments are emptied in an interval of 3 to 5 years. The emptying mechanism of containments is illustrated in the graph. The private desludger from neighboring municipality, Baglung offers an on-demand service in Beni Municipality.

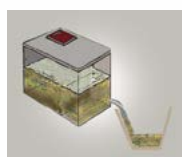
Emptying Interval



22.58% of FS are mechanically emptied by neighboring municipalities-private desludging vehicle.

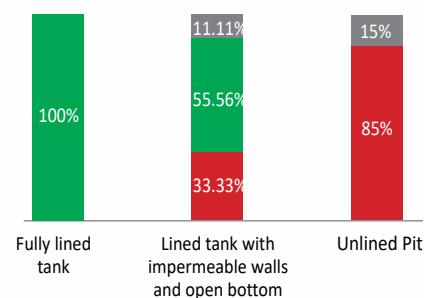


64.52% of FS are manually emptied-self-emptying or traditional sanitation workers.



12.90% practiced open emptying where, FS is disposed into open drain during rainy season.

Emptying Mechanism



■ Mechanical ■ Manual ■ Open emptying



प्रशोधन
(Treatment)

पुनः प्रयोग वा सुरक्षित विसर्जन
(Re-use or Safe Disposal)

ESTIMATION OF FAECAL SLUDGE

Total estimated volume of FS generation in the municipality: 14,896 m³ per year which is 40.8 m³ per day

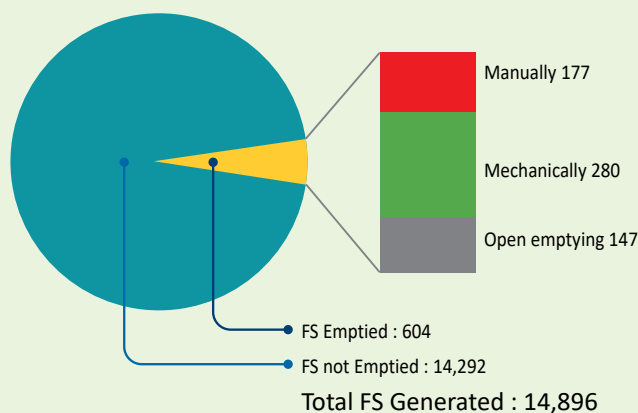
Total volume of FS emptied in the municipality: 604 m³ per year which is 1.7 m³ per day.

Total volume of manually emptied FS: 177 m³ per year which is 0.5 m³ per day.

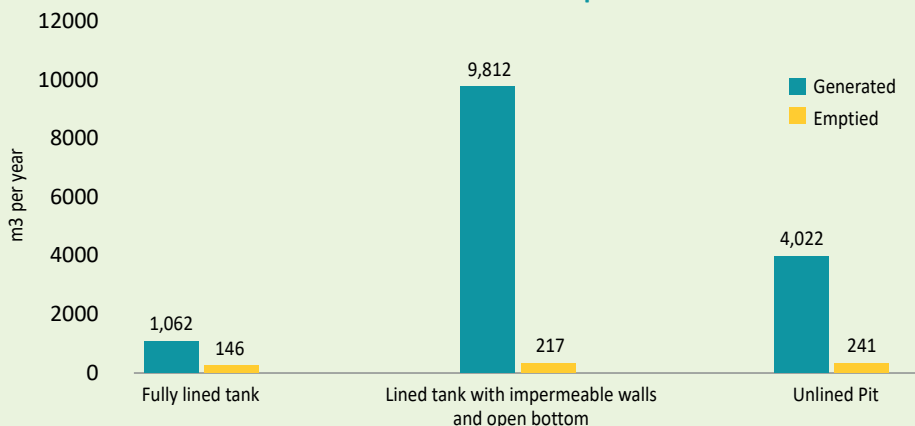
Total volume of mechanically emptied FS: 280 m³ per year which is 0.8 m³ per day.

Total volume of FS emptied by open emptying: 147 m³ per year which is 0.4 m³ per day.

Summary of faecal sludge produced, emptied and transported in Beni Municipality (cubic meter)



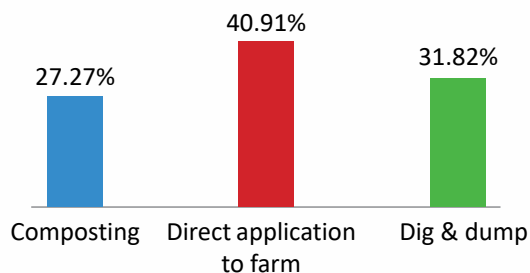
FS Generated and Emptied



SAFE DISPOSAL OR REUSE

The municipality does not have FSTP. Mechanically emptied FS by neighboring desludging vehicle is disposed of in the forest areas or water bodies, while manually emptied FS is directly applied in farms. These practices of disposal in an open environment possess direct risk to public health exacerbating the environmental conditions. Meanwhile, a significant proportion of HH dig and dump the FS, and some practice composting.

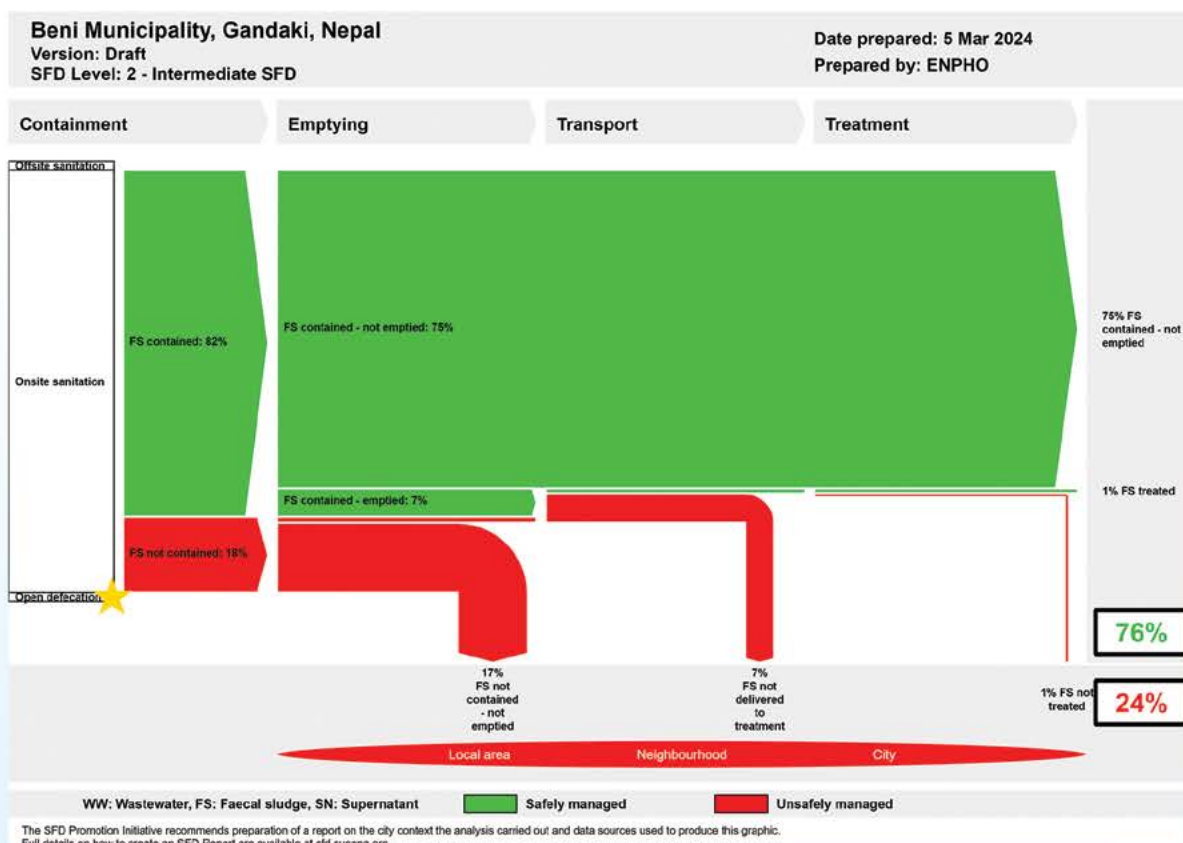
Disposal practice after manual emptying



SHIT FLOW DIAGRAM (SFD)

The SFD of Beni municipality visually represents the status of sanitation practices across the entire sanitation value chain. The diagram shows that FS generated by 76% of the population is safely managed (Green). Initially, FS generated by 82% of the population is safely contained. However, this proportion drops to 75% which can be considered safe until emptied. Out of the 7% safely contained FS which has been emptied, only 1% is treated, and this comes from a biogas digester. This highlights the necessity of safe emptying and treatment. The emptied FS remains safe depending upon the nature of the emptying mechanism and available treatment facilities.

Overall, FS generated by 24% of the population is unsafely managed (Red). 7% of FS is not delivered to treatment plant, 1% FS remains untreated, and 17% FS is neither contained nor emptied highlighting significant gaps that must be addressed to mitigate environmental and public health risks associated with inadequate FS management practices.



RECOMMENDATIONS

- Replace and retrofit existing unsafe containments with safe sanitation techniques and technologies like septic tanks, biogas digesters, and twin pits to ensure protection of groundwater sources.
- Promote mechanical desludging services in the municipality to address the current gap in sanitation value chain.
- Construct a FSTP to manage FS effectively.
- Formulate and enforce sanitation policies and regulations to ensure safe sanitation practices in the municipality.

BESISHAHAR MUNICIPALITY

Municipal Sanitation Synopsis, Study Year -2023

Besishahar City

CITY PROFILE

Besishahar Municipality is in Lamjung District, Gandaki Province of Nepal. It was established on 8 May 2014. It has geographical boundaries within 28° 13' 08" N latitude and 84° 21' 10" longitude with elevation extended from 650 to 1,958 m above mean sea level.

