

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

Municipal Sanitation Synopsis of Sudurpaschim Province, Nepal -2023



Published by : Environment and Public Health Organization (ENPHO)

Municipal Association of Nepal (MuAN)

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

Shreeya Khanal, Asst. Project Officer, ENPHO

Muskan Shrestha, Sanitation Advocacy Specialist, MuAN

Satish Jung Shahi, Communication, Outreach & Knowledge Management Officer, UCLG ASPAC

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 (at 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. Gopal Hamal, Mayor of Dhangadhi Sub-Metropolitan City, Mr. Bhojraj Bohara, Mayor of Bedkot Municipality, Mr. Chet Raj Baral, Mayor of Jaya Prithvi Municipality, Mr. Amar Bahadur Khadka, Mayor of Badhimalika Municipality, Mr. Baji Singh Khadka, Mayor of Dipayal Silgadhi Municipality, Mr. Narsingh Chairshir, Mayor of Mahakali Municipality, Mr. Gairi Singh Rawat, Mayor of Patan Municipality, Mr. Padam Bahadur Bohara, Mayor of Mangalsen Municipality, along with all deputy mayors, ward chairpersons and municipal staffs, for their unwavering support and invaluable feedback throughout the study. Special thanks to respective Chief Executive Officers (CAO), for efficiently coordinating and mobilizing team during the study.

We acknowledge the entire team of Bill and Melinda Gates Foundation (BMGF) for their valuable support. Our acknowledgment also goes to Dr. Bernadia Irawati Tjandradewii, Secretary General, United Cities Local Government - Asia Pacific (UCLG ASPAC) for valuable advice and support.

Furthermore, we are grateful to Mr. Ashok Kumar Byanju Shrestha, Immediate Past President and Mr. Bhim Prasad Dhungana, President from Municipal Association of Nepal (MuAN) for their gracious support.



CONTENTS

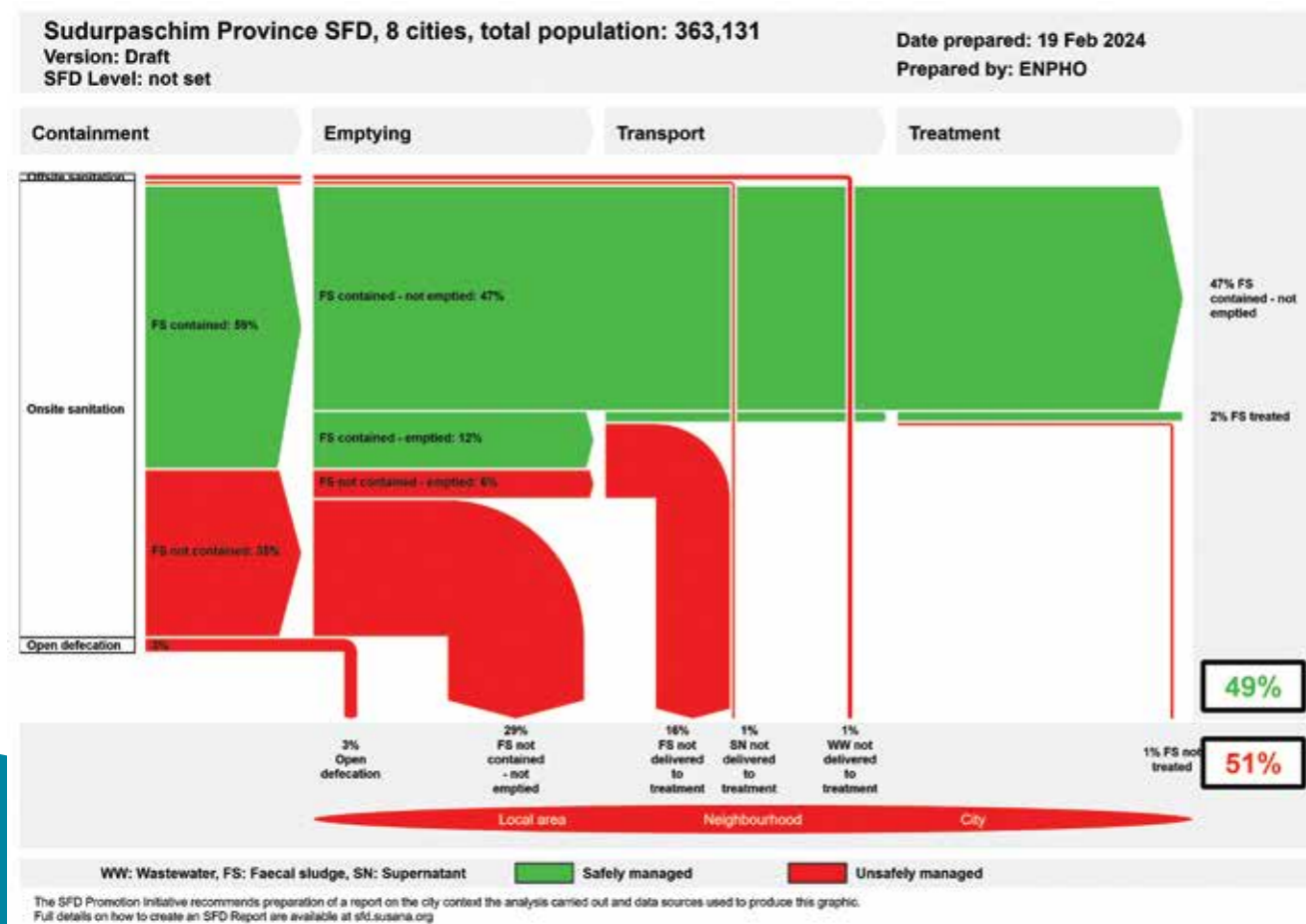
| | |
|--|----|
| Sanitation Synopsis of Sudurpaschim Province, Nepal-2023 | 1 |
| Mahakali Municipality | 7 |
| Badimalika Municipality | 11 |
| Bedkot Municipality | 15 |
| Patan Municipality | 19 |
| Dipayal Silgadhi Municipality | 23 |
| Jayaprithvi Municipality | 27 |
| Mangalsen Municipality | 31 |
| Dhangadhi Sub-Metropolitan City | 35 |

SHIT FLOW DIAGRAM (SFD)

The SFD visually represents the status of safely managed sanitation practices in Sudurpaschim Province across the entire sanitation service chain. The color green denotes safely managed and contained sanitation, while red indicates unsafely managed sanitation.

The diagram reveals that 59% of faecal sludge is safely contained. However, only 2% of the total emptied faecal sludge

(12%) undergoes treatment, and the remaining 10% is discharged into the environment without treatment, posing pollution and public health risks. This highlights the urgent need for municipalities to establish faecal sludge treatment facilities to prevent escalating risks over time.



RECOMMENDATION

Infrastructure Upgrade:

Improve basic containment to septic tanks, twin pit and promote biogas digester and dry ecosan toilet.

Mechanical Desludging:

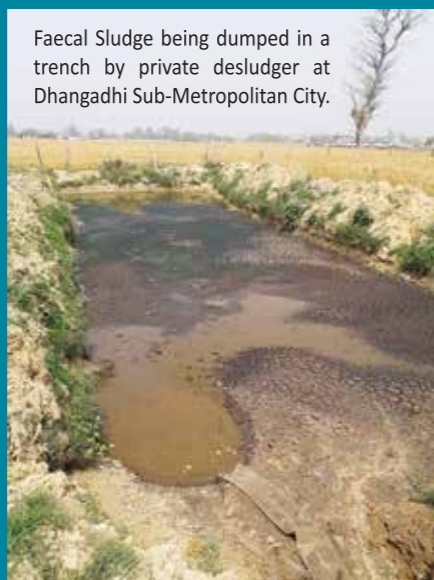
Establish mechanical desludging service either by municipality itself or inviting private sector investment.

Service Regulation:

Regulate desludging services through establishment and effective enforcement of legal tools, proper registration and licensing mechanism.

Treatment Facilities:

Invest for the establishment of FS treatment plant and ensure adequate capacity and resources for proper operation and maintenance of treatment plant.



SANITATION SYNOPSIS OF SUDURPASCHIM PROVINCE, NEPAL -2023



DEMOGRAPHICS



AREA : 19,539 KM²



POPULATION GROWTH RATE: 0.52%

SOURCE : CENSUS 2021



POPULATION : 2,694,783
 MALE : 1,272,786
 FEMALE : 1,421,997



HOUSEHOLD: 577102



MUNICIPALITIES: 33



STUDIED MUNICIPALITIES: 8

ABOUT

A study on faecal sludge management is being carried out in 65 municipalities across Nepal as part of the Municipalities Network Advocacy on Sanitation in South Asia phase II (MuNASS-II) program. Specifically, the research has been conducted in eight municipalities within the Sudurpaschim Province. These municipalities include Dhanagadi Sub-metropolitan City, Jayaprithvi, Mahakali, Bedkot, Patan, Dipayal Silgadhi, Mangalsen, and Badimalika municipality.

OBJECTIVE OF THE STUDY

The objective of this study is to evaluate the sanitation conditions, specifically focusing on the faecal sludge management (FSM), and to develop Shit Flow Diagrams (SFD) for 65 municipalities in Nepal.

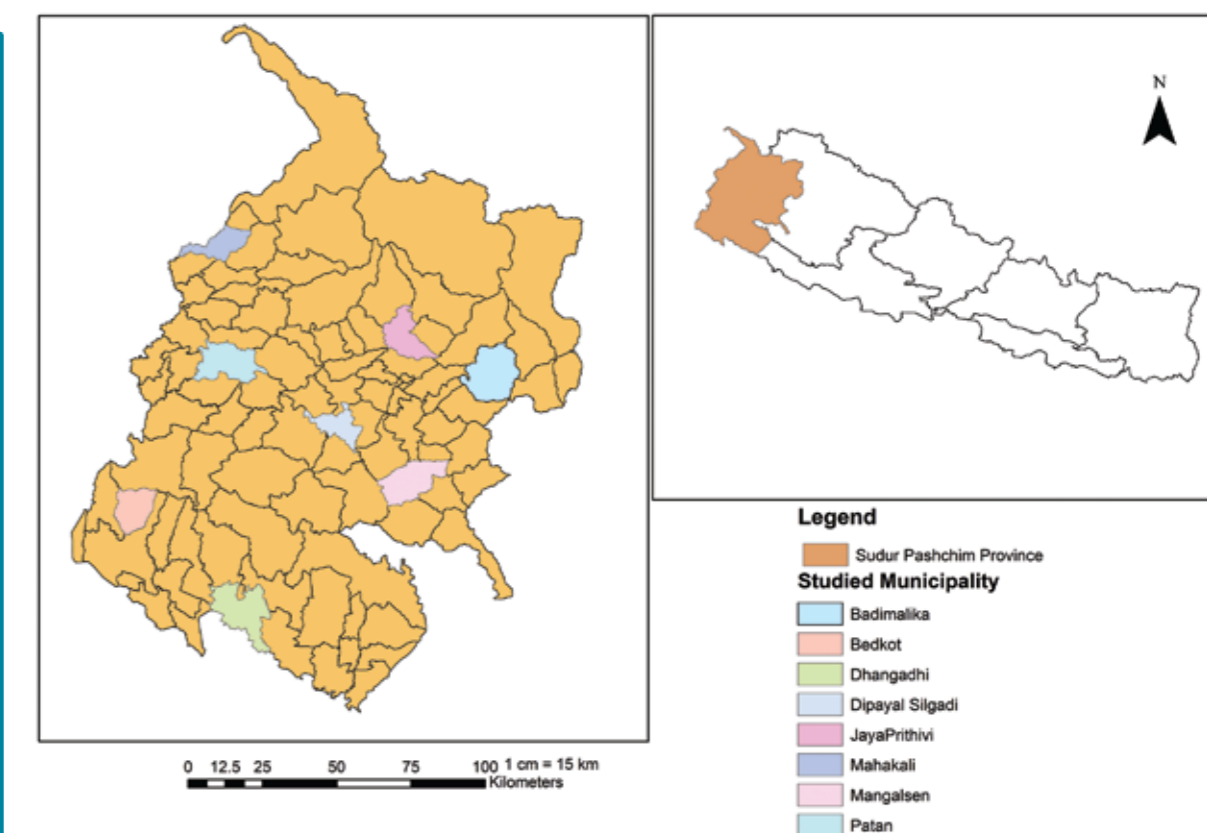
METHODOLOGY OF THE STUDY

A random questionnaire survey was conducted at households using KOBO mobile application following proportionate stratified random sampling. The number of households to be sampled was determined by using Cochran sample size formula. Local enumerators selected by respective municipalities were mobilized for the survey. The enumerators were deployed after two days intensive training on conducting surveys and collecting data from questionnaire set. The data and information were then organized and analysed computing frequency distributions, means and cross tabulations.

PROVINCE PROFILE

Sudurpaschim Province shares borders with China at the north, Karnali Province and Lumbini Province to the east, and India to the west and south.

MAP LOCATING STUDIED MUNICIPALITIES IN SUDURPASCHIM PROVINCE





संकलन (User Interface) **अण्डारण (Containment)** **रित्याउने 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.

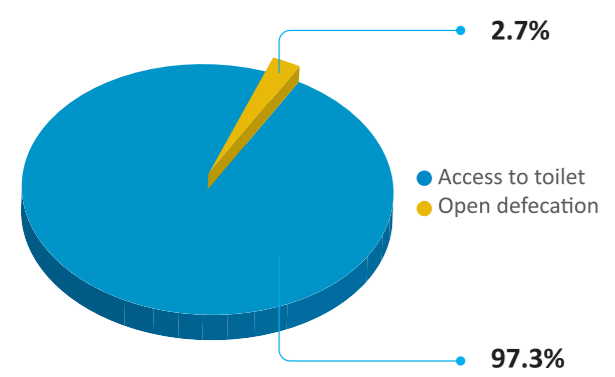
COLLECTION FACILITY

The collection facility, commonly referred to as a toilet, gathers faecal waste and directs it to either sewer or non-sewered sanitation systems.

In Sudurpaschim province, there is currently no sewerage sanitation system in place. Among the total households (HHs), 97.3% utilized improved sanitation facilities, while the remaining households use shared toilets and practice open defecation.

Notably, a small number of households release faecal waste directly into storm drains without proper authorization.

Sanitation Status of Sudurpaschim Province



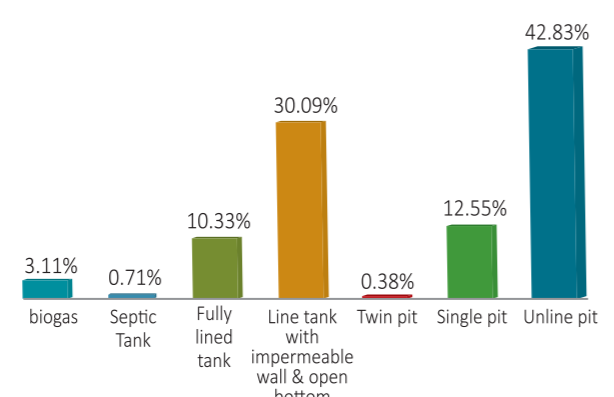
CONTAINMENT



In absence of sewerage network, faecal waste from toilet is stored into a various type of tanks such as septic tanks, biogas digesters, Eco-San Vaults, Pits, holding tanks etc. for certain period which is called containment in general. The faecal waste thus stored in containment is termed as faecal sludge (FS).

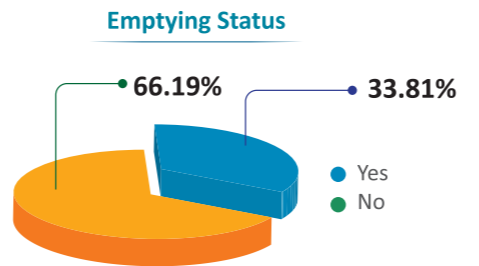
In the province, only 0.71% of HHs use septic tanks. Out of the remaining 10.33%, 30.09% and 12.55% are found to be fully lined tanks, Holding tanks and single pits respectively. Remarkably, 42.83% HHs have unlined containments posing a risk of groundwater contamination. Notably, 3.11% of HHs connect their toilets into biogas digesters while 0.38% use twin pits.

Types of containment used in Sudurpaschim province



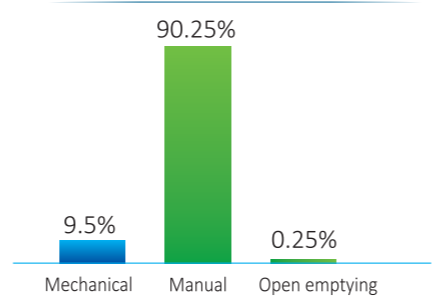
EMPTYING & TRANSPORTATION

Regular emptying is essential for the proper functioning of containment systems. Containment is designed to be emptied at fixed intervals.



The survey revealed that 33.81% HHs have emptied their containment as it is filled irrespective of the designed interval. The figure reveals that manual desludging is prevalent in the province, accompanied by open emptying practices, posing significant health risks. Notably, private desludging services are available only in Dhangadi Sub-Metropolitan City. In Mahakali and Dipayal Silgadhi Municipality, the municipality itself provides desludging services, while no such services are available in the remaining surveyed municipalities.

Transportation of Faecal Sludge



Status of desludging services in surveyed municipalities.

| Service Provider | Private | Municipality |
|-------------------------|---------|--------------|
| No. of service provider | 6 | 2 |
| No. of Vehicles | 12 | 2 |

TREATMENT

No treatment plants were found in the study municipalities. Few biogas and twin pits exist, suggesting that emptied faecal sludge in the province is disposed of without treatment into the open environment.