DEMOGRAPHICS



Area : 127.64 km²



POPULATION : 38,232

Male : 17,879

Female : 20,353



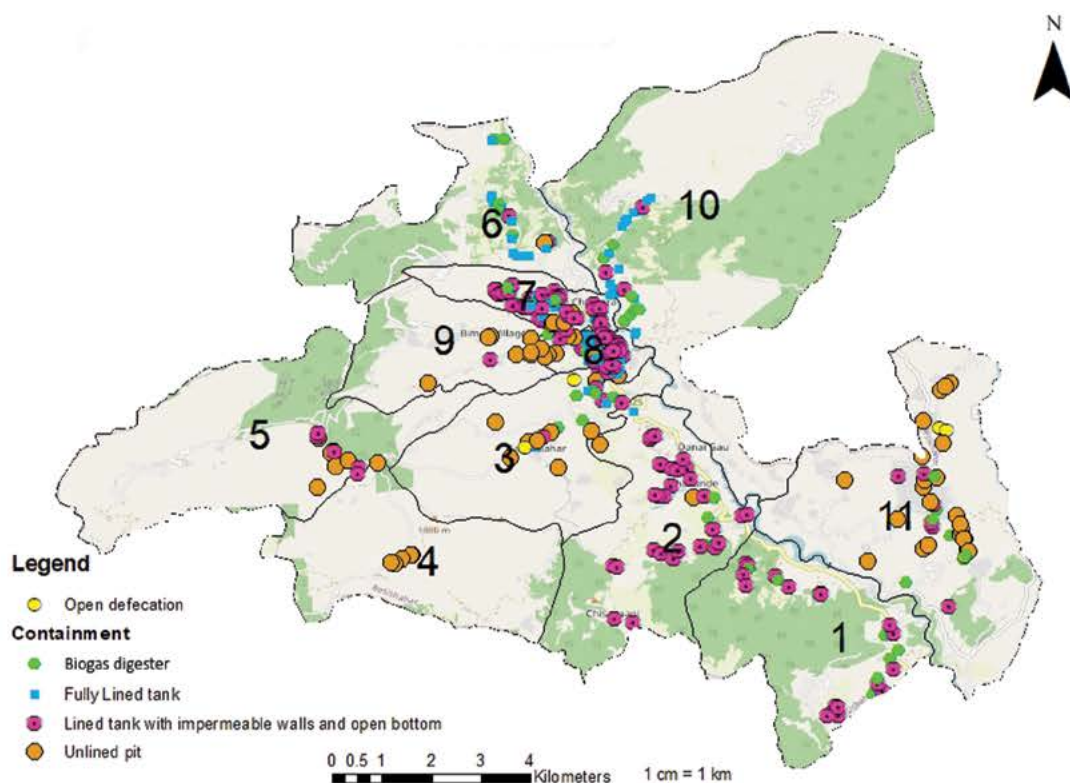
Household : 11,038



Wards : 11

Source: Census 2021

Sanitation technologies installed at household level in Besishahar Municipality





संकलन
(User Interface)



अण्डारण
(Containment)

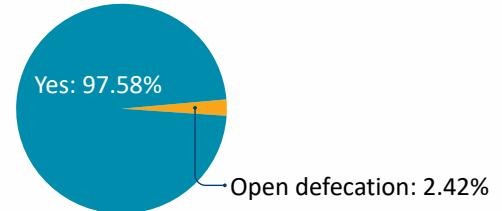


रिचार्जने र ढुवानी
(Emptying & Transportation)

USER INTERFACE FACILITY

Besishahar Municipality attained ODF status in 2016 A.D. However, the household survey reveals that 2.42% of the HHs in the municipality lack access to toilets, resorting to open defecation.

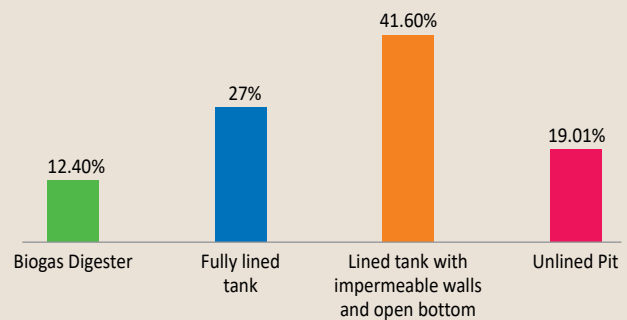
Sanitation Facility



CONTAINMENT

The survey shows that almost half of the HH in the municipality constructed lined tanks with impermeable walls and open bottoms, and a small proportion built unlined pits which pose high risk of leachate percolation and potential water source contamination. A significant proportion of HH have constructed fully lined tanks, while few have installed biogas. Biogas is an onsite treatment technology which can be considered safe as it treats faecal sludge and produces biogas as a byproduct.

Types of containment



EMPTYING AND TRANSPORTATION

The study shows that only 6.19% of HHs have emptied their containments at least once since installation. Half of the surveyed HH containments (50%) are emptied in an interval of 3 to 5 years. There is one private desludging service provider offering an on-demand desludging service within the municipality. The data shows that fully lined tanks and lined tanks are emptied using both mechanical and manual emptying methods, whereas unlined pit is manually emptied.

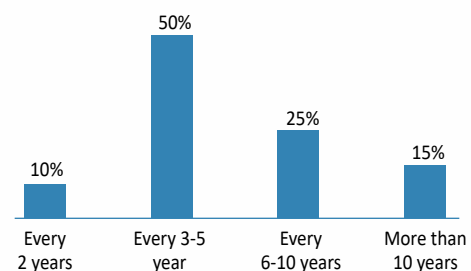


45% are mechanically emptied by private desludging service providers.

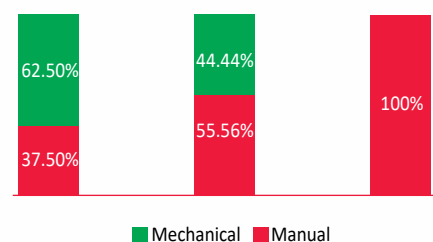


55% are manually emptied - self-emptying or traditional sanitation workers.

Emptying Interval



Emptying mechanism



Service Provider	Private
No. of vehicle	1
No. of service provider	1
Capacity of vehicle (Litres)	4,000
Average number of trips per month	6-8
Average Service Charge (NPR) per trip	Rs.8,000-9,000



Private Desludging vehicle



प्रशोधन
(Treatment)

पुनः प्रयोग वा सुरक्षित विसर्जन
(Re-use or Safe Disposal)

ESTIMATION OF FAECAL SLUDGE

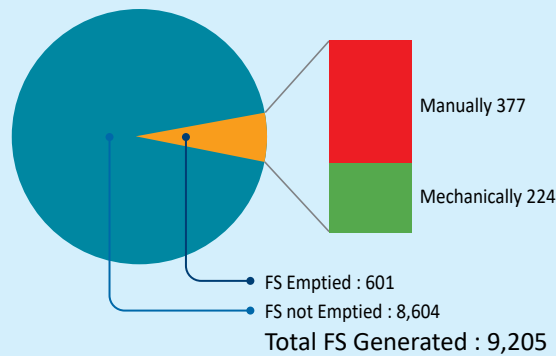
Total estimated volume of FS generation in the municipality: 9,205 m³ per year which is 25.2 m³ per day

Total volume of FS emptied in the municipality: 601 m³ per year which is 1.7 m³ per day.

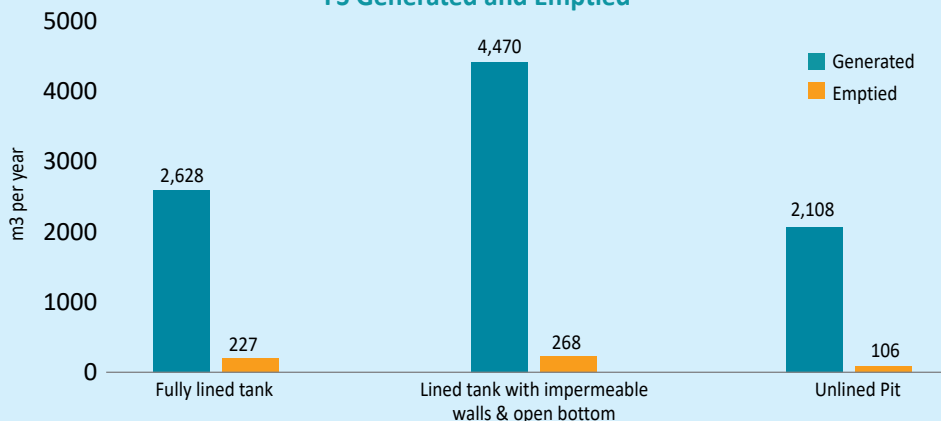
Total volume manually emptied FS in the municipality: 377 m³ per year which is 1.0 m³ per day.

Total volume of mechanically emptied FS in the municipality: 224 m³ per year which is 0.7 m³ per day.

Summary of faecal sludge produced, emptied and transported in Besishahar Municipality (cubic meter)



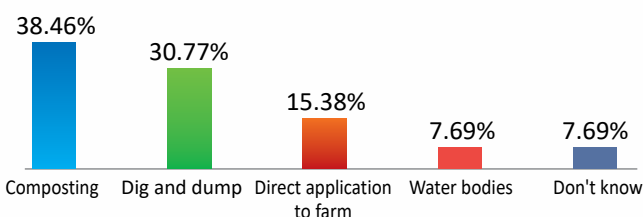
FS Generated and Emptied



SAFE DISPOSAL OR REUSE

The municipality lacks FSTP. The mechanically collected FS is disposed near to municipality's solid waste dumping site (ward-8) using trenching method. The manually emptied FS is used for composting, and some practice dig and dump methods. Those FS which are directly applied to farms, and FS disposed of in water bodies possess direct risk to environment and public health.

Disposal practice after manual emptying

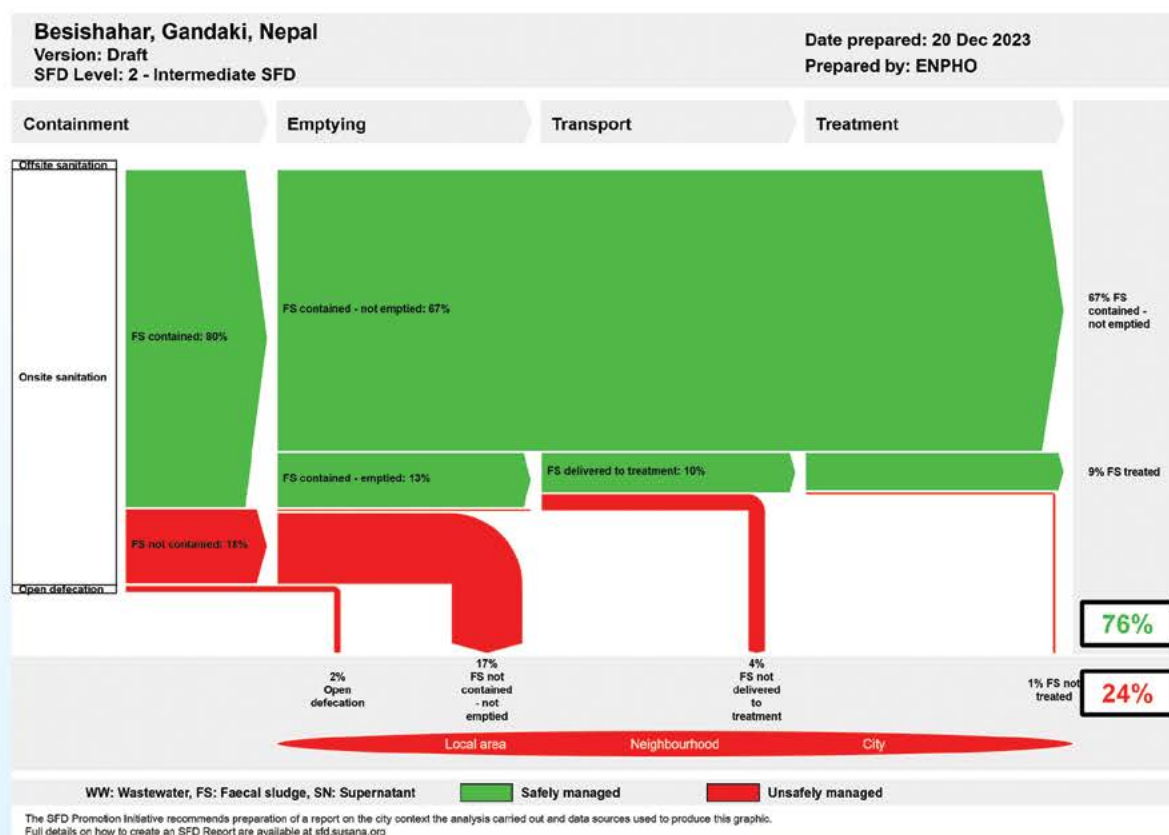


FS disposal site near to solid waste dumping site

SHIT FLOW DIAGRAM (SFD)

The SFD of Besishahar Municipality visually represents the status of sanitation practices across the entire sanitation value chain. The diagram illustrates that FS generated by 76% of the population is safely managed (Green). Initially, FS generated by 80% of the population is safely contained. However, this proportion drops to 67% when 13% of FS is emptied. Out of 13% emptied FS, 9% of FS is considered treated that primarily comes from biogas digesters. This underlines the necessity of safe emptying and treatment. The emptied FS remains safe depending upon the nature of the emptying mechanism and available treatment facilities.