ESTIMATION OF FAECAL SLUDGE

The estimation of faecal sludge production in the Sudurpaschim 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 33 municipalities of Sudurpaschim Province: 394,563 m³ per year which is 1,081 m³ per day

Total estimated volume of FS emptied: 84,569 m³ per year which is 231.7 m³ per day.

Total estimated volume of mechanically emptied FS: 13,005 m³ per year which is 35.6 m³ per day.

Total estimated volume of manually emptied FS: 71,194 m³ per year which is 195.1 m³ per day.

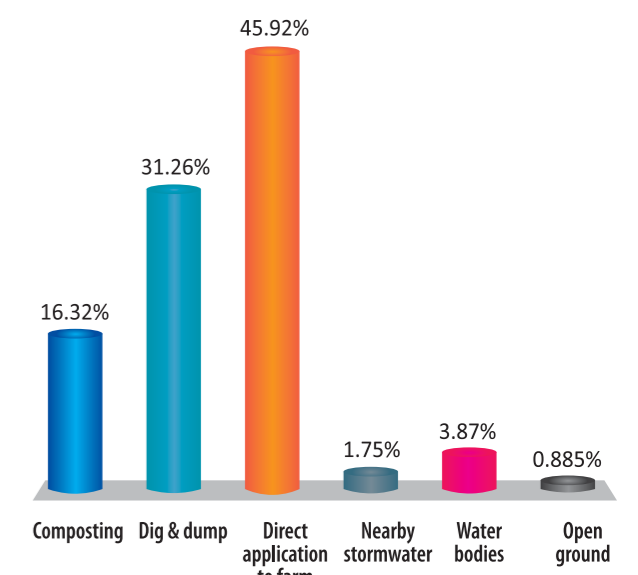
Total estimated volume of FS emptied by open emptying: 370 m³ per year which is 1 m³ per day.

SAFE DISPOSAL OR REUSE

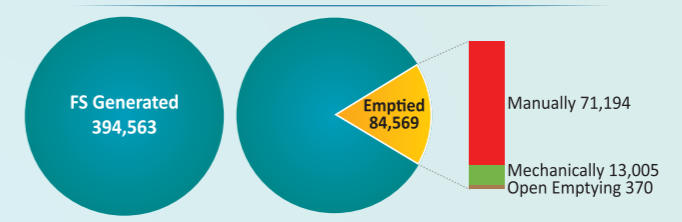
The study found that 45.9% of faecal sludge is commonly applied untreated to farms in the province. About 31.3% is disposed of at designated locations without treatment, and 16.3% of households practice composting. The remaining portion of faecal sludge is haphazardly dumped.



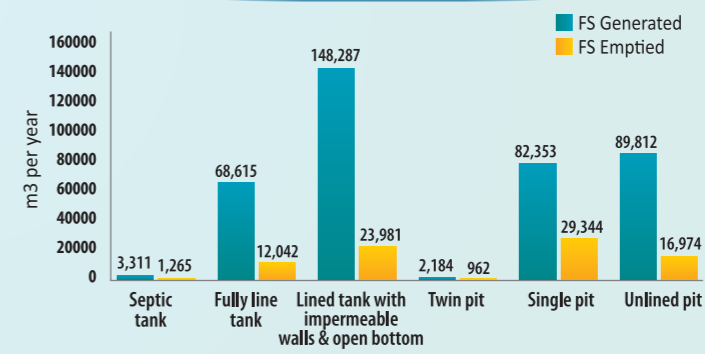
Disposal practice of faecal Sludge



Summary on faecal sludge produced, emptied, and transported in Sudurpaschim Province (cubic metre)



FS Generated and Emptied



MAHAKALI MUNICIPALITY

Municipal Sanitation Synopsis, Study Year -2023



DEMOGRAPHICS



Area : 135.11 km²



POPULATION : 24,081

Male : 11,457

Female : 12,624



Household : 5,982



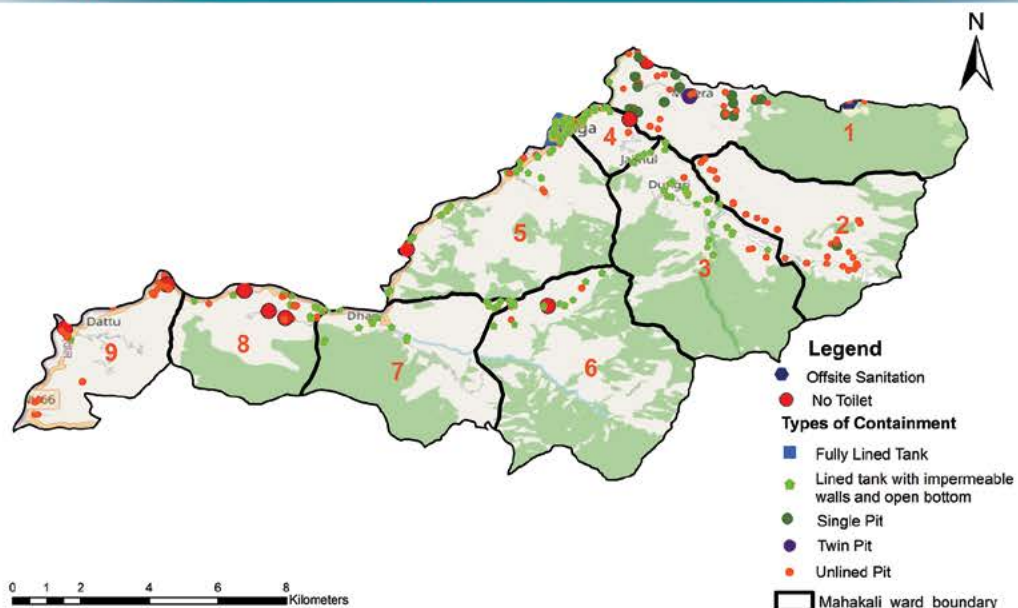
Wards : 9

Source: Census 2021

CITY PROFILE

Mahakali Municipality, located in the scenic Darchula District of Sudurpaschim Province. It is located at an elevation of 900 m to 3,100 m above mean sea level and positioned at 29.36° N to 29.45° N latitude and 80.24° E to 80.31° E longitude.

Types of sanitation technologies at household in Mahakali Municipality





संकलन
(User Interface)



अण्डारण
(Containment)



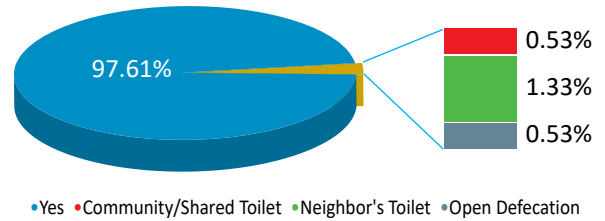
रिच्याउने र ढुवानी
(Emptying & Transportation)

USER INTERFACE FACILITY

In Mahakali Municipality, 97% of the households have access to improved sanitation facility and remaining households use shared toilet and defecate at open spaces.

The municipality does not have sewer network, although about 0.27% of households practice unauthorized discharge of effluents from their toilets into water bodies.

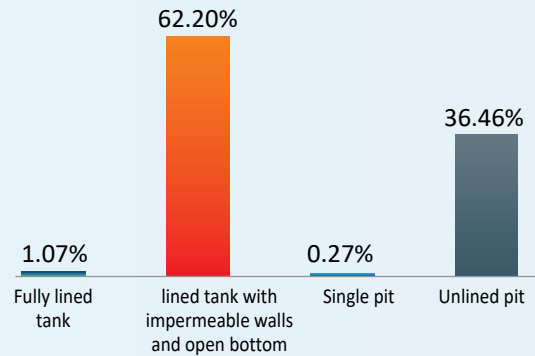
Access to basic improved sanitation facility



CONTAINMENT

The study shows that almost all the containments are unlined holding tanks and are technically considered as unsafe due to potential groundwater contamination. Notably there exist no septic tanks and other types of safe containments such as biogas digester or twin pit.

Types of containment in households

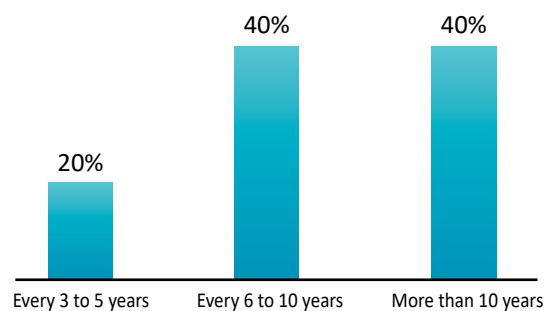


EMPTYING AND TRANSPORTATION

The survey reveals that the municipality practices on-demand practices and only 1% of the households have found to be emptied their containment. Which is considerably low.

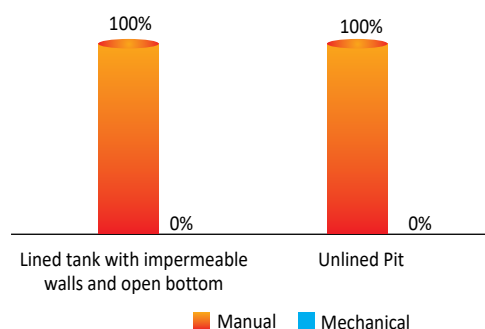
Manual scavenging is the only practice found in the municipality.

Emptying Frequency



The municipality has a desludging vehicle of tank capacity 6000 liters, however, it has not been used due to inaccessibility of vehicle in the narrow streets of the city. This suggests having proper study on required size of vehicle according to the existing width of street in the city.

Emptying Mechanism





प्रशोधन
(Treatment)

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

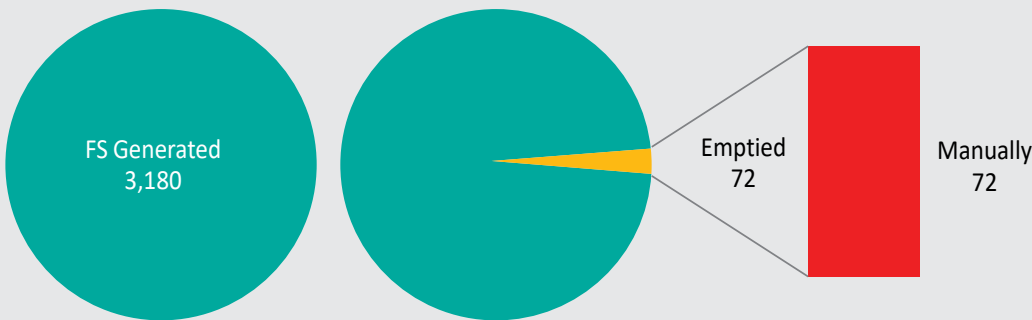
ESTIMATION OF FAECAL SLUDGE

Total estimated volume of FS generation in the municipality: 3180 m³ per year which is 8.71 m³ per day

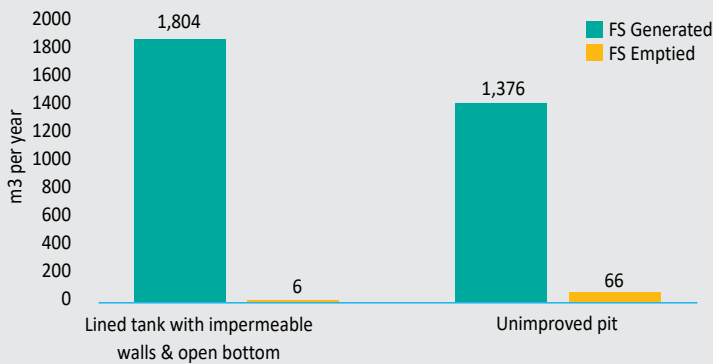
Since there exist no mechanical desludging service, manual desludging is only the option.

Total emptied volume of FS in the municipality by manual desludging: 72 m³ per year which is 0.19 m³ per day.

Summary on faecal sludge produced, emptied, and transported in Mahakali Municipality (m³).



FS Generated and emptied

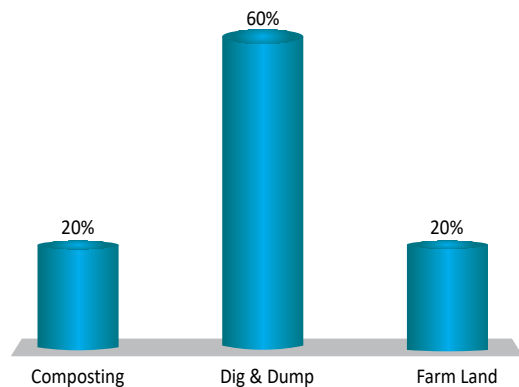


In the figure, the emptied volume of FS in the unimproved pit is higher than lined tank though there is higher chances of infiltration from unimproved pit. The reason behind it is the size of lined tank is considerably bigger than unimproved pit.

SAFE DISPOSAL OR REUSE

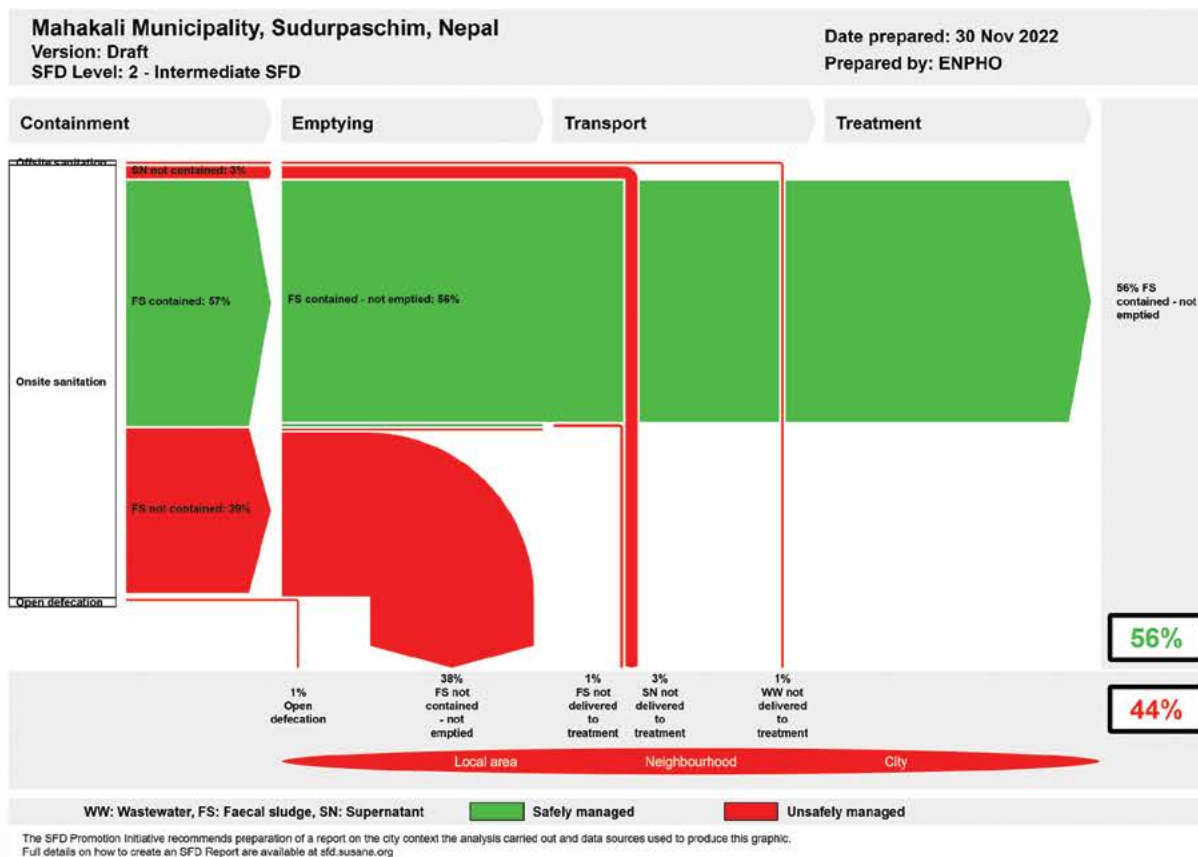
Since, no treatment plant exists in the municipality, there is high risk of unsafe disposal of emptied FS. However, the study finds out that disposal of FS on farmlands dig and dump, and composting as common practices. Yet few household from the Mahakali bazar area still directly discharge the FS into mahakali river which increases high risk.

Disposal Practice



SHIT FLOW DIAGRAM (SFD)

The diagram suggests that 57% of faecal sludge is safely contained which is reduced to 56% after emptying (i.e. 1%) of FS. This clearly indicates that the risk of unsafe disposal of FS will increase in future as the FS emptying increases in absence of proper arrangement of safe disposal of FS.



RECOMMENDATIONS

- Establish proper arrangement for safe disposal of faecal sludge.
- Operationalize and improve the existing mechanical desludging service to serve the households in the narrow streets of city.
- Implement containment improvements by upgrading particularly the existing unlined pits to proper septic tanks, Biogas digester, Twin pits and dry Ecosan according to the feasibility in the local context
- Formulate and enforce comprehensive sanitation policies and regulations to ensure the safer sanitation practices in the municipality.