Furthermore, FS generated by 24% of the population is unsafely managed (Red). It includes 1% of FS untreated, and 4% of emptied FS (3%- FS contained, 1%-FS not contained) that are not delivered to treatment plant, posing pollution risks. Further, 17% of FS are neither contained nor emptied, and 2% of the population still practices open defecation exacerbating sanitation challenges. This highlights the significant gap that must be addressed to mitigate environmental and public health risks associated with inadequate FS management practices.



RECOMMENDATIONS

- Replace and retrofit unsafe containments with appropriate techniques and technologies such as septic tanks, biogas digesters, and encourage the use of twin pits.
- Formalize and regulate the private desludging services within the municipality.
- Construct a FSTP to manage FS effectively, reduce environmental pollution, and safeguard public health.
- Formulate and enforce sanitation policies and regulations to ensure safe sanitation practices in the municipality

GAINDAKOT MUNICIPALITY

Municipal Sanitation Synopsis, Study Year -2023



Maula Kalika Temple

CITY PROFILE

Gaindakot is a municipality situated in Nawalpur (Bardaghat Susta East) district, Gandaki Province of Nepal. It is situated on the shore of Narayani River and in the lap of Maula Kalika temple and at an elevation of 562 meters above sea level, and geographical coordinates range from 84° 24' 46" E longitude to 27° 42' 29" N latitude.

DEMOGRAPHICS



Area : 159.93 km²



POPULATION : 79,349

Male : 37,929

Female : 41,420



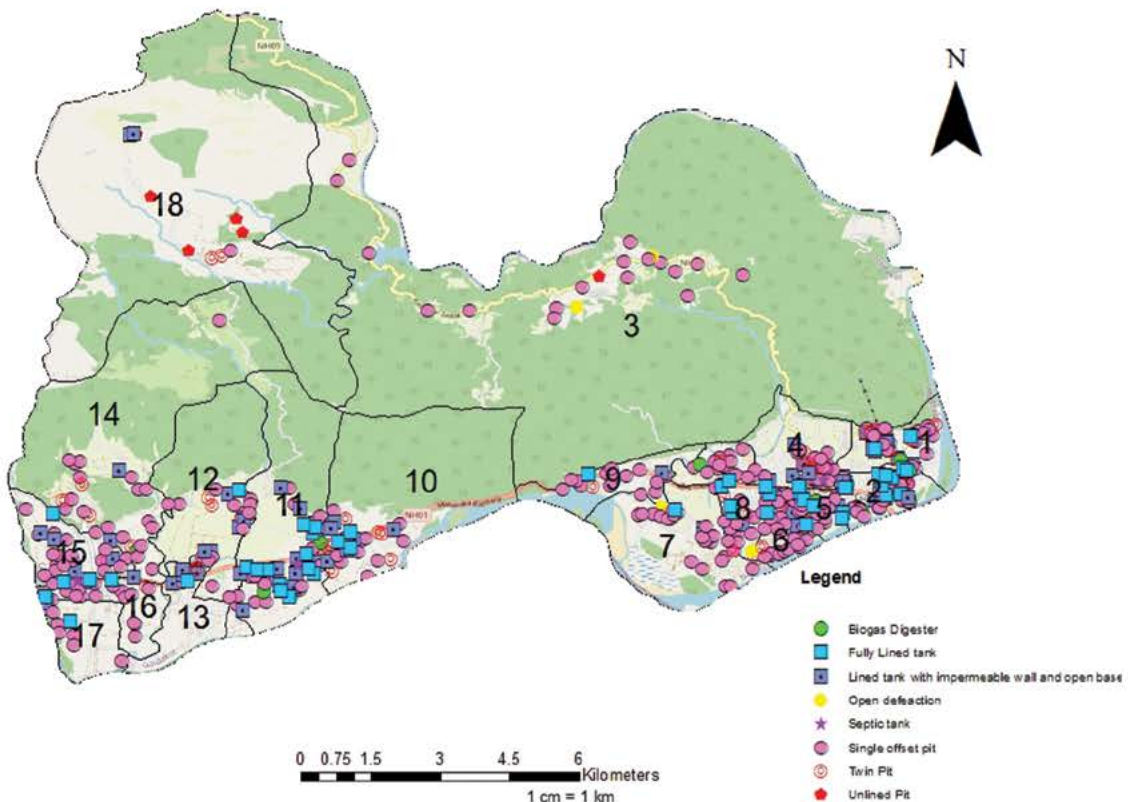
Household : 20,191



Wards : 18

Source: Census 2021

Sanitation technologies installed at household level in Gaindakot Municipality





संकलन
(User Interface)



भण्डारण
(Containment)

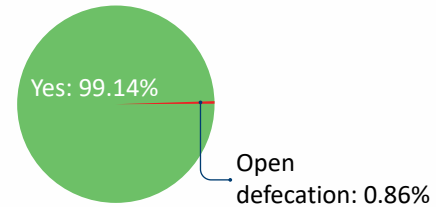


रिच्याउने र ढुवानी
(Emptying & Transportation)

USER INTERFACE FACILITY

Despite Gaidakot Municipality being declared as ODF in 2017 AD, the survey reveals that still 0.86% of the households (HHs) do not have access to toilet resorting to open defecation.

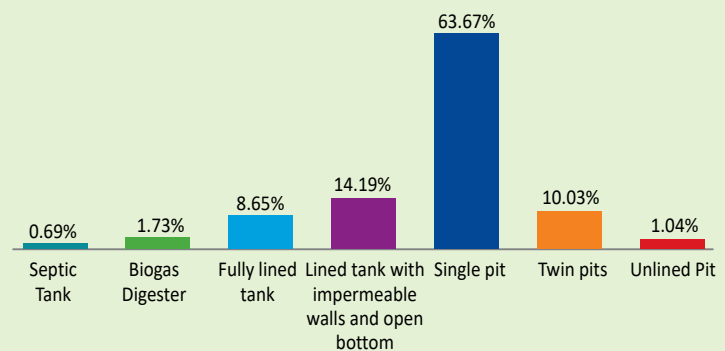
Sanitation Facility



CONTAINMENT

The survey reveals that majority of HH have built single pits, followed by lined tanks with permeable bases, and a small proportion use unlined pits posing groundwater pollution risks. About one-tenth have twin pits, while very few have septic tanks and biogas systems, which can be considered safe.

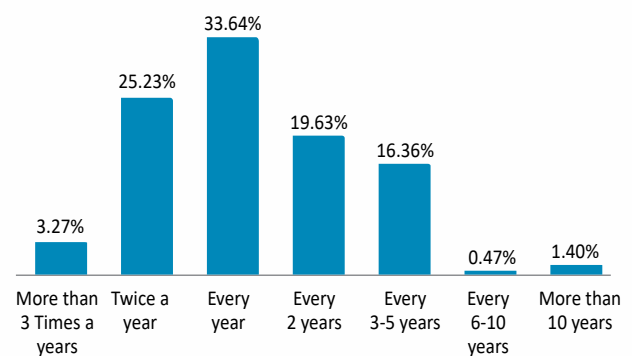
Types of containment



EMPTYING AND TRANSPORTATION

The survey reveals that 37.74% of the HHs have emptied their containments at least once since installation. The containments are usually emptied in an interval of every 3 to 5 years.

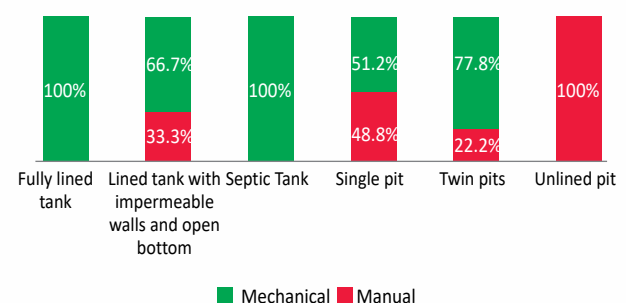
Emptying Interval



Details of desludging service provider

Service Provider	Private
No. of service provider	4
No. of vehicles	4
Capacity of vehicle (Litres)	4000-4500
Average number of trips per day per vehicle	1
Average Service Charge (NPR) per trip	3500-5000
Note: 2-3 desludgers from Bharatpur SMC also provides on demand services in the municipality.	

Emptying mechanism



56.54% are mechanically emptied by private desludging service providers.



43.46% are manually emptied - self-emptying or traditional sanitation workers.



प्रशोधन
(Treatment)

पुनः प्रयोग वा सुरक्षित विसर्जन
(Re-use or Safe Disposal)

ESTIMATION OF FAECAL SLUDGE

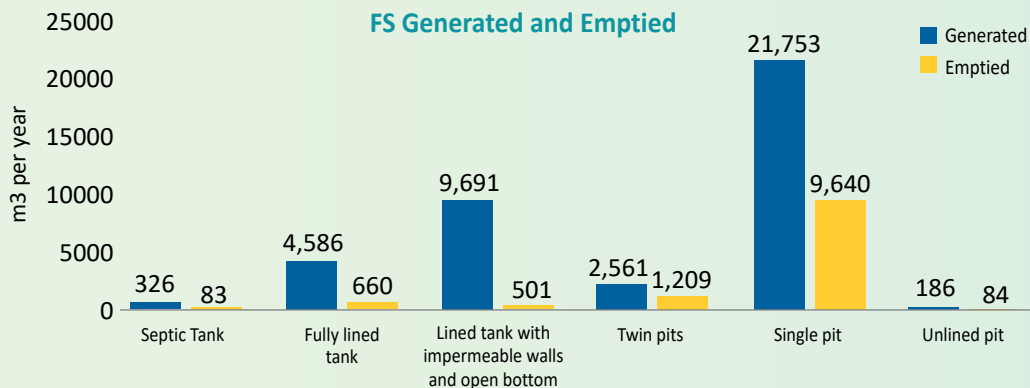
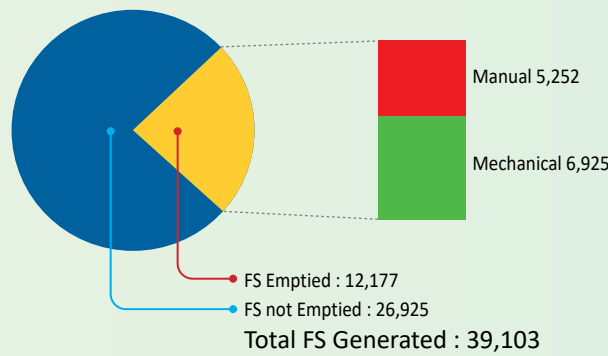
Total estimated volume of FS generation in the municipality: 39,103 m³ per year which is 107.1 m³ per day

Total volume of FS emptied in the municipality 12,177 m³ per year which is 33.3 m³ per day.

Total volume of mechanically emptied FS: 6,925 m³ per year which is 18.9 m³ per day.

Total volume of manually emptied FS: 5,252 m³ per year which is 14.4 m³ per day.

Summary of faecal sludge produced, emptied and transported in Gaidakot Municipality (cubic meter)



TREATMENT

Biogas digesters, if functioning properly, are regarded as safe and considered capable of treating faecal sludge. However, FS stored in other containments requires treatment. There is a FSTP constructed by Mukundapur Water Sanitation Users Committee inside the Mukundapur community forest premises, but it remains non-functional.

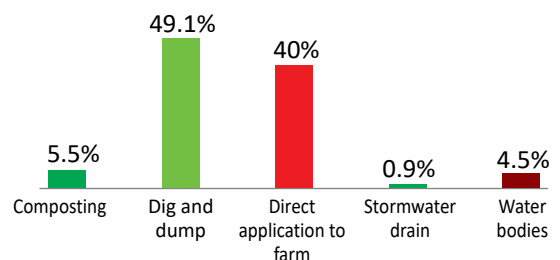


Component of treatment plant

SAFE DISPOSAL OR REUSE

The mechanically collected FS is either applied in farmland or disposed in water bodies, whereas almost half of the manually emptied FS is dig and dump. Some HH directly applied FS in farm, and some disposed it to nearby storm drain and water bodies, which possess direct risk to environment and public health.

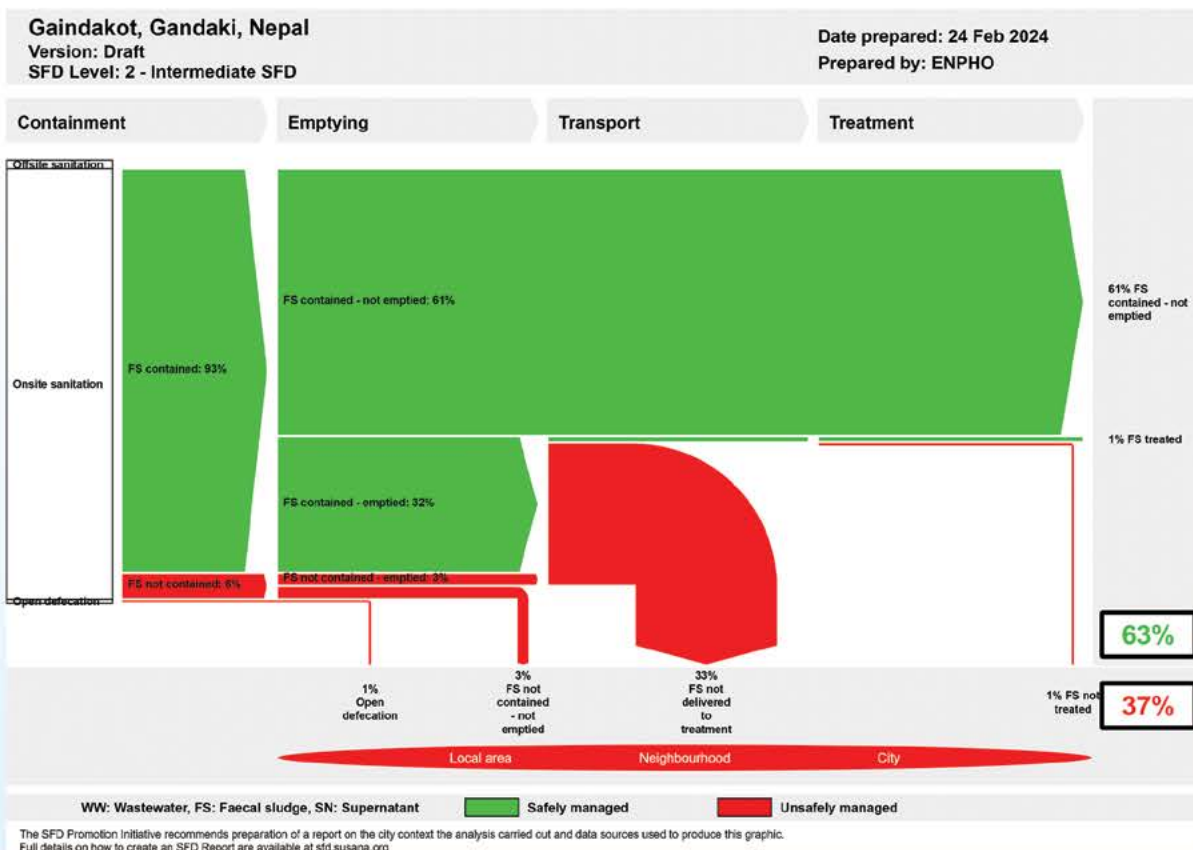
Disposal practice after manual emptying



SHIT FLOW DIAGRAM (SFD)

The SFD of Gaindakot Municipality visually represents the status of sanitation practices across the entire sanitation value chain. FS generated by 63% of the population is safely managed (Green). Initially, 93% of FS is safely contained, but this proportion drops to 61% when 32% of safely contained FS are emptied. Only 1% of emptied FS are considered treated, which comes from biogas user. The emptied FS remains safe depending upon the emptying mechanism and available treatment options/facilities.

Overall, FS generated by 37% of the population is unsafely managed (Red). It includes 33% emptied FS (30%- FS contained, 3%-FS not contained) not delivered to treatment plant, and 1% of untreated FS. This highlighted the necessity of safe emptying and its subsequent treatment. Additionally, FS generated by 3% of the population is neither safely contained nor emptied, and 1% of the population still practices open defecation, exacerbating sanitation challenges. This highlights the critical gaps that must be addressed to mitigate environmental contamination and public health risks associated with inadequate FS management practices.



RECOMMENDATIONS

- Replace and retrofit the unsafe containments to safe techniques and technologies such as septic tanks, biogas, and encouraging the use of twin pits.
- Advocate for formal registration and proper regulations of desludging services.
- Proper operation and maintenance of existing FSTP inside Mukundapur community forest and ensure its proper functioning for effective use by resolving the existing issues.
- Formulate and enforce sanitation policies and regulations to ensure safe sanitation practices in the municipality.

GORKHA MUNICIPALITY

Municipal Sanitation Synopsis, Study Year-2023

The Historic Gorkha Durbar

CITY PROFILE

Gorkha Municipality, the historic place, is located in Gorkha District of Gandaki Province in the western region of Nepal. It extends from 27°56'03" N to 28°13'07" N latitude and 84°23'00" E to 84°38'00" E longitude. The municipality's elevation ranges from 328 meters to 1522 meters above sea level.

DEMOGRAPHICS



Area : 131.86 km²



POPULATION : 52,468

Male : 24,257

Female : 28,211



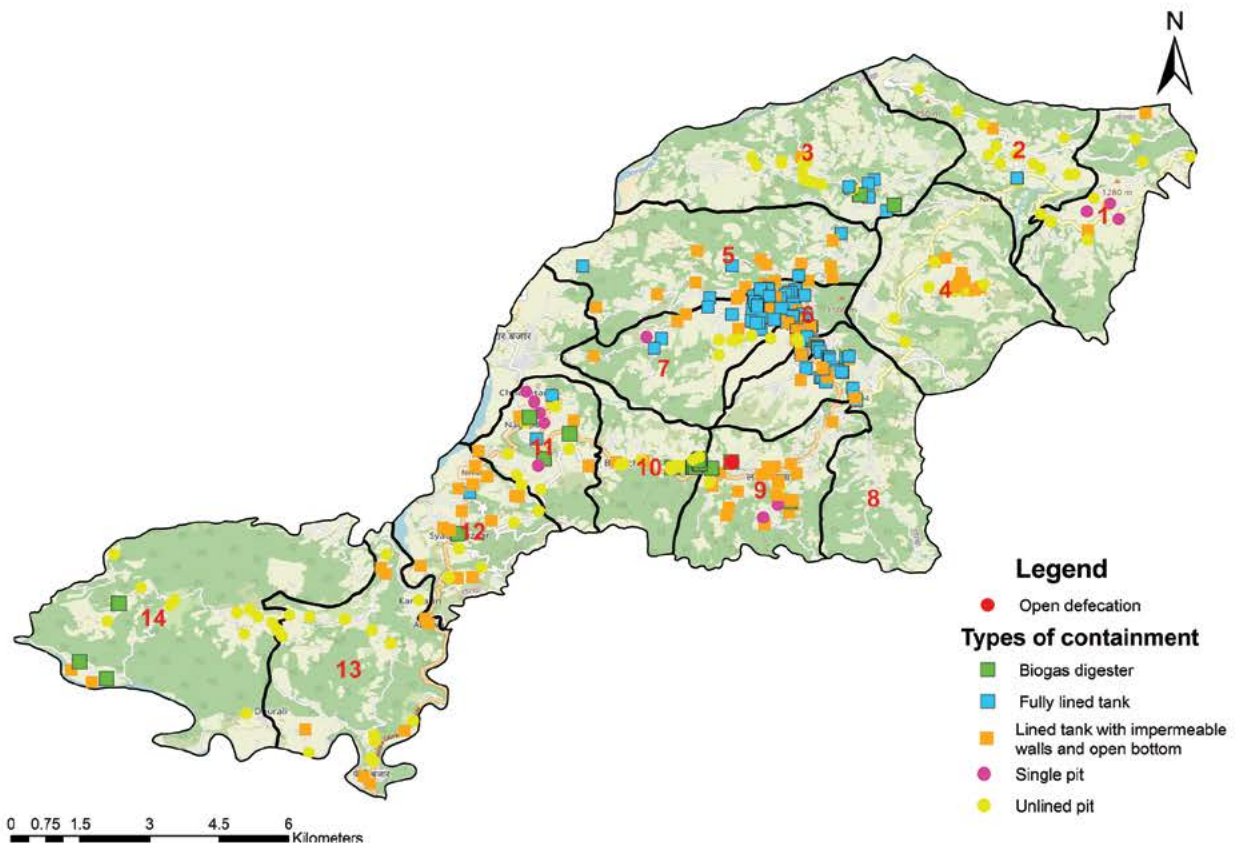
Household : 14,988



Wards : 14

Source: Census 2021

Sanitation technologies installed at household level in Gorkha Municipality





संकलन
(User Interface)



अण्डारण
(Containment)

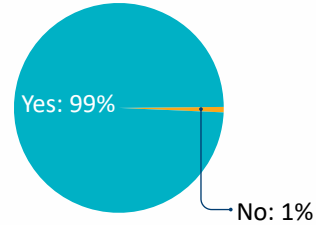


रिचार्जने र ढुवानी
(Emptying & Transportation)

USER INTERFACE FACILITY

Gorkha Municipality attained ODF status on 31 December 2015. However, a HH survey reveals that 1% of HHs still lack access to toilet and practice open defecation.

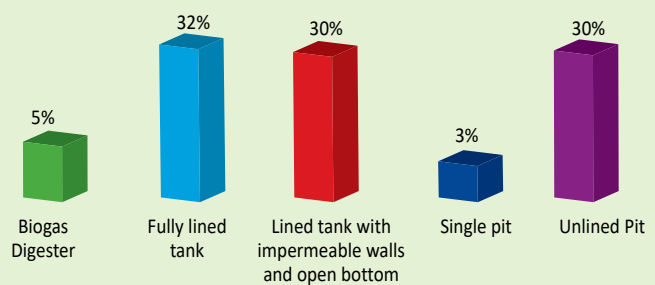
Sanitation Facility



CONTAINMENT

The survey shows that a significant proportion of the HHs use safe containments such as fully lined tanks, while relying on biogas digester. The unsafe containments such as unlined pit, and lined tanks with impermeable walls and open bottom are used by 30% of the HH, few HH also rely on single pit which can't be considered safe as these containments have permeable bases allowing leachate percolation and possessing high risk to groundwater contamination.