BADIMALIKA MUNICIPALITY

Municipal Sanitation Synopsis, Study Year -2022

DEMOGRAPHICS



Area : 276 km²



POPULATION : 18,414

Male : 9,249

Female : 9,165



Household : 4,046



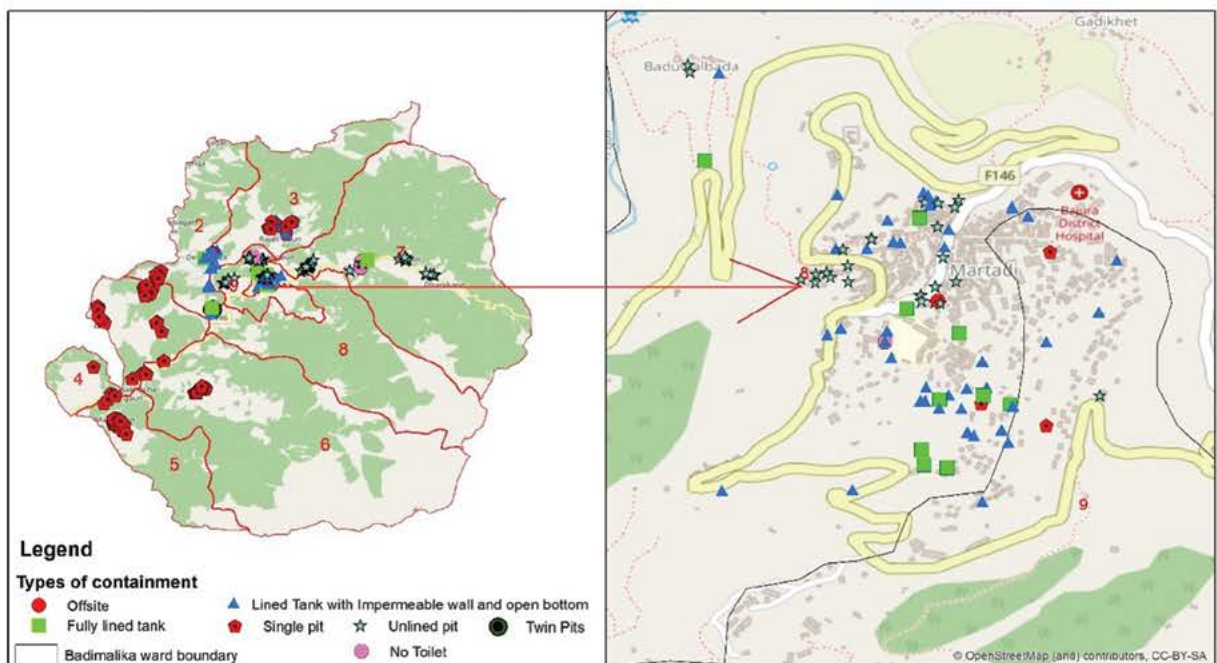
Wards : 9

Source: Census 2021

CITY PROFILE

Badimalika Municipality lies in Bajura district of Sudurpaschim Province in Nepal. Martadi, the district headquarters of Bajura district, also falls into ward 8 and 9 of the municipality and is the major urban centre of this region.

Types of Sanitation technologies at household level in Badimalika Municipality





संकलन
(User Interface)



अण्डारण
(Containment)

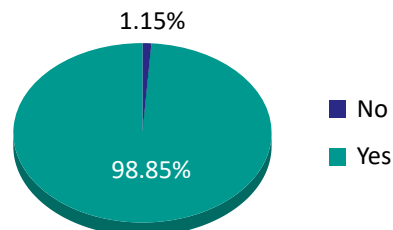


रिच्याउने र ढुवानी
(Emptying & Transportation)

USER INTERFACE FACILITY

Though the Badimalika Municipality declared as open defecation-free, 1.15% of households still practice open defecation or use their neighbour's toilet. Additionally, about 1% of households discharge their toilet effluent into open drain and nearby water bodies.

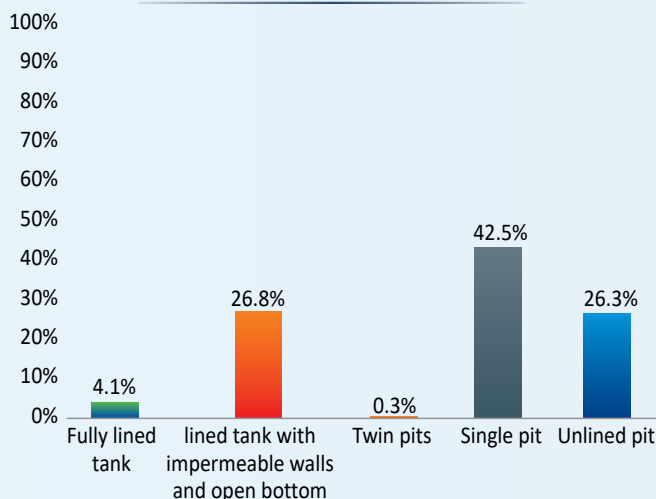
Access to Basic Improved Sanitation Facility



CONTAINMENT

In the municipality, 99% of HHs rely on onsite sanitation system and 95.5% HHs have various types of containment which allows infiltration of leachate into ground.

Types of Containment

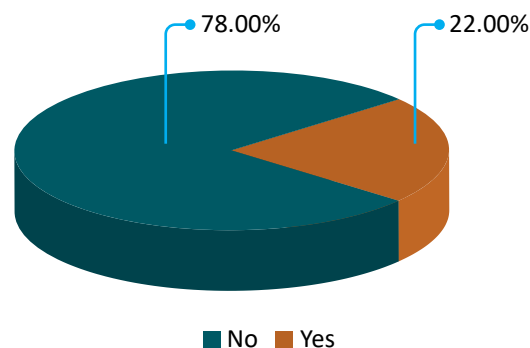


EMPTYING AND TRANSPORTATION

As common practice containments are emptied once it gets filled and only 22% of HHs have emptied their containments as per the study which means remaining are not yet filled up.

Since there is no mechanical desludging service in and neighbouring municipalities, people have only option to empty their containment manually. Out of the 22% of HHs 96% emptied their containment manually and buried into barred land. Few of them empty openly, commonly in the drain out into surface drain during rainy day causing environment pollution and adverse impact on public health.

Emptying





प्रशोधन
(Treatment)

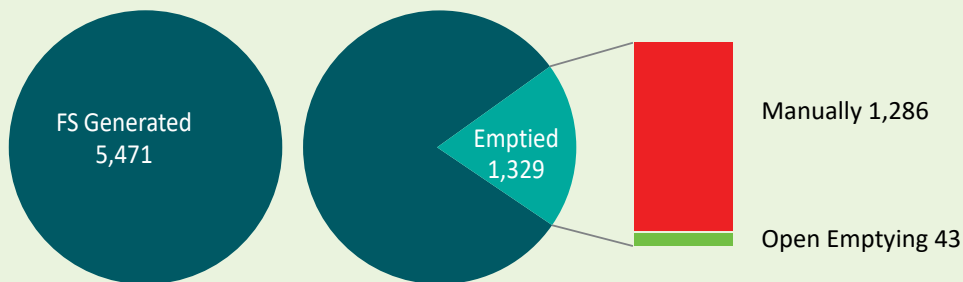
पुनः प्रयोग वा सुरक्षित विसर्जन
(Re-use or Safe Disposal)

ESTIMATION OF FAECAL SLUDGE

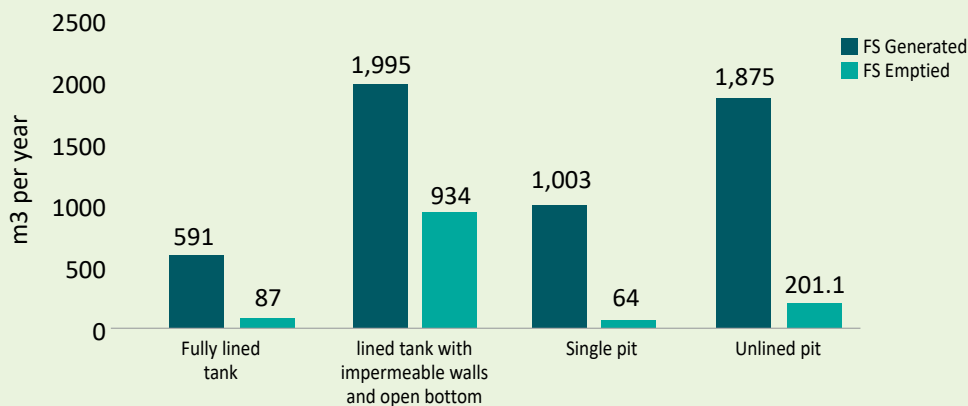
Total estimated volume of FS generation in the Municipality: 5471 m³ per year or 14.98 m³ per day

Total emptied volume of FS in the city: 1329 m³ per year or 3.64 m³ per day.

Summary on faecal sludge produced, emptied, and transported in Badimalika Municipality (m³).



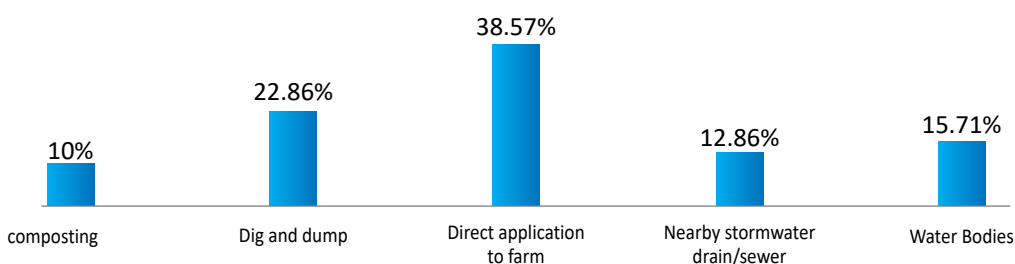
FS Generated and emptied



SAFE DISPOSAL OR REUSE

Badimalika Municipality lacks a faecal sludge treatment plant. Most emptied faecal sludge is applied in farmlands, buried in pits, or composted. Some households connect toilets to water bodies, and a few have illegal connections to open drainage.

Disposal Mechanism



BEDKOT MUNICIPALITY

Municipal Sanitation Synopsis, Study Year -2022

DEMOGRAPHICS



Area : 158.5 km²



POPULATION : 57,680

Male : 27,033

Female : 30,647



Household : 12,595



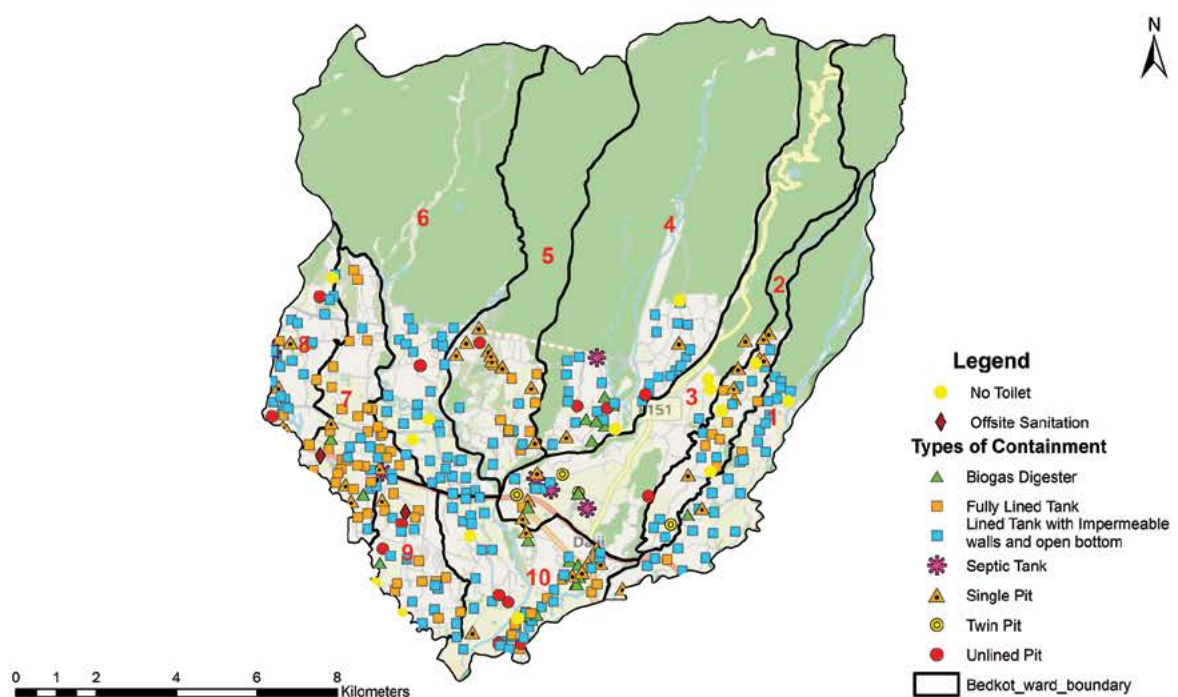
Wards : 10

Source: Census 2021

CITY PROFILE

Bedkot Municipality, situated in Kanchanpur District within Sudurpaschim Province, Nepal. It is located at 28.570 N latitude, 80.13480 E longitude and elevation ranges from 192 m to 1401m above mean sea level. The municipality spans the Northern Terai and Siwalik range, offering a diverse and geographically rich environment.

Types of sanitation technologies at household level in Bedkot Municipality





संकलन
(User Interface)



अण्डारण
(Containment)

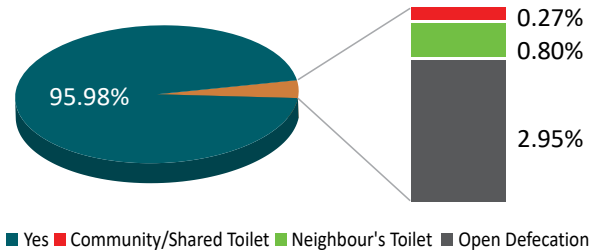


रिच्याउने र ढुवानी
(Emptying & Transportation)

USER INTERFACE FACILITY

In Bedkot Municipality, 96% of HHs have improved sanitation facilities, while 1% use shared toilets, and 3% defecate in open spaces. Despite lacking sewer network in the city, few HHs (0.56%) discharge their toilet effluent into water bodies and the open environment.

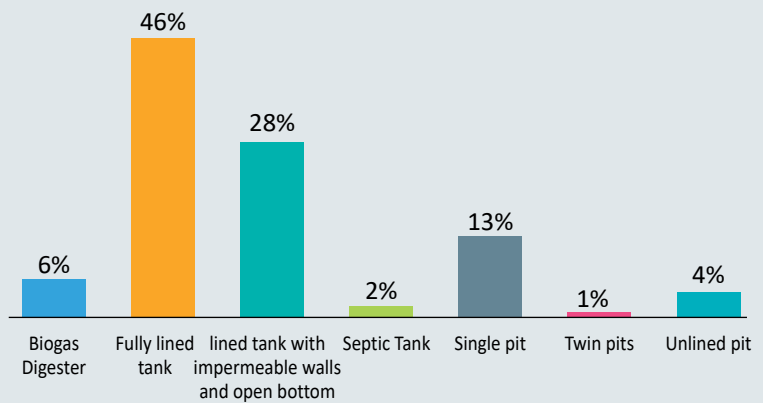
Access to basic improved sanitation facility



CONTAINMENT

Interestingly there are 2% HHs having proper septic tanks and a major portion of community uses biogas digesters, fully lined tanks and twin pit. However, significant number of HHs are using permeable containments that leach out liquid posing a risk of groundwater contamination.

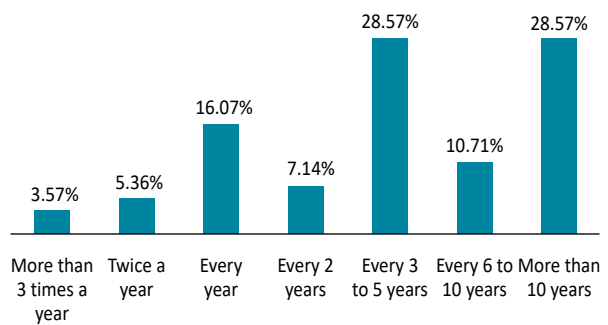
Types of containment in households



EMPTYING AND TRANSPORTATION

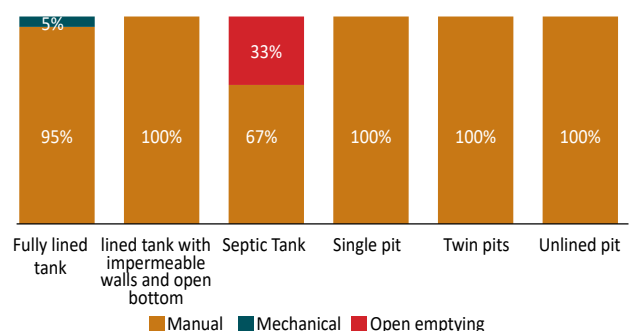
The survey reveals on-demand emptying practices in the municipality, with 22% of households emptying their containment regardless of the designed interval. This suggests issues with containment appropriateness, runoff water inflow, and groundwater intrusion. Interestingly, common emptying frequencies are once a year or every three to five years, with 28.57% of households emptying their containment in over ten years.

Emptying Frequency



Manual emptying is widely practiced in the municipality, covering all types of containments. Additionally, 2% of septic tanks are emptied using the open emptying method, discharging effluent into open drains during the rainy season.

Emptying Mechanism



The municipality does not have any municipal or private desludging service. Moreover, private desludging services in Dhangadhi Sub-Metropolitan City provides the services in the Bedkot Municipality as well.



Only, 2% of households practice mechanical desludging.



Still, 96% of households practice manual desludging.



प्रशोधन
(Treatment)

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

ESTIMATION OF FAECAL SLUDGE

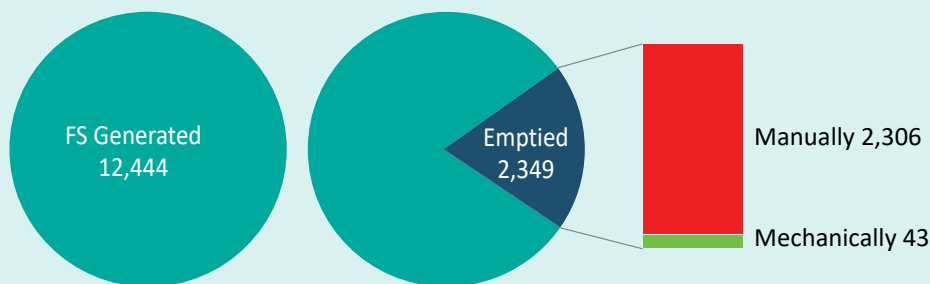
Total estimated volume of FS generation in the municipality: 12444 m³ per year which is 34.09 m³ per day

Total volume of FS emptied in the municipality: 2349 m³ per year which is 6.43 m³ per day.

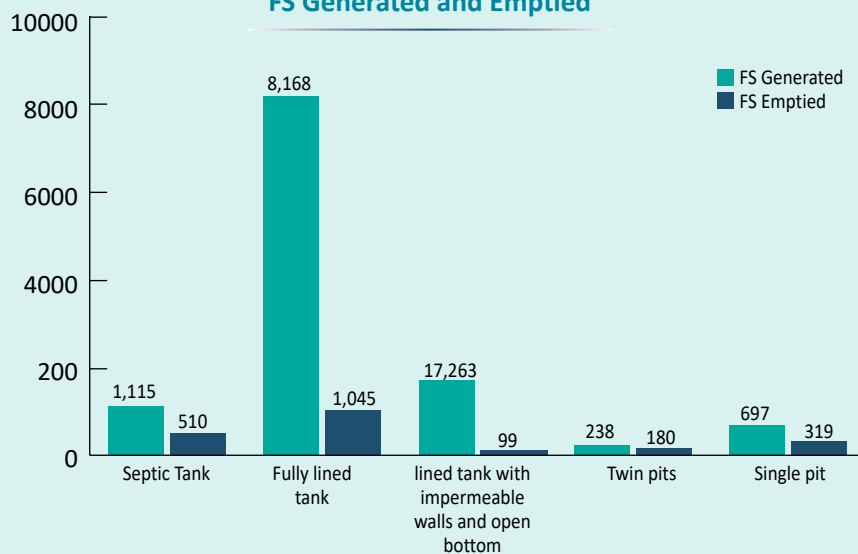
Total volume of FS emptied in the municipality by mechanical desludging: 43 m³ per year which is 0.11 m³ per day.

Total volume of FS emptied in the municipality by manual desludging: 2306 m³ per year which is 6.31 m³ per day.

Summary on faecal sludge produced, emptied, and transported in Bedkot Municipality (m³).



FS Generated and Emptied

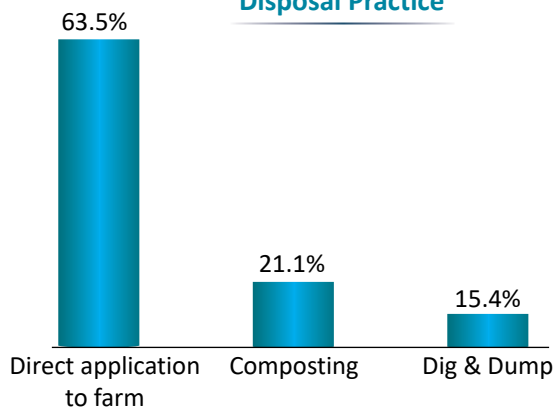


SAFE DISPOSAL OR REUSE

Currently, there is no FS treatment plant in the municipality. The private service providers dispose collected FS directly to farmlands and water bodies.

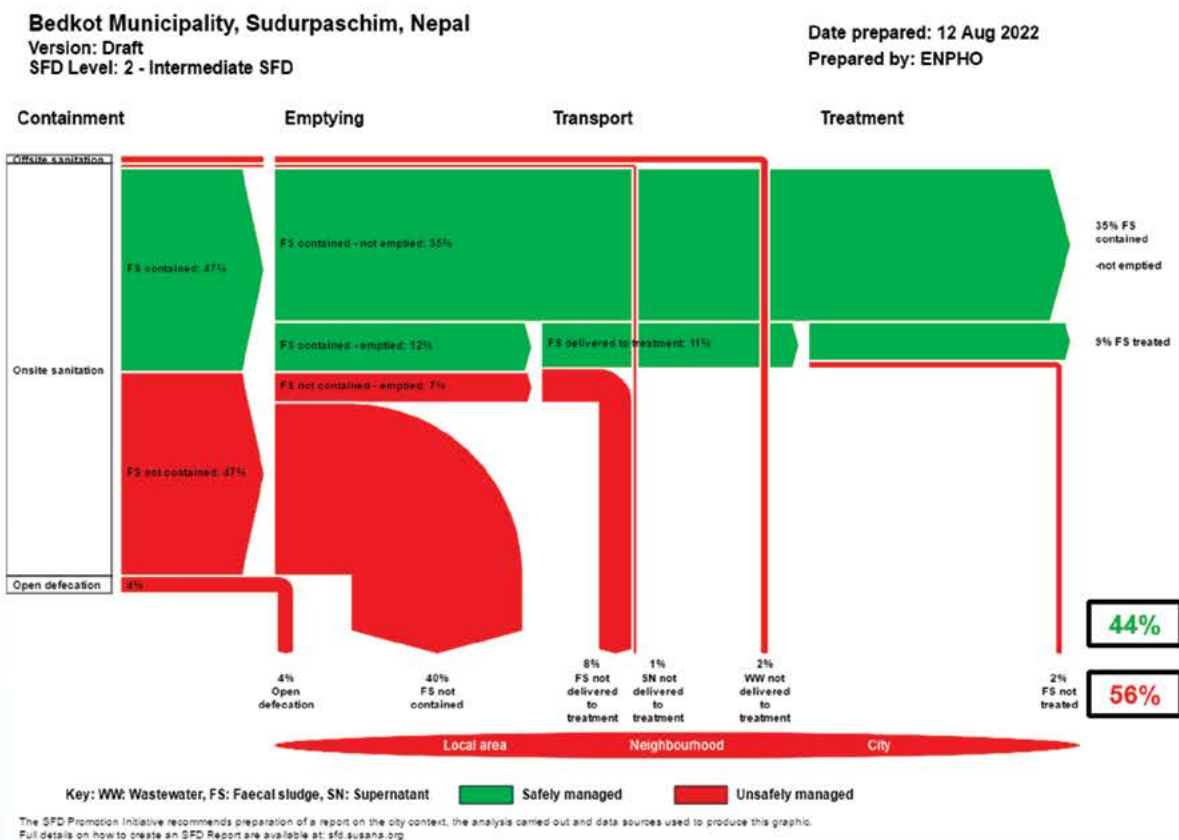


Disposal Practice



SHIT FLOW DIAGRAM (SFD)

The diagram indicates 47% of faecal sludge is safely contained which reduced to 35% after emptying (i.e. 12%) of FS. Only 9% of the FS is treated while 2% is discharged into environment without any treatment causing pollution and public health risks. This clearly indicates that there exist risk of pollution and problem in public health due to unsafe disposal of faecal sludge and it will be increasing over the time if municipality does not establish FS treatment facilities with utmost priority.



RECOMMENDATION

- Upgrade containment: Convert lined tanks and single pits to proper septic tanks. Promote biogas digesters in the farming community.
- Regulate desludging services: Formalize and regulate private desludging providers to ensure proper faecal sludge disposal.
- Formulate sanitation policies: Develop and enforce sanitation policies for the safe management of sanitation in the municipality.

PATAN MUNICIPALITY

Municipal Sanitation Synopsis, Study Year -2022

CITY PROFILE

Patan Municipality lies in Baitadi District, Sudurpaschim Province of Nepal. The municipality was formed on 2nd December 2014. The municipality is divided into 10 wards. The municipality is extended to 219.26 square kilometres.

DEMOGRAPHICS



Area : 219.26 km²



POPULATION : 29,230

Male : 13,558

Female : 15,672



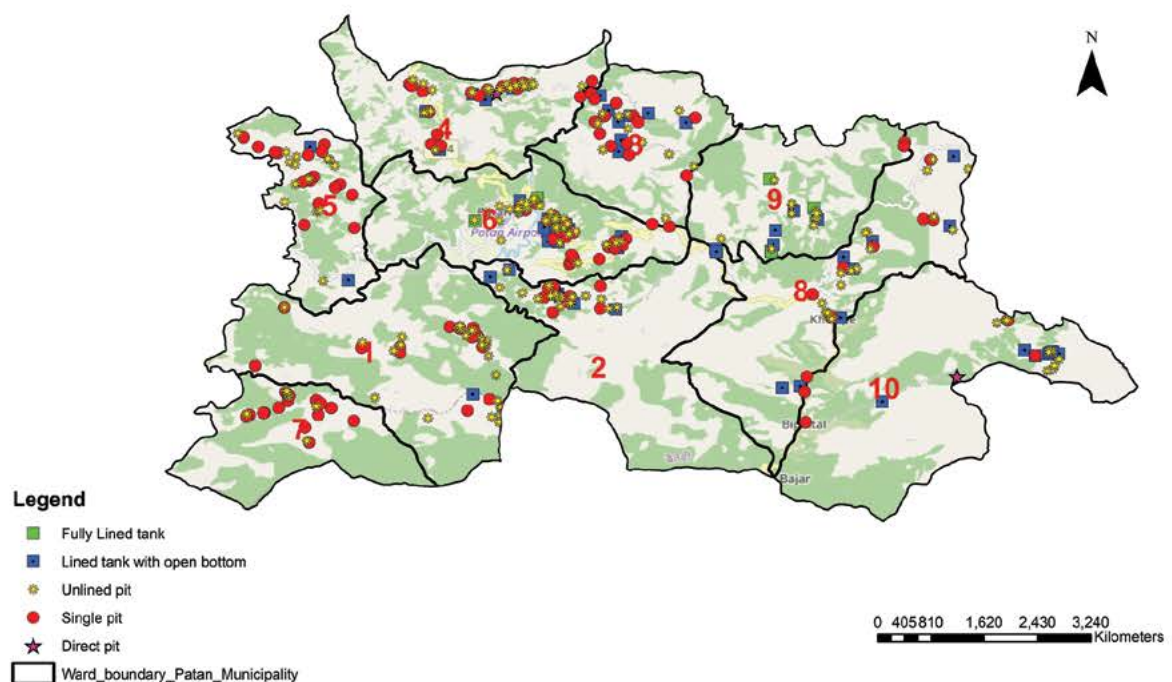
Household : 6,442



Wards : 10

Source: Census 2021

Different Types of Containments in Patan Municipality





संकलन
(User Interface)



अण्डारण
(Containment)



रिचार्जने र ढुवानी
(Emptying & Transportation)

USER INTERFACE FACILITY

In Patan Municipality, 99% of the households have access to improved sanitation facility. Remaining 1% of households defecate at nearby forest and temporary pit.

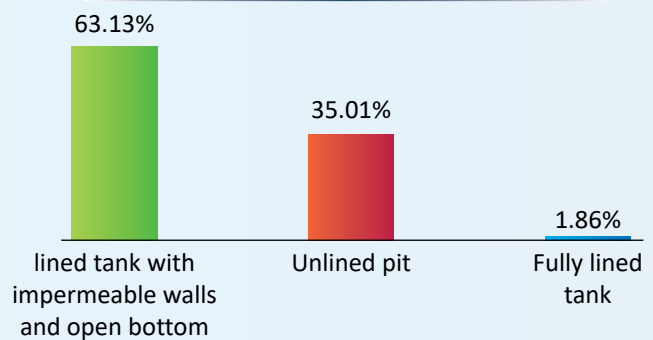
The city does not have sewer network till the date of study. But there is planning to construct 500m sewer system under New Town Project by Department of Urban Development and Building Construction (DUDBC).



CONTAINMENT

The study shows almost all the containments are unlined holding tanks which can be technically considered as unsafe due to high risk of leachate percolation and potential water source contamination.

Types of containment in households level

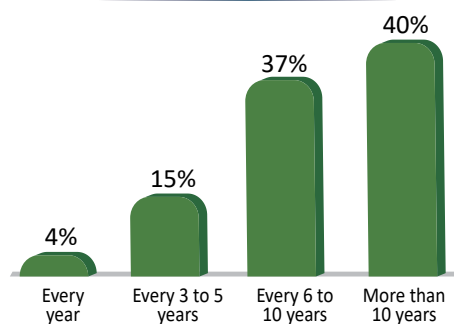


EMPTYING AND TRANSPORTATION

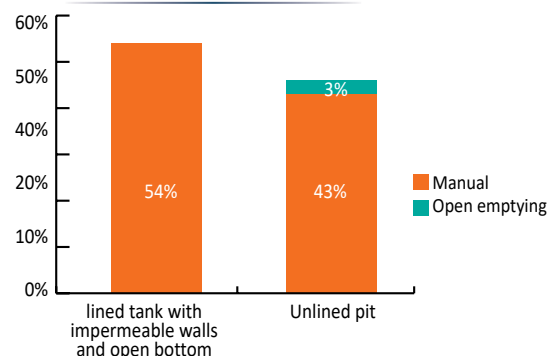
The survey indicates that 18% of households in the municipality have manually emptied their containments at least once, with this practice persisting for over 10 years. Mechanical emptying and transport of faecal sludge in a proper manner are nonexistent. Consequently, most households perform self-emptying, while 3% hire traditional labor, posing health risks due to poor emptying practices and lack of safety measures. Manual scavenging, though prohibited globally, is observed in the municipality, highlighting a critical issue of safety negligence during evacuation services.

Remarkably, the infiltration of surface runoff or ground water occurs through the lined tank and open bottom and unlined pit as containments are not sealed.

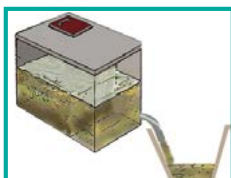
Emptying Frequency



Emptying Mechanism



97% of the households practice manual emptying as there is no desludging vehicle in the municipality.



3 % of the households have directly discharged or disposed of the faecal sludge into the open environment during rainy season.



प्रशोधन
(Treatment)

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

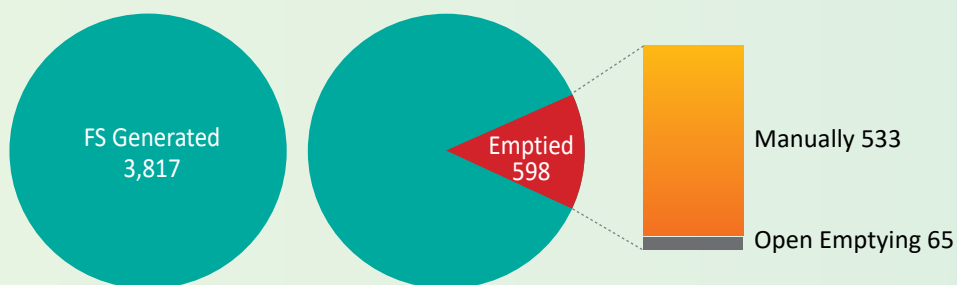
ESTIMATION OF FAECAL SLUDGE

Total estimated actual volume of FS generation in the city: 3817 m³ per year or 10.45 m³ per day

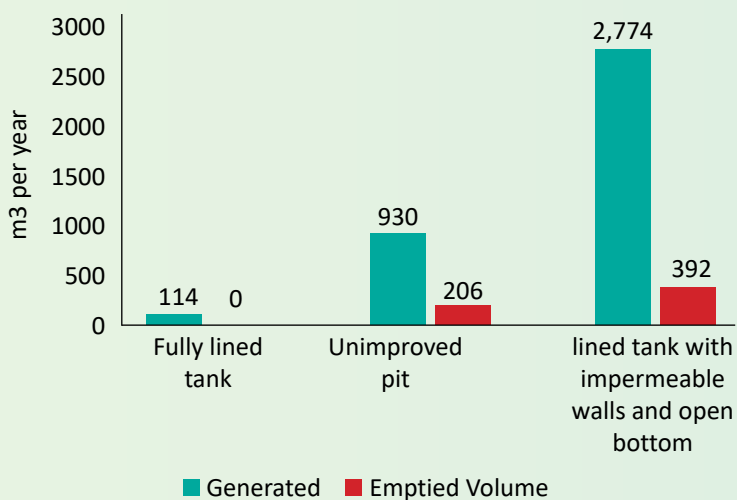
Total volume of FS emptied in the city: 598 m³ per year or 1.63 m³ per day.

Total volume of FS emptied in the city by manual desludging: 1.46 m³ per day.

Summary on faecal Sludge Produced, emptied and transported in Patan Municipality (m³).