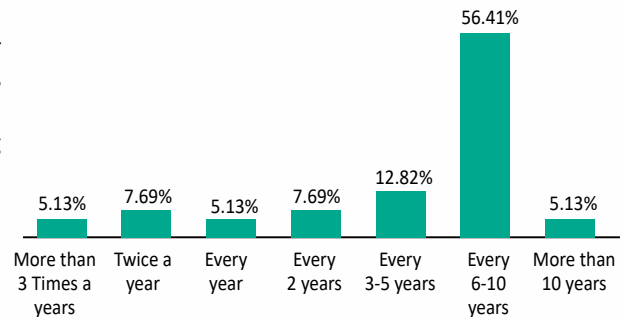
Types of containment



EMPTYING AND TRANSPORTATION

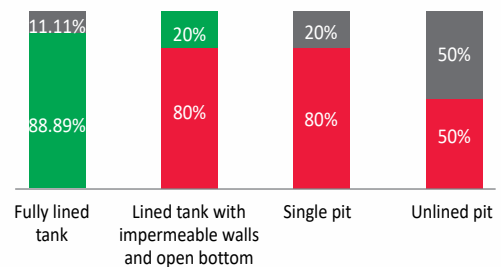
In the municipality, only 11% of HHs have emptied their containments at least once after installation. The containments are usually emptied at an interval of more than 10 years. Private desludging service providers are engaged for emptying and transport of faecal sludge within the municipality.

Emptying Interval



	64.10% of HHs emptied mechanically by private desludging service providers.
	23.08% of HHs emptied manually: self-emptying or traditional sanitation workers.
	12.82% of HHs practice open emptying -disposed into open drain during rainy season.

Emptying mechanism



Details of desludging service providers

Service Provider	Private
No. of service provider	1
No. of Vehicles	1
Capacity of vehicle (Litres)	4,500
No. of trips per day per vehicle	1
Average Charge per trip (NPR)	7,000



Private desludging vehicle



प्रशोधन
(Treatment)

पुनः प्रयोग वा सुरक्षित विसर्जन
(Re-use or Safe Disposal)

ESTIMATION OF FAECAL SLUDGE

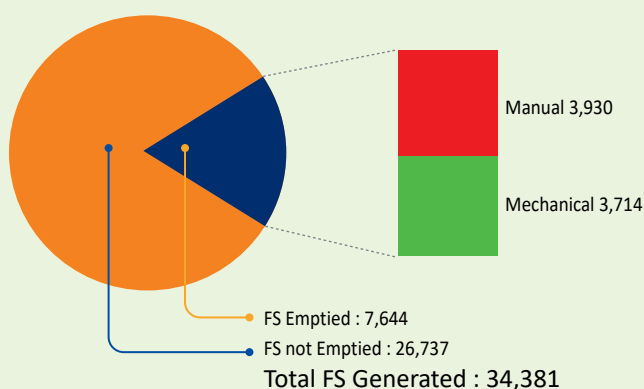
Total estimated volume of FS generated in the municipality: 34,381 m³ per year which is 94.2 m³ per day.

Total volume of FS emptied in the municipality: 7,644 m³ per year which is 20.9 m³ per day

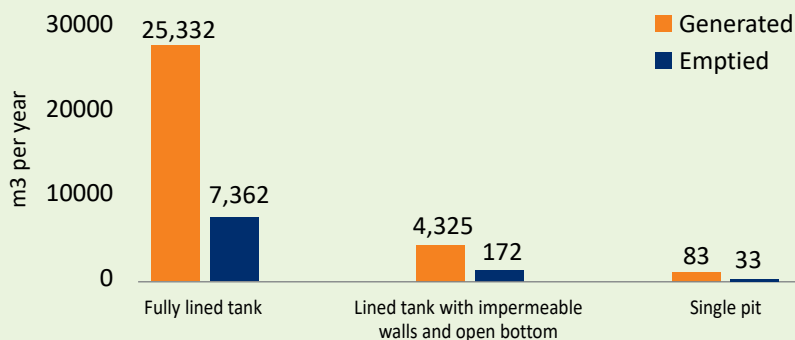
Total volume of mechanically emptied FS in the municipality: 3,714 m³ per year which is 10.2 m³ per day

Total volume of manually emptied FS in the municipality: 3,930 m³ per year which is 10.7 m³ per day

Summary of faecal sludge produced, emptied and transported in Gorkha Municipality (cubic meter)



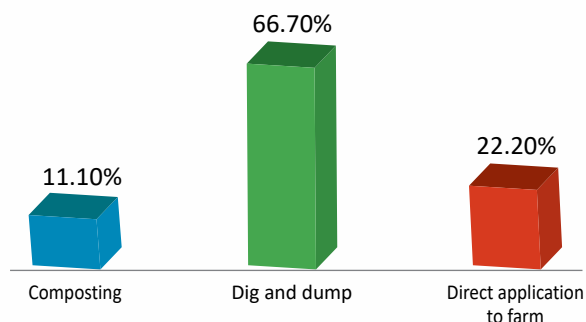
FS Generated and Emptied



Disposal practice after manual emptying

SAFE DISPOSAL OR REUSE

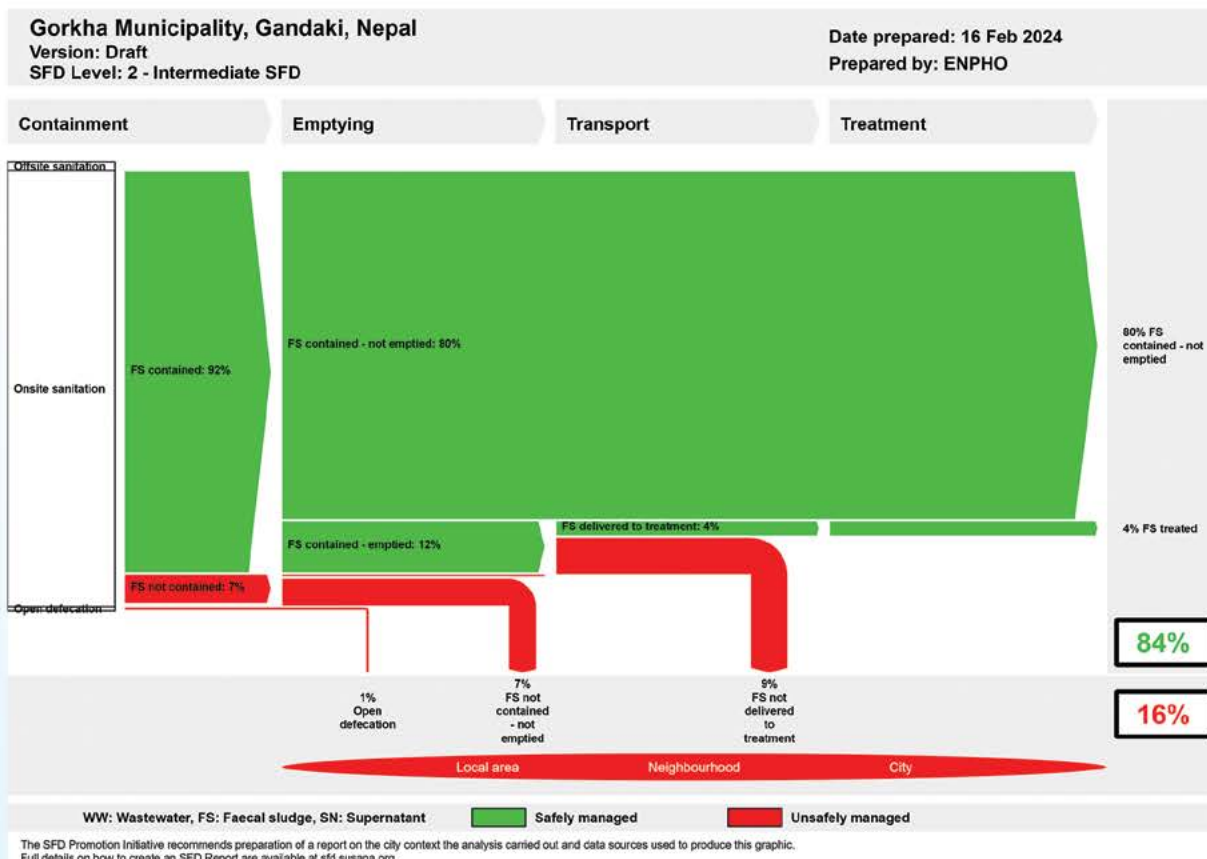
Mechanically emptied FS are usually applied in farmlands as demanded or in an open space. On the other hand, manually emptied FS are dig and dump, directly applied to farmlands, and used in composting. However, direct application to farms possess risk to the environment and public health.



SHIT FLOW DIAGRAM (SFD)

The SFD of Gorkha Municipality visually represents the sanitation status across entire sanitation value chain. It showed that FS generated by 84% of the population is safely managed (Green). Initially, 92% of FS is safely contained. However, this proportion drops to 80% when 12% of the FS contained is emptied while considering the unemptied FS is safe. Of the remaining 12% of FS which is contained are emptied, 4% are treated that primarily comes from population using biogas digesters.

Overall, FS from 16% of the population is unsafely managed (Red). It includes 9% of FS which are not delivered to treatment plant, 7% of FS which is neither contained nor emptied, and FS generated from 1% of the population who still practices open defecation exacerbating sanitation challenges. These possess high risks of environmental pollution and public health threats. It highlights significant gaps that must be addressed to mitigate environmental and public health risks associated with inadequate FS management practices.



RECOMMENDATIONS

- Replace and retrofit unsafe containment systems to safe techniques and technologies such as septic tanks, biogas digesters or twin pits.
- Formalize and regulate the private desludging service within the municipality to ensure proper FS disposal.
- Establish FSTP of appropriate capacity with reuse options.
- Formulate and enforce sanitation policies and regulations to ensure safe sanitation practices in the municipality.

POKHARA METROPOLITAN CITY

Municipal Sanitation Synopsis, Study Year-2023

Pokhara City

CITY PROFILE

Pokhara Metropolitan City is in Kaski District, Gandaki Province of Nepal. It was declared as Metropolitan City in 10th march, 2017. It is located between 27°55' N to 28°23' N latitude and 83°48' E to 84°11' E longitude. The highest elevation of Pokhara is 1,740 meters (5,710 ft.) and lowest elevation 827 meters above sea level.