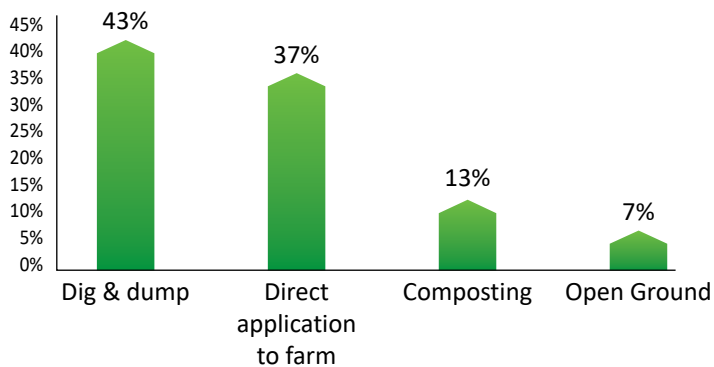
FS Generated and Emptied



Disposal

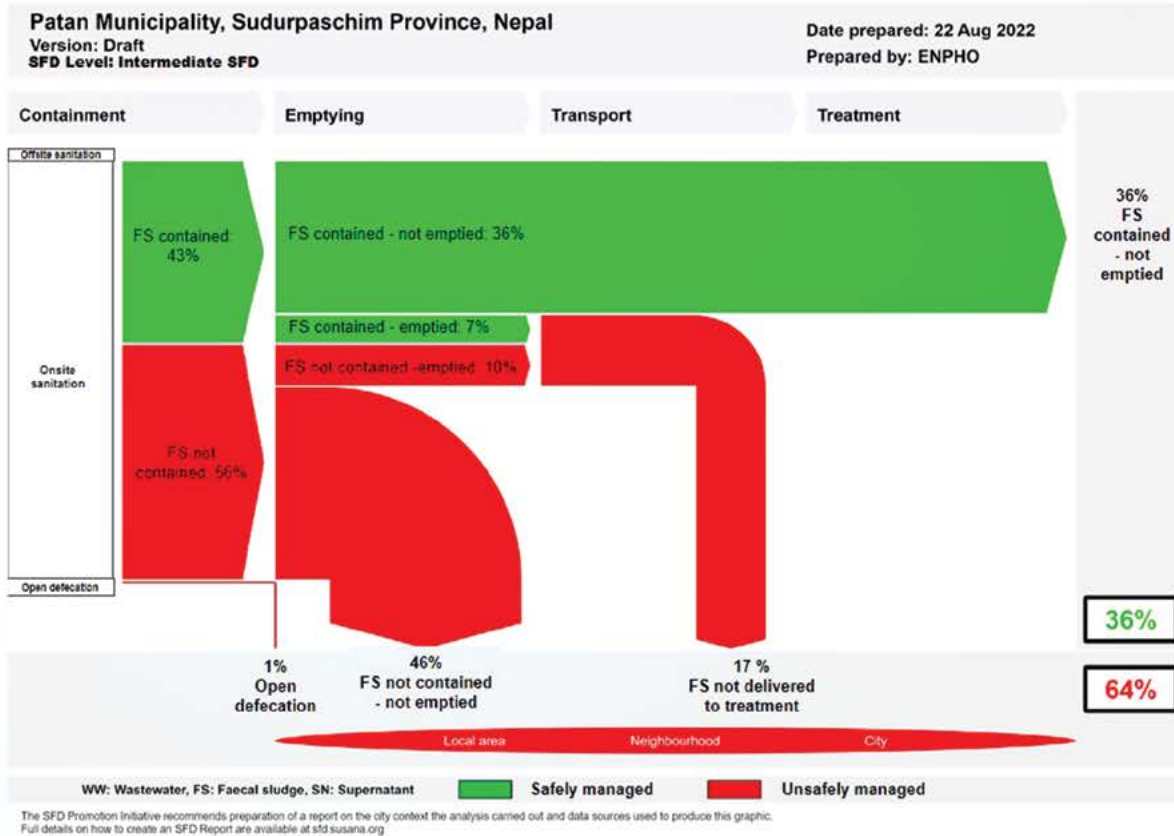
SAFE DISPOSAL OR REUSE

Patan Municipality lacks a faecal sludge treatment plant; after emptying, most emptied FS is dig and dumped, applied in farmland, composted and discharged in open ground.



SHIT FLOW DIAGRAM (SFD)

From the diagram, the safely managed faecal sludge (FS) means safely contained as the emptied FS is disposed into open environment without any treatment posing pollution and public health risk. It is obvious that the percentage of safely managed FS decreases as it is emptied from the containment.



RECOMMENDATIONS:

- Ensure proper arrangement for safe desludging, transportation and disposal of faecal sludge by establishment of mechanical desludging and transportation services, and treatment facilities prior to dispose.
- Implement containment improvements by upgrading particularly the existing unlined pits to proper septic tanks, Biogas digester, Twin pits and dry Ecosan according to the feasibility in the local context.
- Formulate and enforce comprehensive sanitation policies and regulations to ensure the safer sanitation practices in the municipality.

DIPAYAL SILGADHI MUNICIPALITY

Municipal Sanitation Synopsis, Study Year -2022



DEMOGRAPHICS



Area : 126.6 km²



POPULATION : 33,968

Male : 15,469
Female : 18,499

Source: Census 2021



Household : 8,385

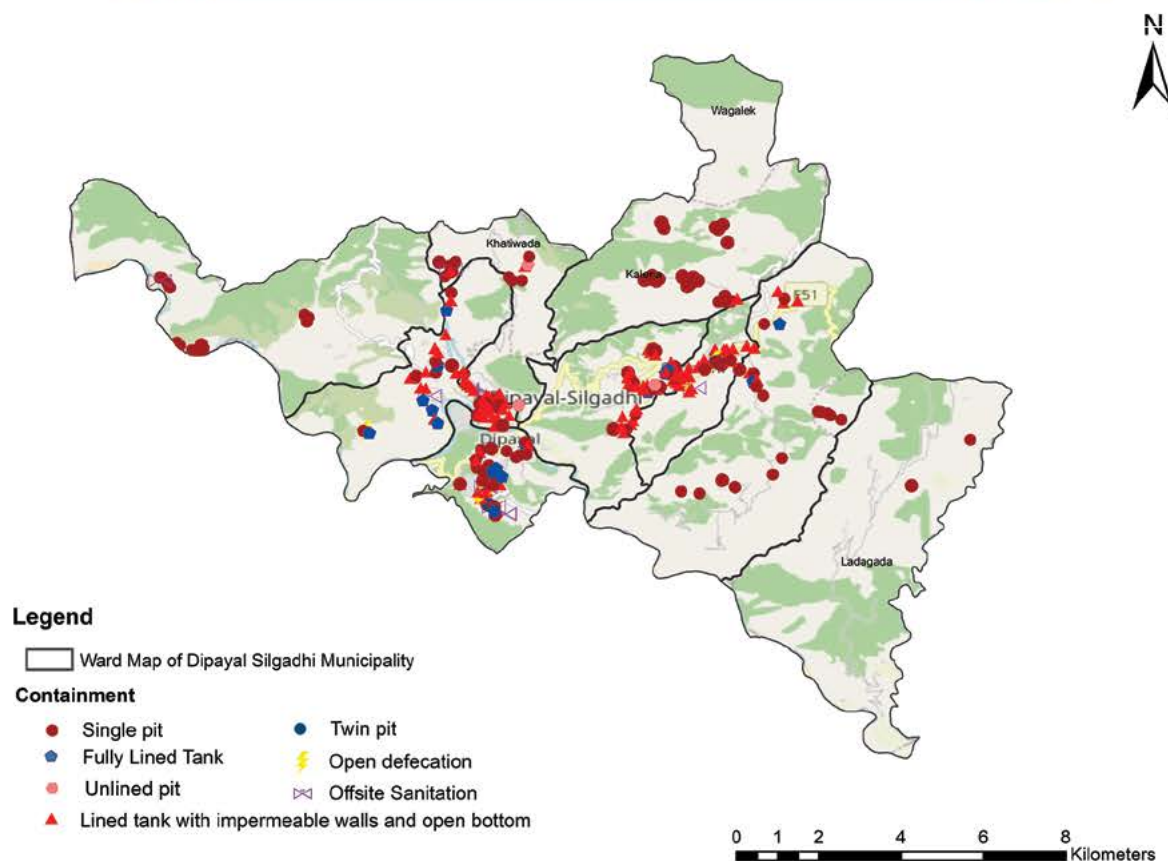


Wards : 9

CITY PROFILE

Dipayal Silgadhi municipality is the district headquarters of Doti District in Sudurpashchim Province, in the far west of Nepal. It lies in the lesser Himalayas on the bank of Seti River used at household level.

Sanitation technologies used in household level





संकलन
(User Interface)



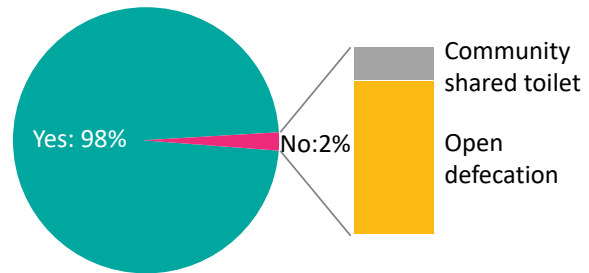
भण्डारण
(Containment)



रिचार्जने र ढुवानी
(Emptying & Transportation)

USER INTERFACE FACILITY

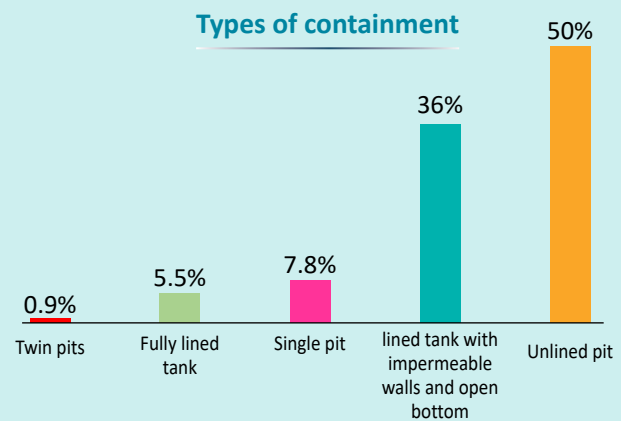
In the city, 98% of households have improved sanitation, with 2% using shared toilets or defecating openly. There's no sewer or treatment plant. It was noticed that 2% of the households directly discharge effluents into open drains and water bodies.



CONTAINMENT

In the municipality, only 5.50% have safe onsite sanitation (fully lined tanks), while the majority (50%) use unlined pits. Unsafe systems include 36% lined tanks with impermeable walls and open bottoms, along with 7.80% single pits and 0.90% twin pits.

Types of containment

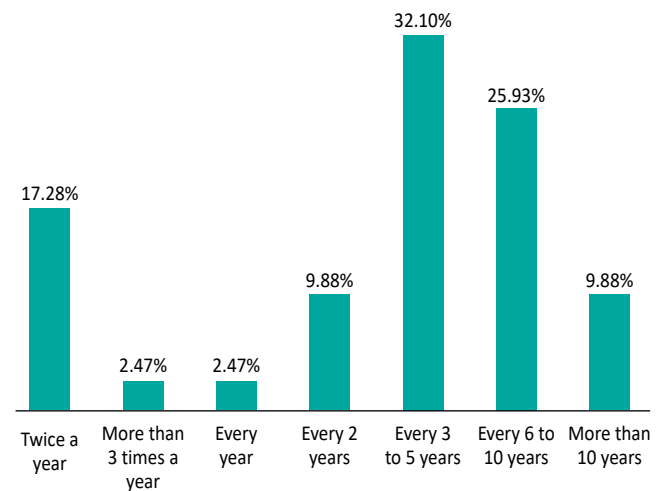


EMPTYING AND TRANSPORTATION

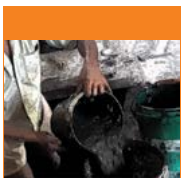
The survey reveals that only 25% of households practice on-demand emptying, addressing potential sludge overflow and blockages.

In rural settings, households frequently opt to cover, or seal filled containment units rather than regularly emptying them. This approach facilitates the natural decomposition of faecal sludge, and new pits are excavated for toilet outlets. This practice is influenced by the availability of land, which tends to be more abundant in such areas. Containment systems are typically emptied every 3 to 5 years, varying based on construction year and containment type.

Emptying Frequency



Desludging service provided by Dipayal Silgadhi

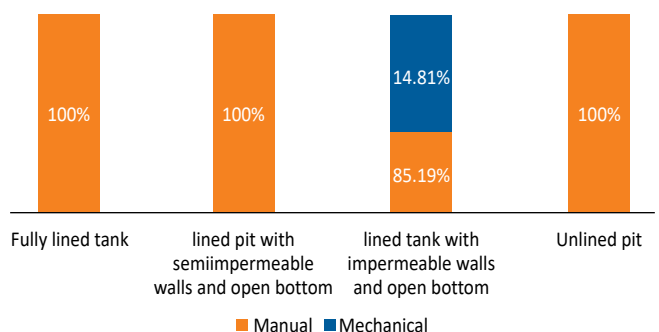


75% of the emptying are done by traditional manual scavenging, due to lack of access to desludging vehicles. Furthermore, there is a common practice of applying faecal sludge (FS) as fertilizer on farms in these rural areas.



Private desludging vehicles from Dhangadi handle 25% of the emptying process through mechanical means. Notably, since August 2022, the municipality has also taken the initiative to provide desludging services.

Emptying Mechanism





प्रशोधन
(Treatment)

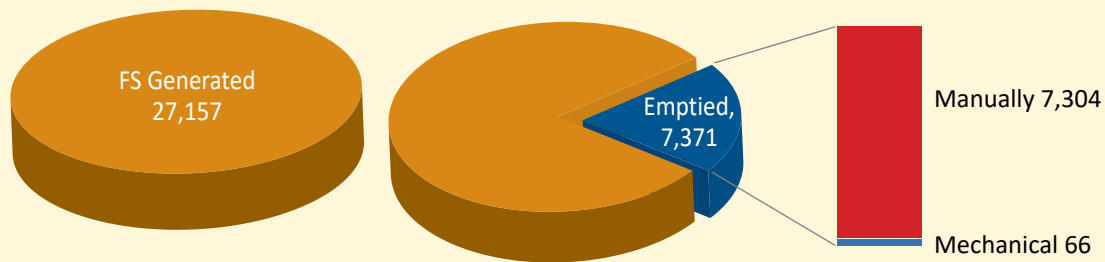
पुनः प्रयोग वा सुरक्षित विसर्जन
(Re-use or Safe Disposal)

ESTIMATION OF FAECAL SLUDGE

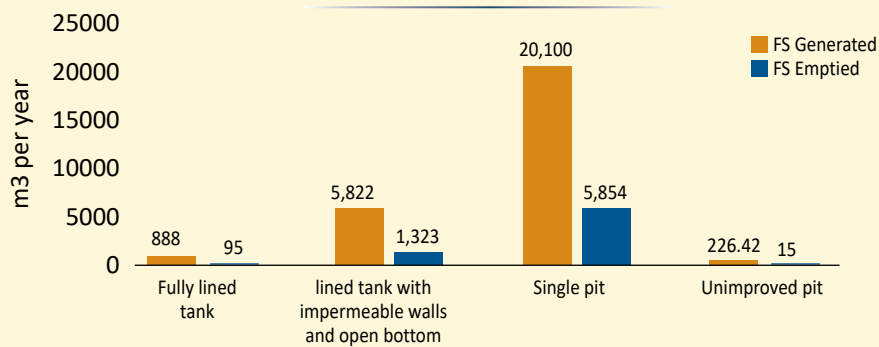
Total estimated actual volume of FS generation in the city: 27,157 m³ per year or 74.40 m³ per day

Total volume of FS emptied in the city: 7,371 m³ per year or 20.19 m³ per day.

Summary on faecal sludge produced, emptied, and transported in Dipayal Silgadhi Municipality (m³).



FS Generated and Emptied

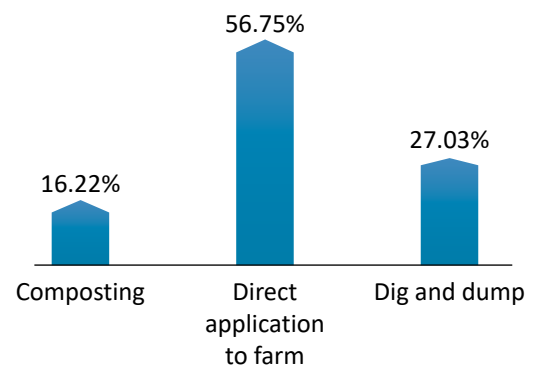


The findings showed that single pit has produced more faecal sludge in compare to holding pits and unlined pit, the emptied portion is also more in single pit in comparison to other. The probable reason for this could be infiltration of surface runoff.