DEMOGRAPHICS



Area : 464.24 km²



POPULATION : 513,504

Male : 247,495

Female : 266,009



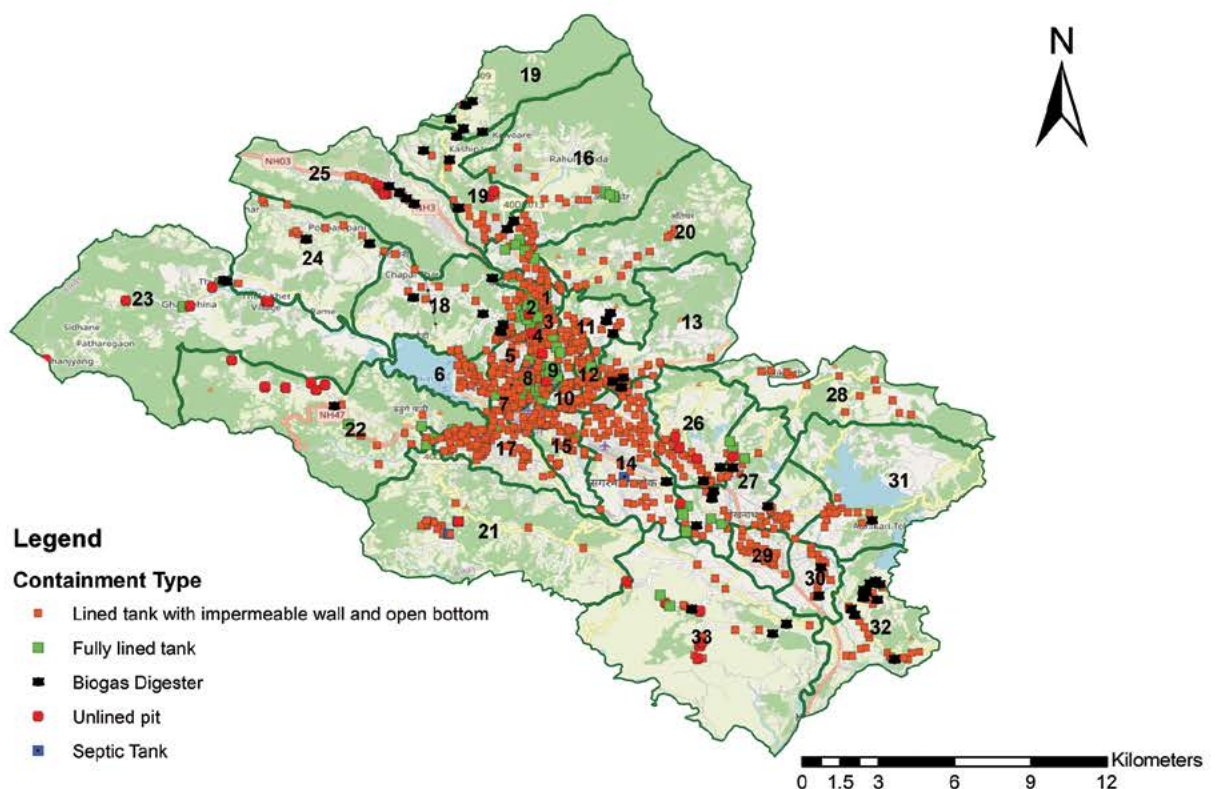
Household : 140,459



Wards : 33

Source: Census 2021

Sanitation technologies installed at household level in Pokhara Metropolitan City





संकलन
(User Interface)



अण्डारण
(Containment)

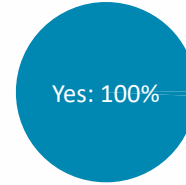


रिचार्जने र ढुवानी
(Emptying & Transportation)

USER INTERFACE FACILITY

Kaski District was declared an ODF zone on 24th June 2011. The survey also reveals that all of the surveyed HHs in the metropolitan city have access to basic sanitation facilities.

Sanitation Facility



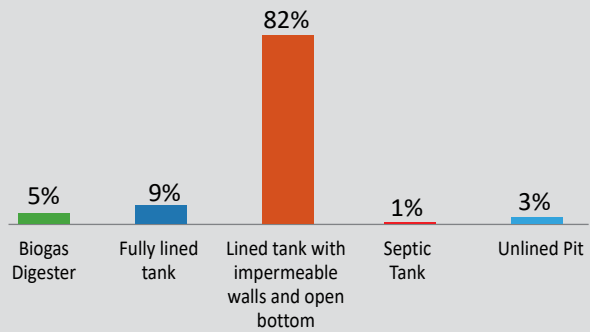
CONTAINMENT

The majority of HHs rely on lined tanks with impermeable walls and open bottoms allowing leachate percolation, possessing a risk to groundwater contamination. Moreover, a few proportion of HHs have opted for safe technologies such as fully lined tanks, biogas digesters and septic tank.



Biogas digester

Types of containment



EMPTYING AND TRANSPORTATION

About 6.98% of the surveyed households have emptied the containment at least once since installation. Most of the containments are emptied at an interval of more than 10 years. The desludging services are provided by a private company.

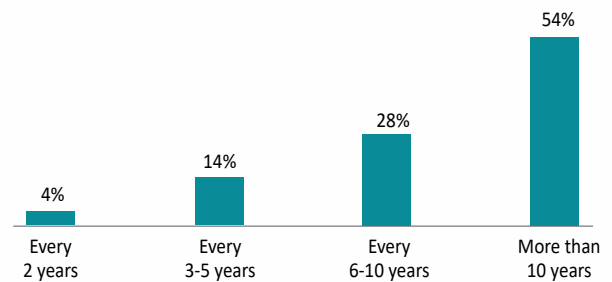


87% of HHs emptied mechanically by private desludging service providers.

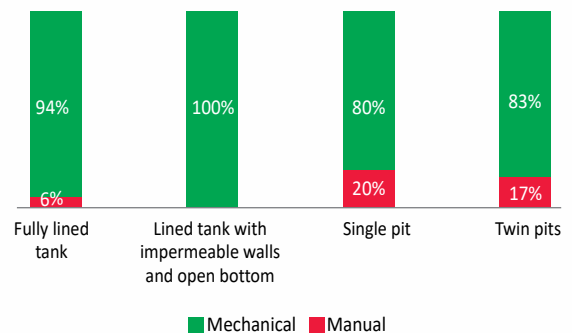


13% of HHs emptied manually: self-emptying or traditional sanitation workers.

Emptying Interval



Emptying mechanism



Details of desludging service providers

Service Provider	Private
No. of service provider	1
No. of Vehicles	2
Capacity of vehicles (litres)	5,000
No. of trips per day per vehicle	1
Average Charge per trip (NPR)	5,500

Note: There were 5 desludging vehicles during study period, but only 2 were functional.



प्रशोधन
(Treatment)

पुनः प्रयोग वा सुरक्षित विसर्जन
(Re-use or Safe Disposal)

ESTIMATION OF FAECAL SLUDGE

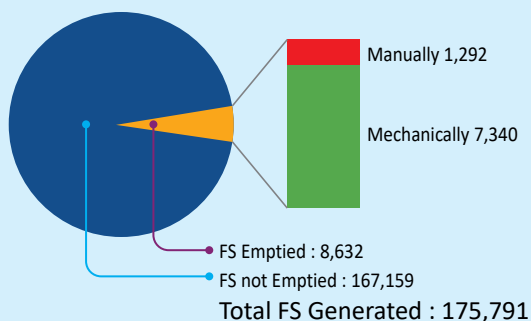
Total estimated volume of FS generation in the metropolitan city: 175,791 m³ per year which is 481.6 m³ per day.

Total volume of FS emptied in the metropolitan city: 8,632 m³ per year which is 23.6 m³ per day.

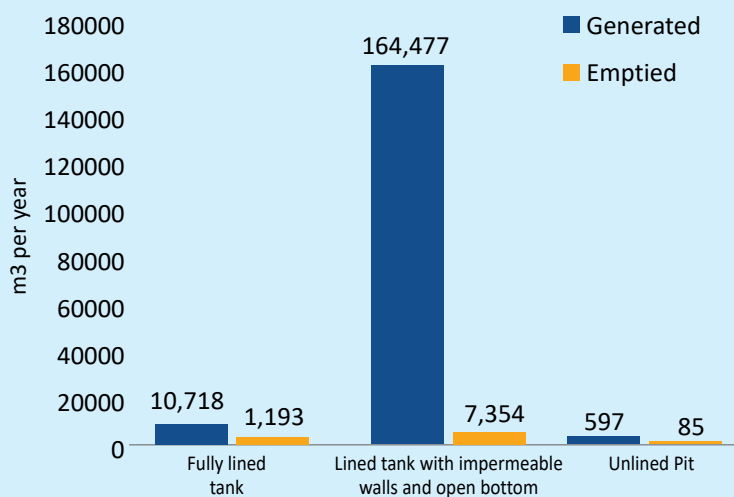
Total volume of mechanically emptied FS in the metropolitan city: 7,340 m³ per year which is 20.1 m³ per day.

Total volume of manually emptied FS in the metropolitan city: 1,292 m³ per year which is 3.5 m³ per day.

Summary of faecal sludge produced, emptied and transported in Pokhara Metropolitan City (cubic meter)



FS Generated and Emptied



TREATMENT

Biogas digesters, when functioning properly, are considered safe and capable of treating FS. However, FS stored in other types of containment requires further treatment. There was a properly functional FSTP, but it has been demolished. During our study, we were informed of plans to construct a new FSTP in collaboration with various agencies. In the meantime, mechanically emptied FS by private desludgers was delivered to Gandaki Urja Pvt. Ltd. for treatment; this facility is one of the few commercialized biogas facilities. The facility is designed to handle organic waste; therefore, FS treatment is still in the experimental phase.

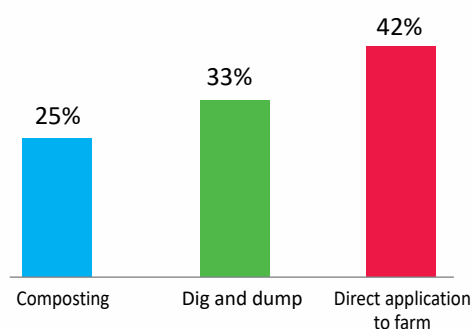


FSTP site of Pokhara which has been demolished.

SAFE DISPOSAL OR REUSE

Some portions of mechanically collected FS are taken to Gandaki Urja where it is used in producing biogas, and some are disposed in an open environment. Meanwhile, the majority of manually emptied FS is directly applied in farmland, dig and dump, and use for composting. The direct application to farm possess high risk to environment and public health.

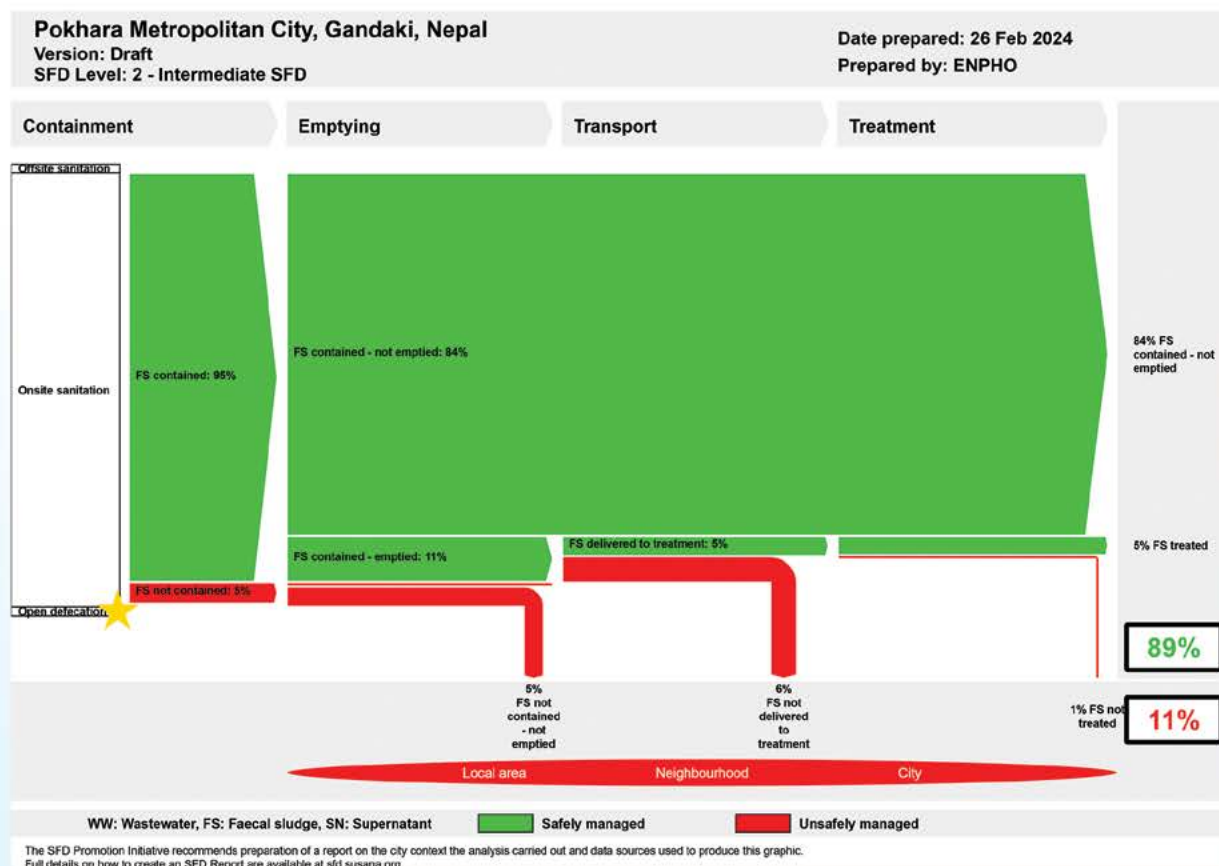
Disposal practice after manual emptying



SHIT FLOW DIAGRAM (SFD)