SAFE DISPOSAL OR REUSE

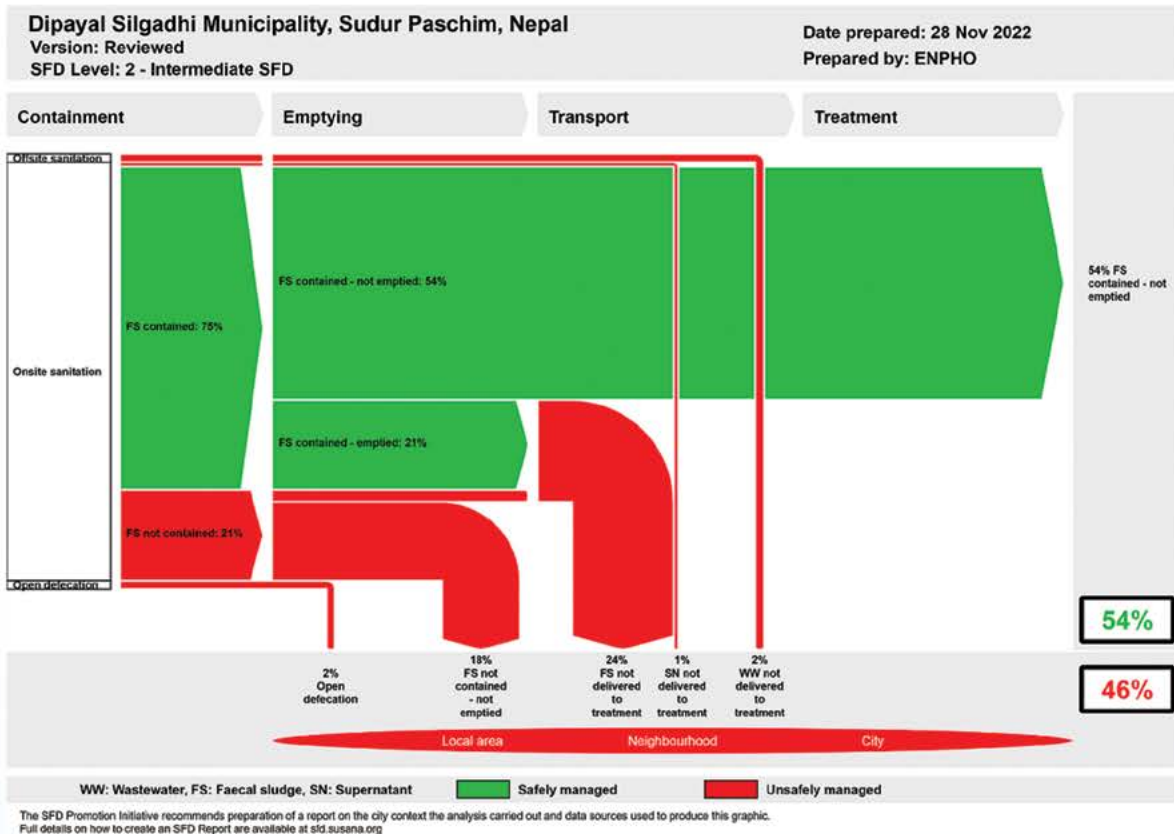
Dipayal Silgadhi doesn't have a proper faecal sludge treatment facility. Among households manually emptying sludge, 56.75% apply it on farmlands, 27.03% use the dig and dump method, and 16.22% practice composting. Some households illicitly connect toilets to open drainage systems.

Disposal Practice



SHIT FLOW DIAGRAM (SFD)

The diagram shows 75% of faecal sludge is safely contained which is reduced to 54% after emptying (i.e. 21%) of FS, considering unemptied sludge as safely contained, while 46% is unsafely managed. Unsafely managed excreta includes 24% not delivered to treatment and 18% not emptied from unsafe systems. This clearly indicates that the risk of unsafe disposal of FS will increase in future as the FS emptying increases in absence of proper arrangement of safe disposal of FS.



RECOMMENDATIONS:

- Implement containment improvements by upgrading particularly the existing unlined pits to proper septic tanks, Biogas digester, Twin pits and dry Ecosan according to the feasibility in the local context
- Operationalize and improve the existing mechanical desludging service to wide range of the community.
- Construct a faecal sludge treatment plant to treat faecal sludge collected mainly from core market area such as Pipla and Dipayal Bazar.
- Formulate and enforce comprehensive sanitation policies and regulations to ensure the safer sanitation practices in the municipality.

JAYAPRITHVI MUNICIPALITY

Municipal Sanitation Synopsis, Study Year -2023

DEMOGRAPHICS



Area : 166.79 km²



POPULATION : 21,933

Male : 10,443

Female : 11,490



Household : 5,002



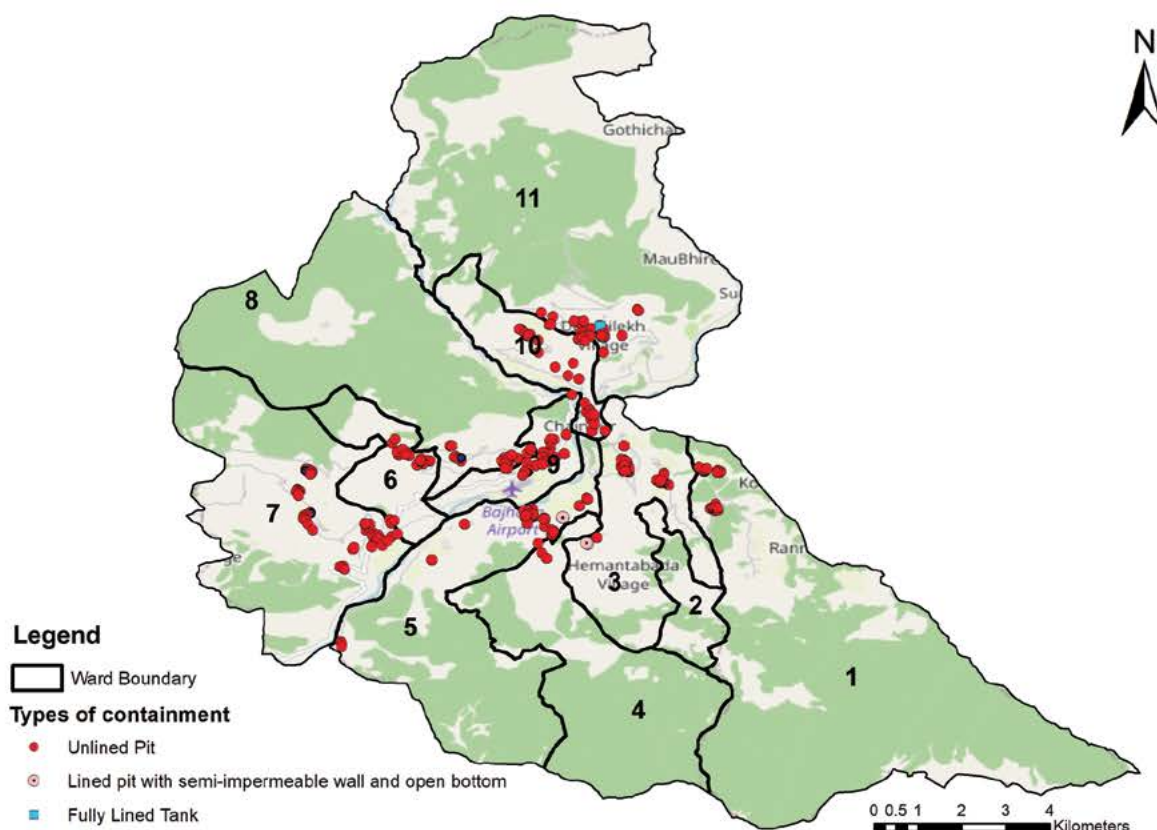
Wards : 11

Source: Census 2021

CITY PROFILE

Jayaprithvi Municipality is located at the northern part of the far-western part of the Nepal with total area of 166.79 square kilometres. The municipality is divided into eleven political wards. It has a total population of 21,933 (10,443 males and 11,490 females) as per 2021 census.

Sanitation technologies Installed in household level





संकलन
(User Interface)



अण्डारण
(Containment)

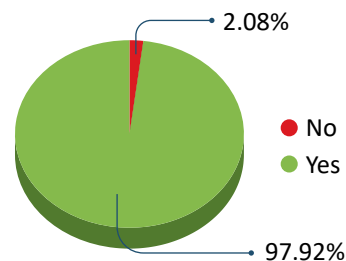


रिचार्जने र ढुवानी
(Emptying & Transportation)

USER INTERFACE FACILITY

In Jayaprithvi Municipality, 97.92% of households have improved sanitation, while the rest use shared toilets or defecate in open spaces. There's no sewer network, and 0.31% discharge effluents directly into stormwater drainage without authorization.

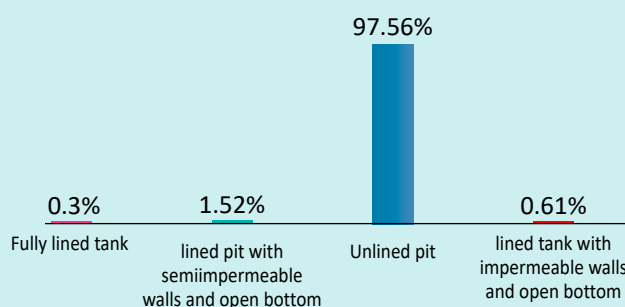
Basic Sanitation Coverage



CONTAINMENT

In Jayaprithvi Municipality, almost all the containments are unlined holding tanks and are technically considered as unsafe due to potential groundwater contamination. Notably there exist no septic tanks and other types of safe containments such as biogas digester or twin pit.

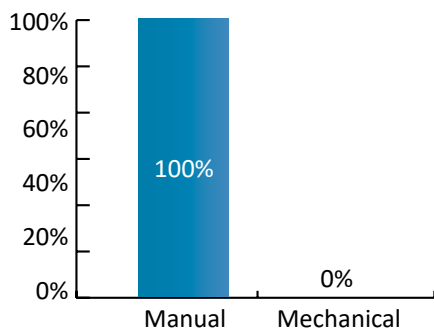
Types of containments



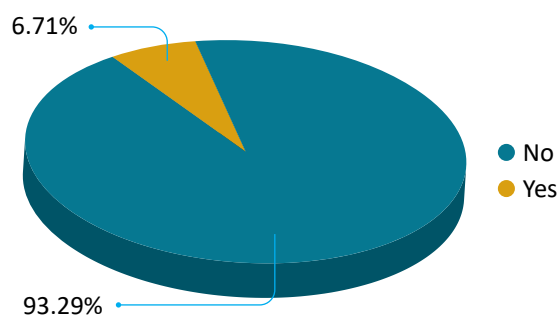
EMPTYING AND TRANSPORTATION

The survey shows that only 6.71% of households have emptied their containment systems, all manually. No mechanical emptying services are available. Thus, 93.29% of households haven't emptied their systems as they are not yet full.

Emptying Mechanism



Emptying status





प्रशोधन
(Treatment)

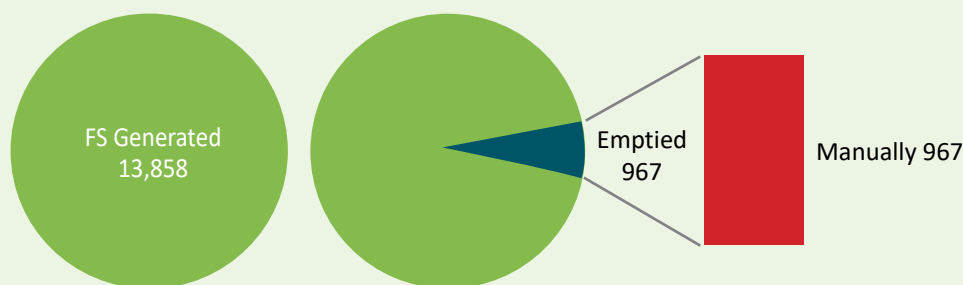
पुनः प्रयोग वा सुरक्षित विसर्जन
(Re-use or Safe Disposal)

ESTIMATION OF FAECAL SLUDGE

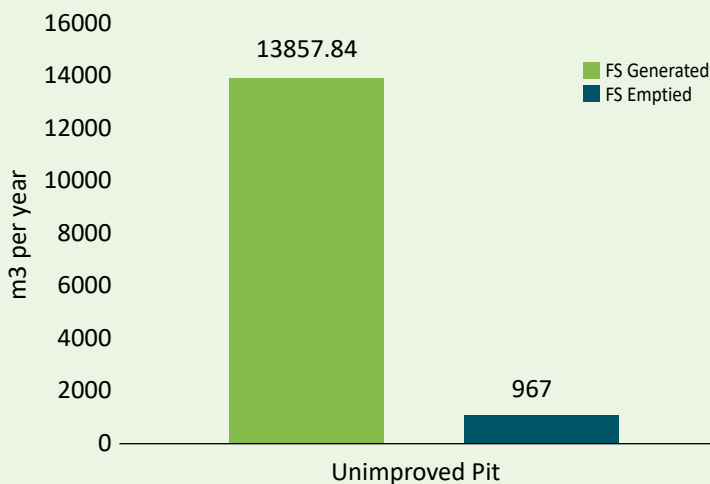
Total estimated actual volume of FS generation in the Municipality: 13,858 m³ per year which is 37.96 m³ per day

Total volume of FS emptied in the city: 967 m³ per year which is 2.64 m³ per day.

Summary on faecal sludge produced, emptied, and transported in Jayaprithvi Municipality (m³)



FS Generated and Emptied

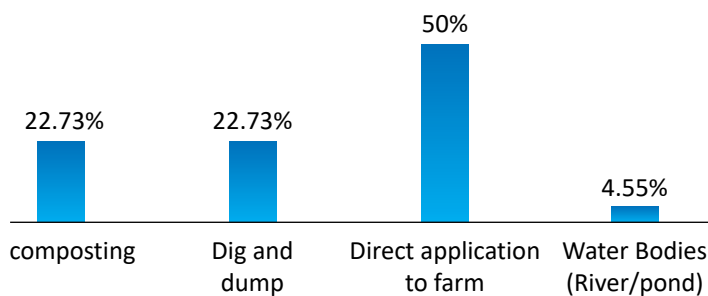


Disposal of Faecal Sludge

SAFE DISPOSAL OR REUSE

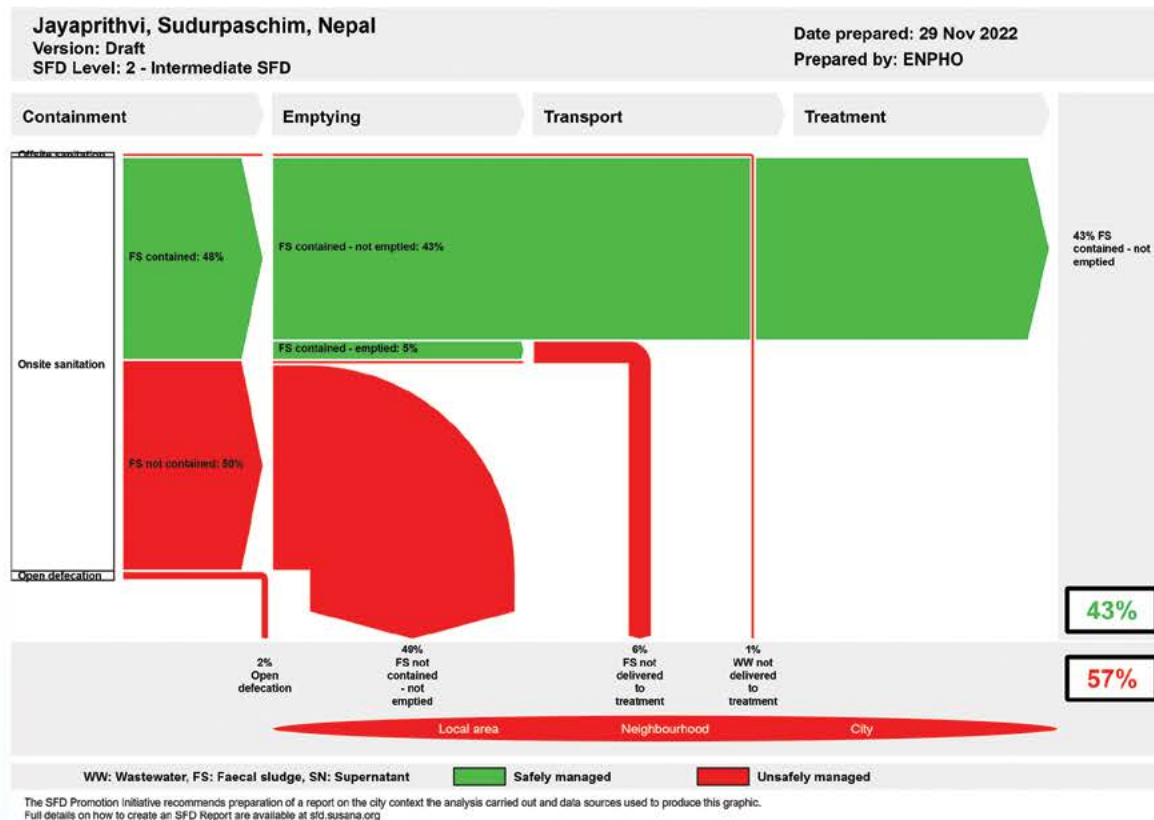
Jayaprithvi Municipality does not have any form of treatment plant for faecal sludge.

Half of the HHs that have manually emptied the containments, are directly applied in farmland while some HHs practice composting. Meanwhile, some are dug and dumped, and few proportions are directly discharged into water bodies.



SHIT FLOW DIAGRAM (SFD)

Safely managed faecal sludge (FS) includes 43% that hasn't been emptied. Unsafely managed FS includes 49% not contained and not emptied, 6% emptied but not treated, 1% wastewater not treated, and 2% open defecation. Lack of a treatment plant raises concerns about future safe disposal as filled pits and tanks will need transport to a treatment plant.

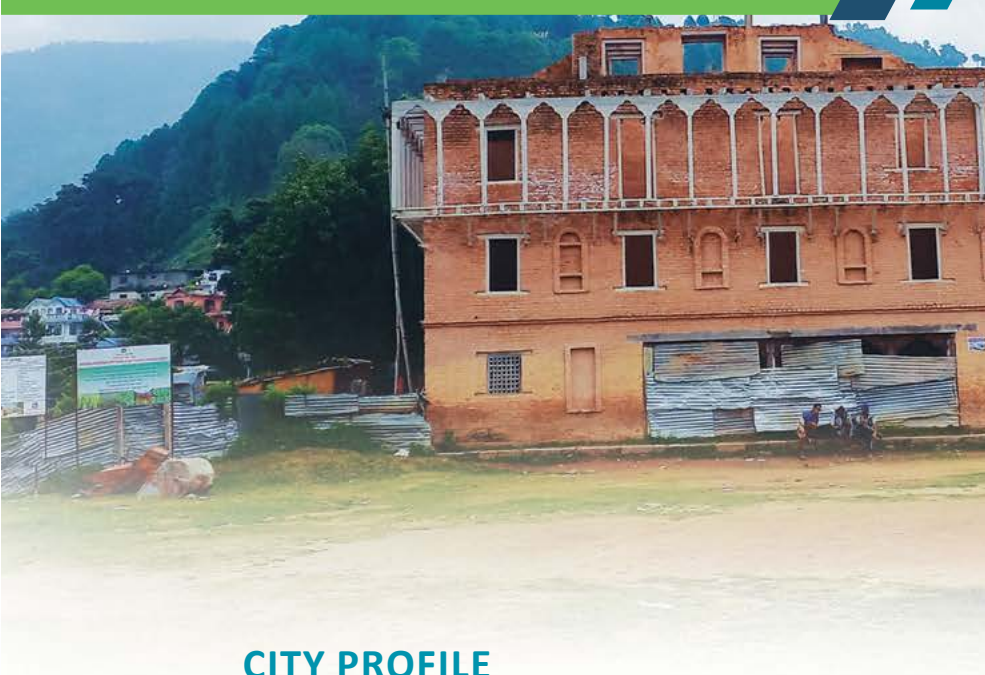


RECOMMENDATIONS:

- Implement containment improvements by upgrading particularly the existing unlined pits to proper septic tanks, Biogas digester, Twin pits and dry Ecosan according to the feasibility in the local context.
- Formulate and enforce comprehensive sanitation policies and regulations to ensure the safer sanitation practices in the municipality.
- Establish proper arrangement for safe disposal of faecal sludge.

MANGALSEN MUNICIPALITY

Municipal Sanitation Synopsis, Study Year -2023



DEMOGRAPHICS



Area : 220 km²



POPULATION : 26,557

Male : 12,082

Female : 14,475



Household : 6,222



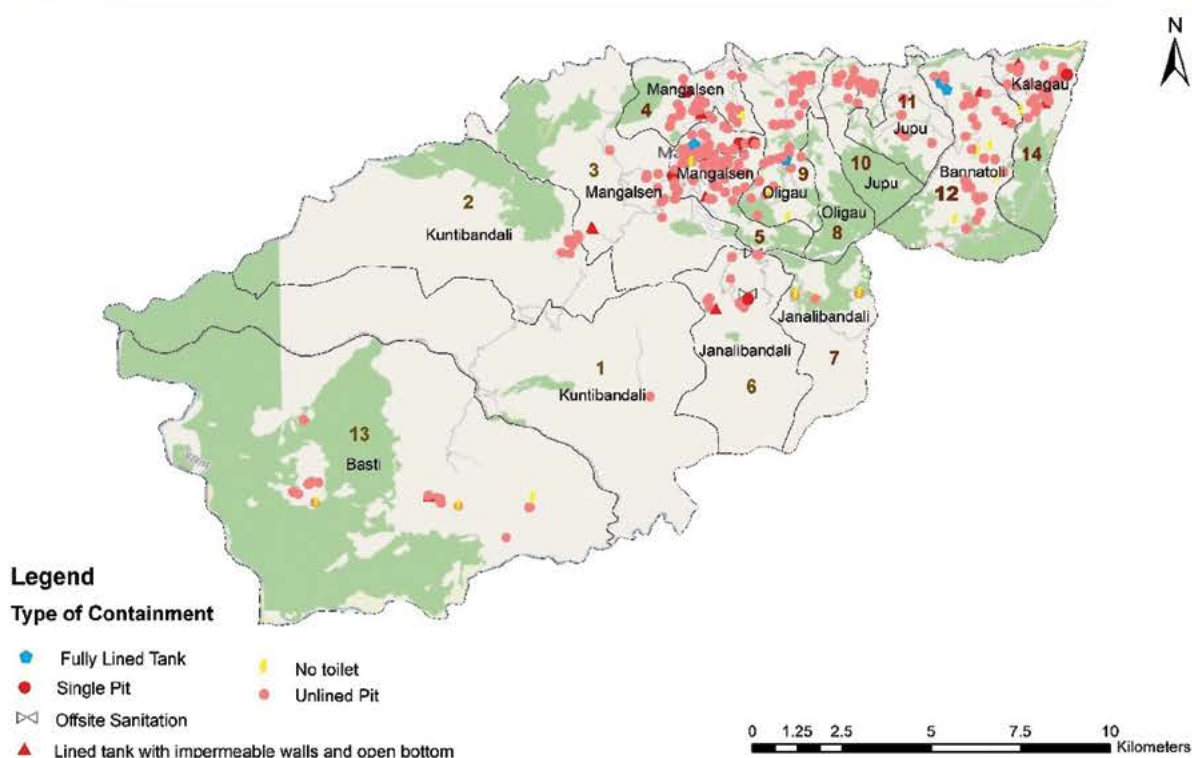
Wards : 14

Source: Census 2021

CITY PROFILE

Mangalsen municipality, is the headquarter of Achham District in the Far-western Province of Nepal.

Types of sanitation technologies at household level in Mangalsen Municipality





संकलन
(User Interface)



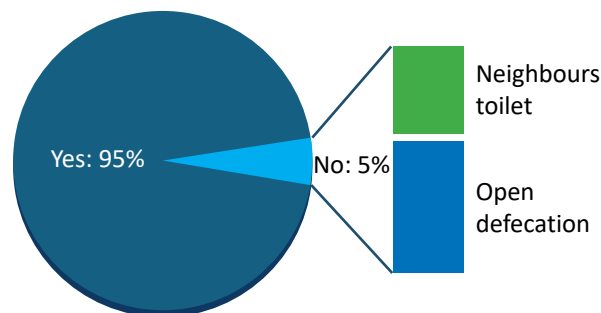
भण्डारण
(Containment)



रिचार्जने र ढुवानी
(Emptying & Transportation)

USER INTERFACE FACILITY

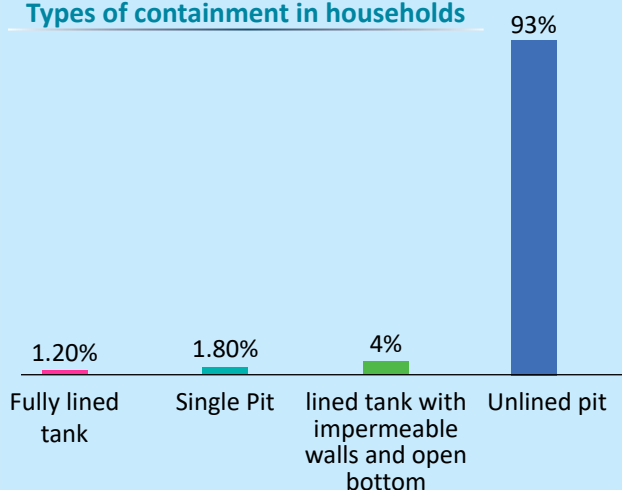
In Mangalsen municipality, 95% of households have proper sanitation, but 5% use neighbors' toilets or open spaces. There's no sewer system, but 0.67% discharge effluents into open drains.



CONTAINMENT

In the municipality, only 1.20% have safe fully lined tanks, while 93% use unsafe unlined pits. Unsafe containments may contaminate groundwater.

Types of containment in households



EMPTYING AND TRANSPORTATION

Within the municipality, merely 41.2% of households have experienced at least one emptying operation since installation. In rural areas, it is common for households to cover, or seal filled containment units instead of opting for regular emptying. Unlined pits are typically left abandoned. Meanwhile, fully lined tanks undergo annual emptying, lined tanks are emptied twice a year, and lined pits are emptied every seven months. The frequency of emptying varies depending on factors such as the construction year, size, and type of the containment structure.

| Onsite sanitation systems | Average Emptying Frequency |
|---|----------------------------|
| Fully lined tank | Once a year |
| Lined tank with impermeable walls and open bottom | Twice a year |
| Lined pit with semi-permeable walls and open bottom | Once in every seven months |



There is no any desludging services provided the municipality currently does not offer any desludging services, and sporadic assistance from neighboring municipalities is occasionally noted.



The predominant method of emptying involves manual labor, with a noteworthy portion being self-emptying. This is attributed to a perceived decline in the utilization of traditional labor over the past decade, influenced by social stigma and a lack of available mechanical desludging services.



प्रशोधन
(Treatment)

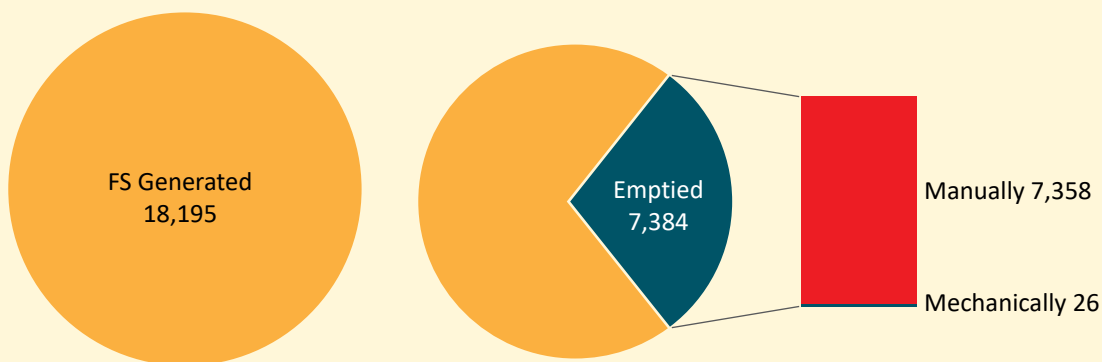
पुनः प्रयोग वा सुरक्षित विसर्जन
(Re-use or Safe Disposal)

ESTIMATION OF FAECAL SLUDGE

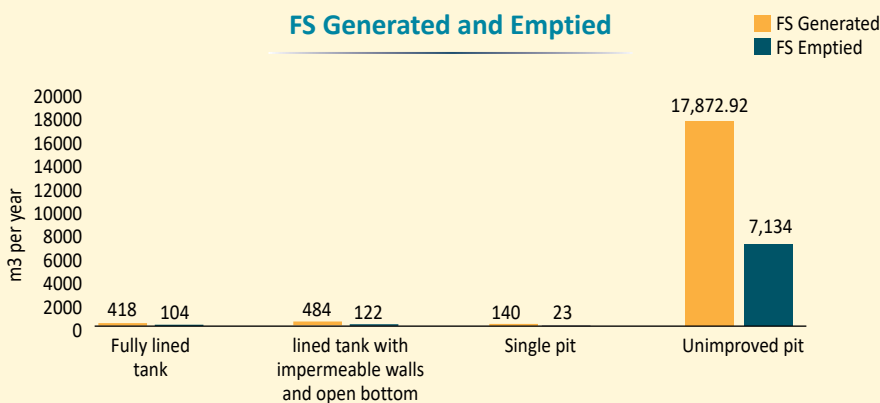
Total estimated actual volume of FS generation in the city: 18,195 m³ per year or 49.84 m³ per day

Total volume of FS emptied in the city: 7,384 m³ per year or 20.23 m³ per day.

Summary on faecal sludge produced, emptied, and transported in Mangalsen Municipality (m³)



FS Generated and Emptied

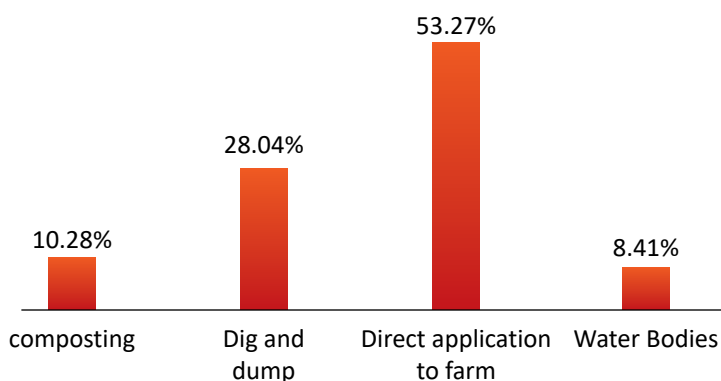


The findings showed that unlined pit has produced more faecal sludge in compare to other containment, probable reason could be infiltration of surface runoff and wide use of unlined pit in the municipality.

TREATMENT AND DISPOSAL OR REUSE

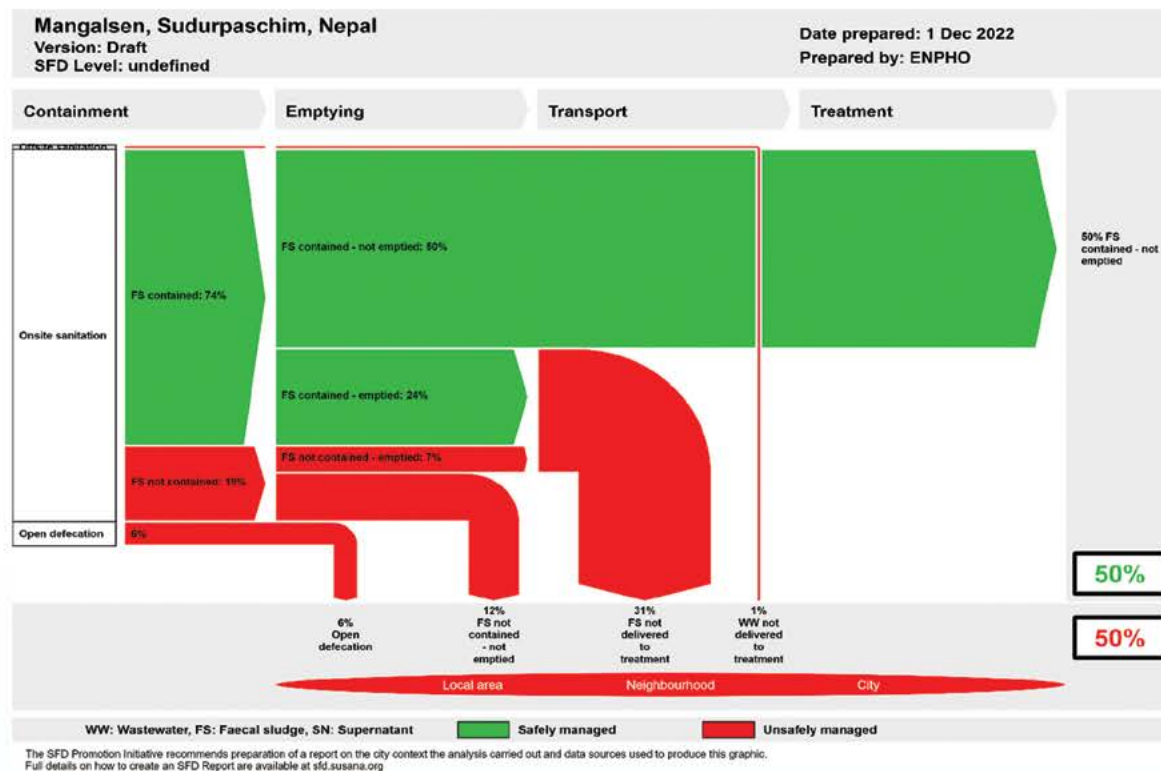
Mangalsen lacks a treatment plant for faecal sludge. Manual emptying is common, with 53.27% applied in farmlands, 8.41% dumped into water bodies, 28.04% using dig and dump, and 10.28% practicing composting. Some households illicitly connect toilets to open drainage systems.

Disposal after Manual Emptying



SHIT FLOW DIAGRAM (SFD)

The Shit Flow Diagram (SFD) shows a balanced distribution: 50% in red for unsafe faecal sludge practices, and 50% in green for safe management. However, the safety of unemptied sludge depends on proper transportation and treatment after emptying.



RECOMMENDATION

- Implement containment improvements by upgrading particularly the existing unlined pits to proper septic tanks, Biogas digester, Twin pits and dry Ecosan according to the feasibility in the local context. Conduct detailed study for decentralized treatment in Mangalsen Bazar.
- Formulate and enforce sanitation policies for safe management.