The SFD of Pokhara metropolitan city visually represents the status of sanitation practices across the entire sanitation value chain. It shows that FS generated by 89% of the population is safely managed (Green). Initially, FS generated by 95% of the population is safely contained. However, this proportion drops to 84% which can be considered safe until emptied. Out of the 11% safely contained FS which has been emptied only 5% is treated, and this comes from a biogas digester. This highlights the necessity of safe emptying and treatment. The emptied FS remains safe depending upon the nature of the emptying mechanism and available treatment facilities.

Furthermore, FS generated by 11% of the population is unsafely managed (Red). It includes 6% of FS not delivered to treatment plants, 1% FS which is not treated, and 5% FS which is neither contained nor emptied. This data highlights the significant gaps that must be addressed to mitigate environmental and public health risks associated with inadequate FS management practices.



RECOMMENDATIONS

- Replace and retrofit the existing unsafe containment systems to safe techniques and technologies such as septic tanks, biogas digesters or twin pits.
- Accelerate the construction of new FSTP to manage FS effectively, reduce environmental pollution, and safeguard public health.
- Formulate and enforce sanitation policies and regulations to ensure safe sanitation practices in the metropolitan.

VYAS MUNICIPALITY

Municipal Sanitation Synopsis, Study Year-2023

View from Manangkot

CITY PROFILE

Vyas Municipality was established in 1991. It is located in Tanahun District, Gandaki Province. It lies at 27°58'35" North latitude and 83°16'05" East longitude and altitude of 280 m to 1245 m above sea level

DEMOGRAPHICS



Area : 248 km²



POPULATION : 78,939

Male : 36,157

Female : 42,782



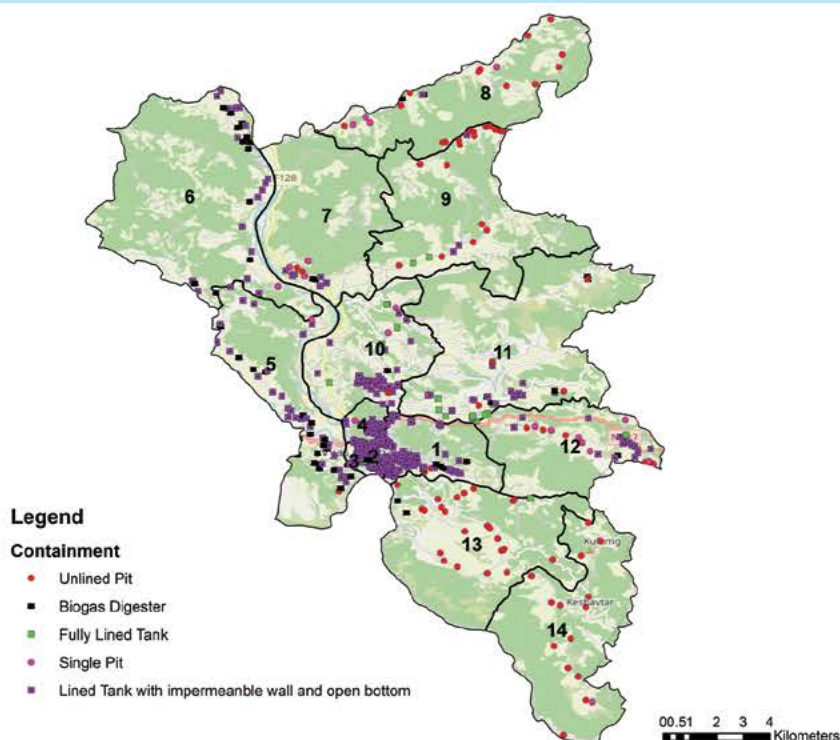
Household : 22,585



Wards : 14

Source: Census 2021

Sanitation technologies installed at household level in Vyas Municipality





संकलन
(User Interface)



अण्डारण
(Containment)



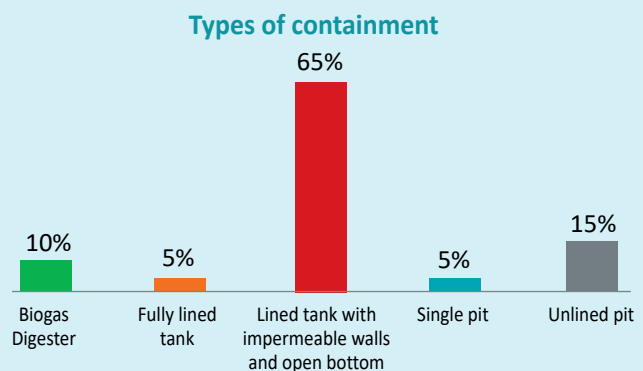
रिचार्जने र ढुवानी
(Emptying & Transportation)

USER INTERFACE FACILITY

Tanahun District was declared as an ODF zone on 19th July 2011. The survey reveals that all of the surveyed HH in the municipality have access to basic sanitation facilities.

CONTAINMENT

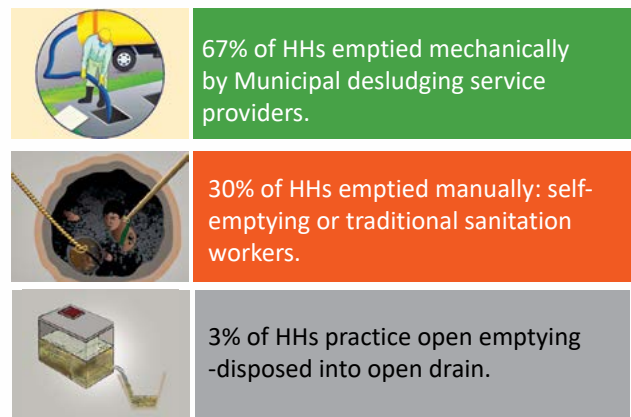
The majority of HHs rely on lined tanks with impermeable walls and open bottoms and unlined pits which allow a leachate percolation, possessing risk to groundwater contamination. Moreover, a few proportion of HHs have opted for safe technologies such as biogas digesters and fully lined tanks.



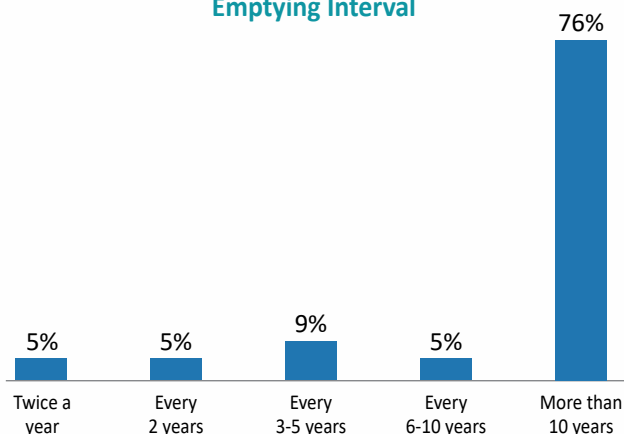
EMPTYING AND TRANSPORTATION

Only 15% of HHs have emptied their containment at least once since installation. Most containments are emptied in an interval of more than 10 years. The municipality itself has been providing desludging service.

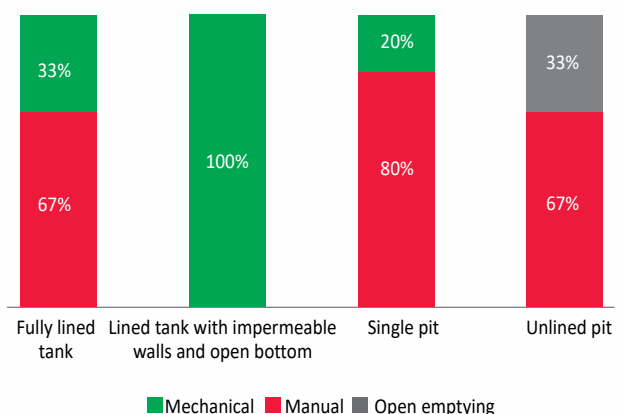
Service Provider	Municipal
No. of service provider	1
No. of Vehicles	1
Capacity of vehicle (litres)	5,000
No. of trips per day per vehicle	1
Average Charge per trip (NPR)	7,000



Emptying Interval



Emptying mechanism





प्रशोधन
(Treatment)

पुनः प्रयोग वा सुरक्षित विसर्जन
(Re-use or Safe Disposal)

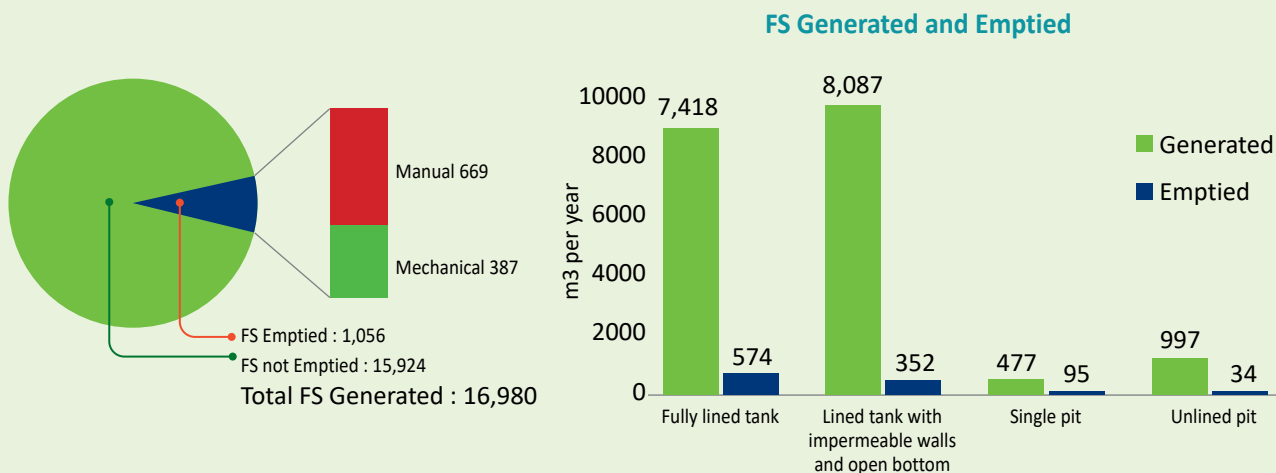
ESTIMATION OF FAECAL SLUDGE

Total estimated volume of FS generation in the municipality: 16,980 m³ per year which is 46.5 m³ per day.