DHANGADHI SUB-METROPOLITAN CITY

Municipal Sanitation Synopsis, Study Year - 2022

DEMOGRAPHICS



Area : 271.74 km²



POPULATION : 198,792

Male : 98,184

Female : 100,608



Household : 44,779



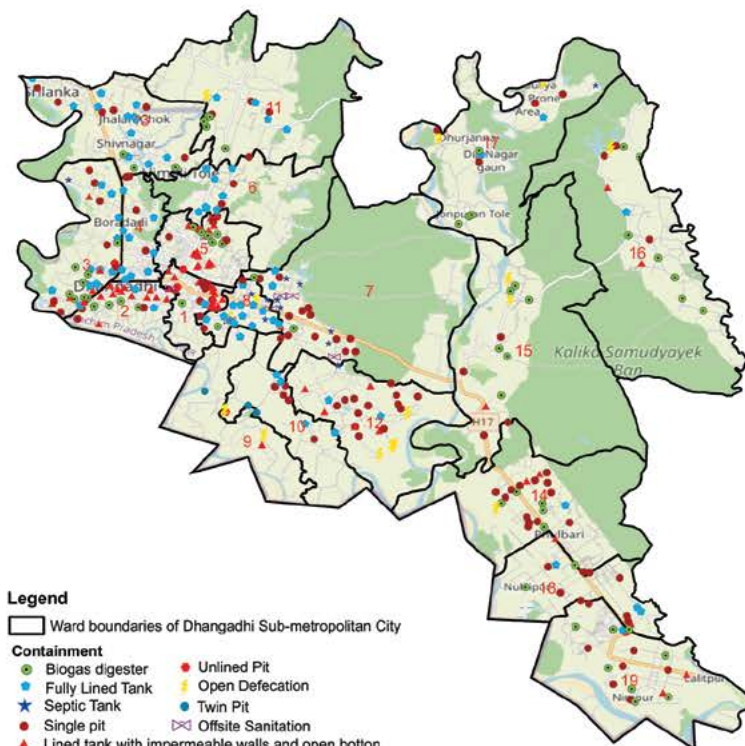
Wards : 14

Source: Census 2021

CITY PROFILE

Dhangadhi Sub-Metropolitan City, situated in the southern belt of western Nepal, encompasses 19 wards. The city serves as a vibrant hub in the region, with each ward contributing to its cultural and demographic diversity. Known for its strategic location, Dhangadhi plays a significant role in the socio-economic landscape of western Nepal, providing a dynamic urban environment while maintaining a connection to the rich cultural heritage of the region.

Types of Sanitation Technologies at Household Level in Dhangadhi Sub-metropolitan City





संकलन
(User Interface)



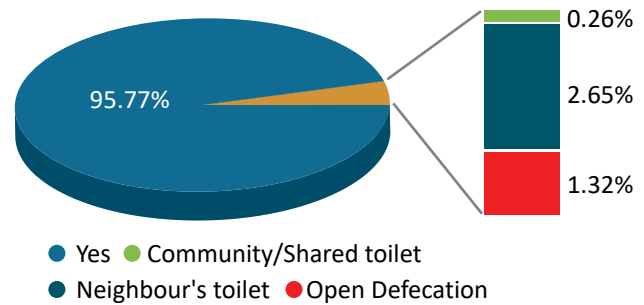
अण्डारण
(Containment)



रिचार्जने र ढुवानी
(Emptying & Transportation)

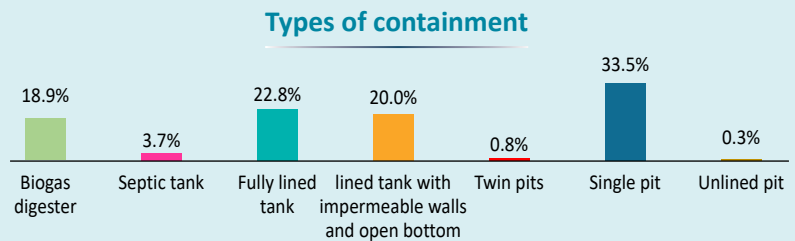
USER INTERFACE FACILITY

Within Dhangadhi Sub-Metropolitan City, 96% of households have access to improved sanitation facilities. The remaining 3% rely on communal toilets, and 1% practice open defecation. Notably, even without a sewer network, 2% of households resort to unauthorized direct discharge of toilet effluents into stormwater drainage



CONTAINMENT

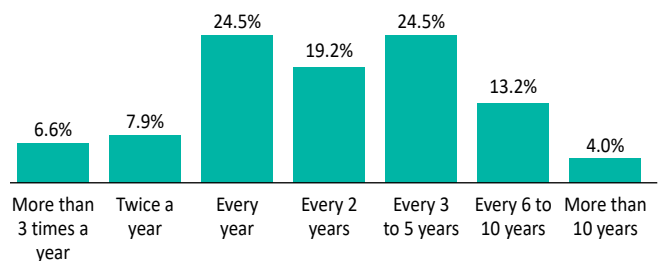
In the city, a mere 3.7% of households possess proper septic tanks. Notably, the majority use single pits, biogas digesters, and holding tanks. Among these, biogas digesters stand out as the only safe containment method. Holding tanks and single pits, sharing similarities, permit leachate percolation, posing a potential risk of groundwater contamination. It's noteworthy that a considerable number of households opt for biogas digesters, designed for managing organic waste and producing alternative energy.



EMPTYING AND TRANSPORTATION

The survey shows that 48% of households in the city practice on-demand emptying, frequently households deviate from the designed containment intervals often points to challenges within the suitability of the containment structure Top of Form and potential water inflow. Manual scavenging persists, particularly in emptying single pits, while septic and holding tanks are mechanically desludged. A concerning 58% of households engage in manual emptying, highlighting safety negligence during emptying services. This practice contrasts with global prohibitions on manual emptying.

Emptying Frequency



58% of households still practice manual desludging. Traditional sanitation workers are involved in the service and safety measures are rarely used during the process.

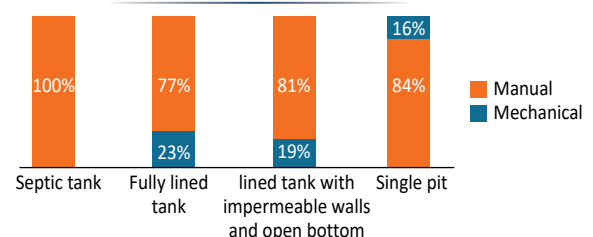


42% of the households practiced mechanical desludging services. Generally, rectangular containments are being emptied which also indicates that service is focused on urban areas of the sub-metropolitan city.

| Service Provider | Private |
|-----------------------------------|---------|
| No. of service provider | 6 |
| No. of Vehicles | 12 |
| No. of trips per week per vehicle | 15 |
| Average Charge per trip (NRs.) | 4000 |

Dhangadhi Sub-Metropolitan City has six private emptying service providers, operating twelve vehicles mounted on tractors or trucks. Notably, there is no emptying service provided by the city office. The service providers report a faecal sludge production of 15 trips per week, roughly 7 cubic meters per day.

Emptying Mechanism





प्रशोधन
(Treatment)

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

ESTIMATION OF FAECAL SLUDGE

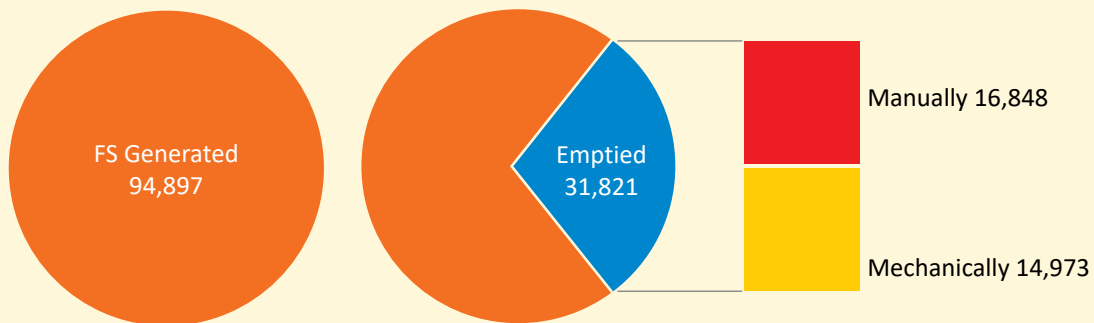
Total estimated actual volume of FS generation in the city: 94,897 m³ per year which is 259.99 m³ per day

Total volume of FS emptied in the city: 31,821 m³ per year which is 87.17 m³ per day.

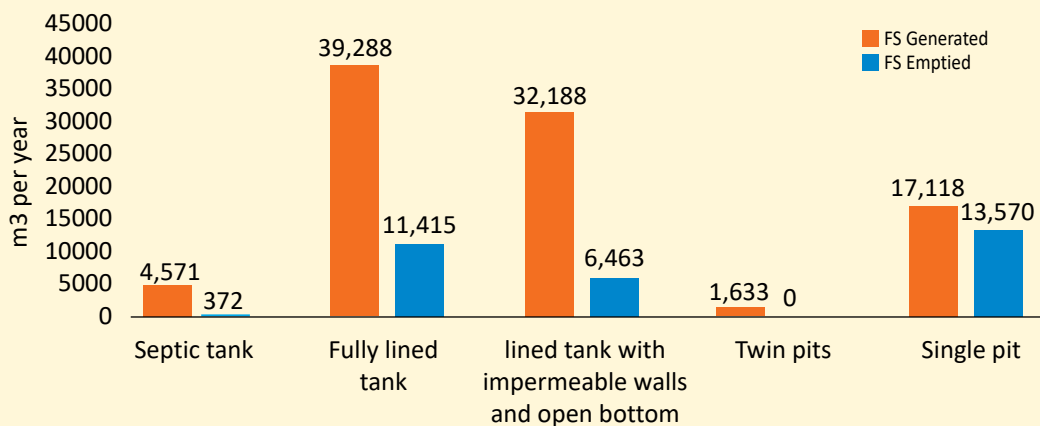
Total volume of FS emptied in the city by mechanical desludging: 41.02 m³ per day.

Total volume of FS emptied in the city by manual desludging: 46.15 m³ per day.

Summary on faecal sludge produced, emptied, and transported in Dhangadhi Sub-Metropolitan City (m³)



FS Generated and Emptied



TREATMENT

There is proposed treatment plant of 28 m³ per day

SAFE DISPOSAL OR REUSE

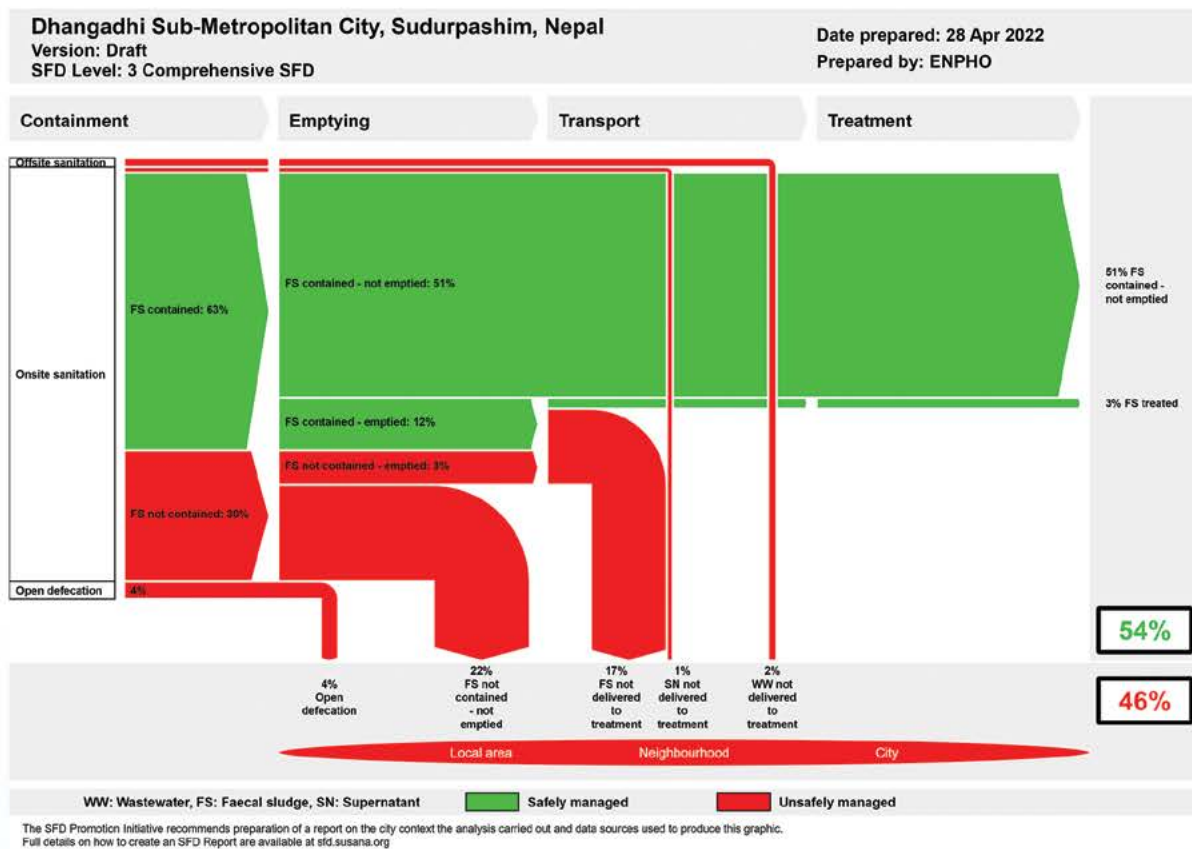
Currently, Dhangadhi lacks an FS treatment plant, and private service providers use trenching technology. The Regional Urban Development Project (RUDP) is underway, led by DUDBC, constructing a phased FS treatment plant with a total capacity of 112 m³.



Faecal Sludge being dumped in a trench by private desludger at Dhangadhi Sub-Metropolitan City.

SHIT FLOW DIAGRAM (SFD)

The graph shows 54% of safely managed faecal sludge, including unemptied FS assumed to be safely contained and biogas digester utilization.



RECOMMENDATIONS:

- Upgrade containment systems (lined tank, single pit) to septic tanks and promote biogas digesters.
- Formalize and regulate private desludging services for proper faecal sludge disposal.
- Establish an appropriate capacity faecal sludge treatment plant with reuse options.
- Formulate and enforce sanitation policies and standards for safer management.

ABOUT THE PROJECT:

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

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)

Funded By : Bill & Melinda Gates Foundation (BMGF)

Program Duration : November 2021 – June 2024

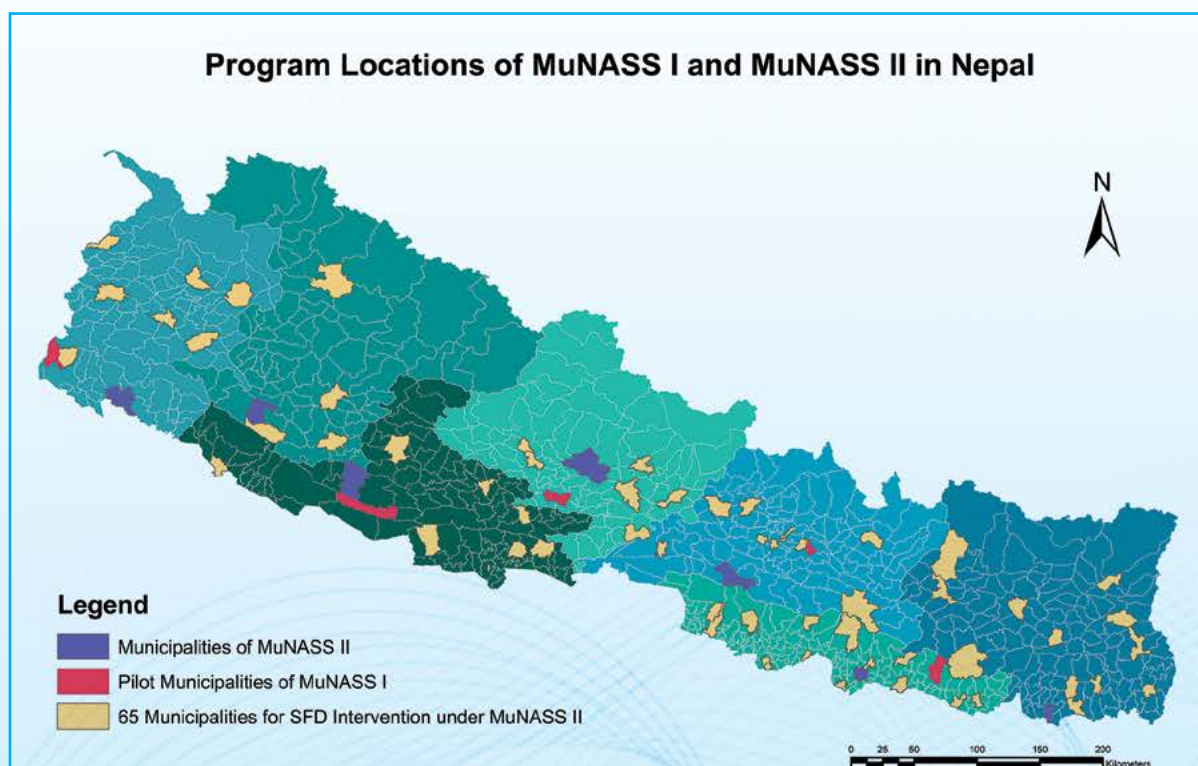
In 2017, phase I of “MuNASS program” was implemented to support the roll-out of the Institutional and Regulatory Framework (IRF) for Faecal Sludge Management in Nepal. After implementation of Phase I of the MuNASS program, a need to scale up the program was recognized. In this prospective Phase II of 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 operation of FSTP and to enhance capacity of elected officials regarding the need for FSM.

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.





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