Total volume of FS emptied in the municipality: 1,056 m³ per year which is 2.9 m³ per day.

Total volume of mechanically emptied FS in the municipality: 387 m³ per year which is 1.1 m³ per day.

Total volume of FS emptied in the municipality: 699 m³ per year which is 1.8 m³ per day.



TREATMENT

Biogas digesters, if functioning properly, are regarded as safe and considered capable of treating faecal sludge. However, FS stored in other types of containments requires treatment. There was a positive initiation in constructing the FSTP at the municipality, however during our study duration it was explored that treatment plant was still incomplete. If the treatment plant could be completed and operated, the collected FS can be treated safely. Meanwhile, Vyas Municipality operates a biogas digester (especially for cowshed nearby and mixing some portion of mechanically collected FS) at the bank of Madi Khola which produces gas and dried sludge as byproducts.



Partially completed FSTP of Vyas

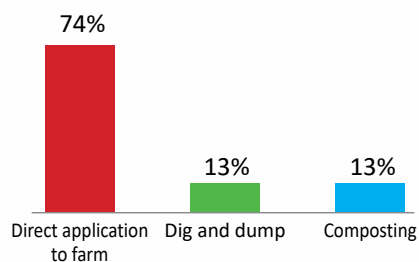


Biogas digesters treating FS partially along with cowdung

SAFE DISPOSAL OR REUSE

The some portion of mechanically collected FS from HH is mixed in the biogas digester operated by municipality. While the majority of manually emptied FS is directly applied to farms. These direct applications to farms have risk to environment and public health. Only some percentages are dig and dump, and some used in composting.

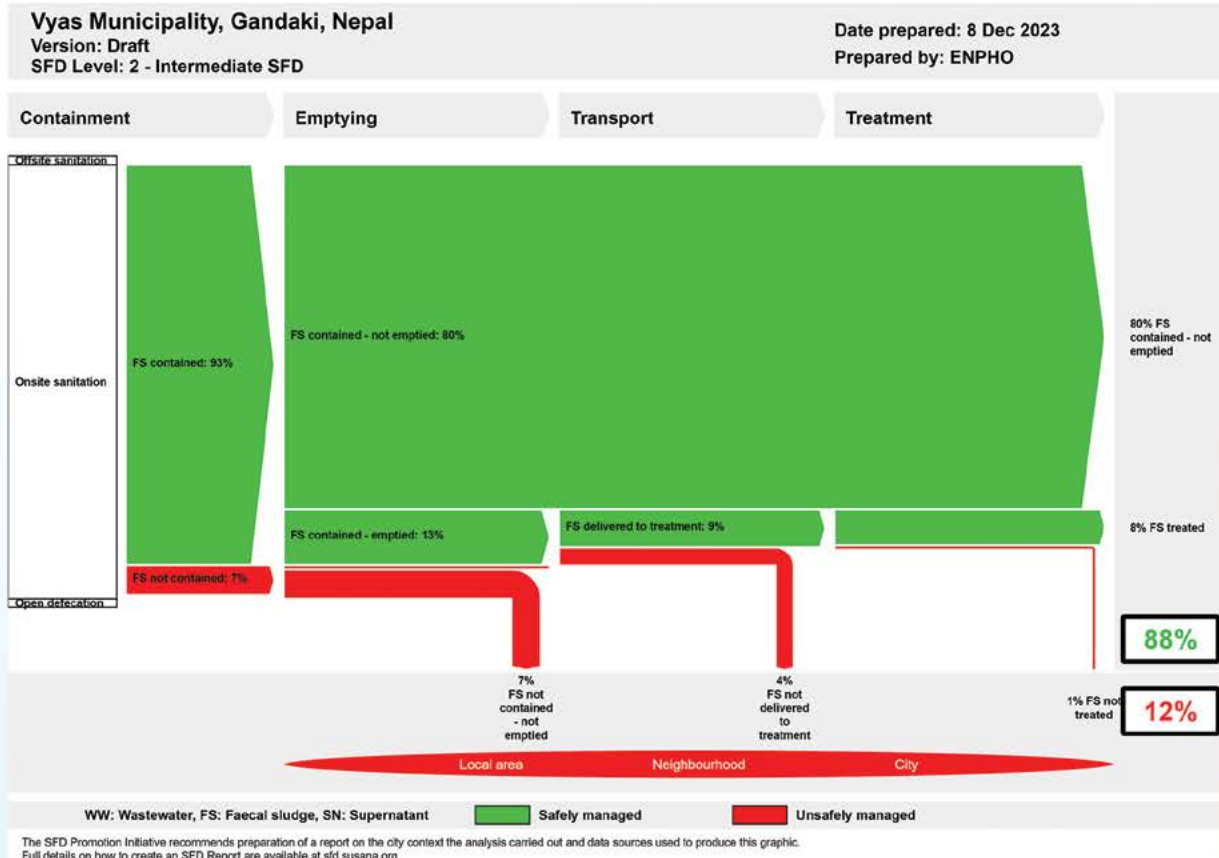
Disposal practice after manual emptying



SHIT FLOW DIAGRAM (SFD)

The SFD of Vyas municipality visually represents the status of sanitation practices across the entire sanitation value chain. It shows that FS generated by 88% of the population is safely managed (Green). Initially, 93% of FS is safely contained. However, this proportion drops to 80% which can be considered safe until emptied. Out of the 13% safely contained FS which has been emptied 8% are treated, primarily from a biogas digester. This highlights the necessity of safe emptying and treatment. The emptied FS remains safe depending upon the nature of the emptying mechanism and available treatment facilities.

Furthermore, FS generated by 12% of the population is unsafely managed (Red). 4% of FS is not delivered to treatment plant, 1% FS remains untreated, and 7% FS is neither contained nor emptied. Overall, this data highlights the significant gaps that must be addressed to mitigate environmental and public health risks associated with inadequate FS management practices.



RECOMMENDATIONS

- Replace and retrofit unsafe containment systems to safe techniques and technologies as septic tanks, biogas digester and twin pits.
- Operation of constructed FSTP to manage FS effectively, reduce environmental pollution, and safeguard public health.
- Formulate and enforce sanitation policies and regulations to ensure safe sanitation practices in the municipality.

ABOUT THE PROJECT:

Municipalities Network Advocacy on Sanitation in South Asia phase II (MuNASS-II)

Funded By : Bill & Melinda Gates Foundation (BMGF)

Executing Agency : United Cities and Local Governments Asia-Pacific (UCLG ASPAC)

Implementing Agency : Municipal Association of Nepal (MuAN)

Technical Partner : Environment and Public Health Organization (ENPHO)

Program Duration : November 2021 – December 2024

In 2017, phase I of “MuNASS program” was implemented to support the roll-out of the Institutional and Regulatory Framework (IRF) for Faecal Sludge Management in Nepal. After implementation of Phase I of the MuNASS program, a need to scale up the program was recognized. In this prospective Phase II of MuNASS program was launched to support meet SDG target 6.2. The project was initiated with the objectives to determine the sanitation status of 65 municipalities and to generate national and provincial level SFD, to enhance knowledge and skill of municipal staffs on installation and operation of FSTP and to enhance capacity of elected representatives and municipal officials regarding the need for FSM/CWIS.

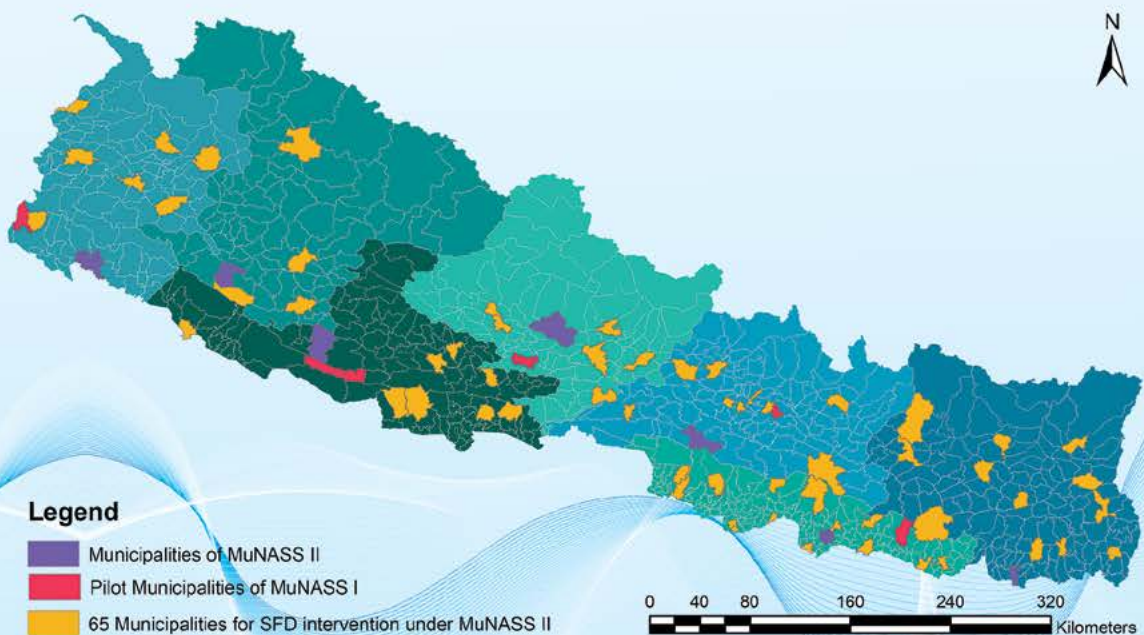
GOAL

The goal of MuNASS Phase II is to develop and demonstrate innovation on safely managed sanitation to achieve SDG 6.2 and mainstream into regional agenda, paying special attention to the needs of women and girls and those in vulnerable situations.

OUTCOMES/OBJECTIVES:

- Demonstrate innovation on SDG 6.2 measurement by mobilizing cities in South Asia
- Documentation of the Municipal-led investment for CWIS and FSM in South Asia is available
- SDG 6.2 are mainstreamed into the regional agenda through advocacy, knowledge exchange and joint activities among municipalities in the Asia-Pacific region.

Program Locations of MuNASS I and MuNASS II in Nepal





FOR FURTHER INFORMATION

Municipal Association of Nepal (MuAN)

P.O.Box: 14286, 530
Pandol Marga, Lazimpat, Kathmandu, Nepal
Tel: +977-1-4425692, 4420559
Email: info@muannepal.org.np
Website: www.muannepal.org.np

Environment and Public Health Organization (ENPHO)

G.P.O Box No. : 4102, 110/25 Adarsa Marg-1,
Thapagaon, New Baneshwor, Kathmandu, Nepal
Tel: +977-1-5244641, 5244051, 5244992, 5244609
Fax: +977-1-5244376
E-mail: enpho@enpho.org
Website: www.enpho.org

United Cities and Local Governments Asia-Pacific (UCLG ASPAC)

City Hall, Jakarta, Indonesia
Te: +62 21 389 01 809
Fax: +62 21 389 09 802
Website: uclg-aspac.org