SFD Report

Beni Municipality
Nepal

Final Report

This SFD Report - SFD level 2 - was prepared by
Environment and Public Health Organization (ENPHO)

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SFD Report Beni Municipality, Nepal, 2025

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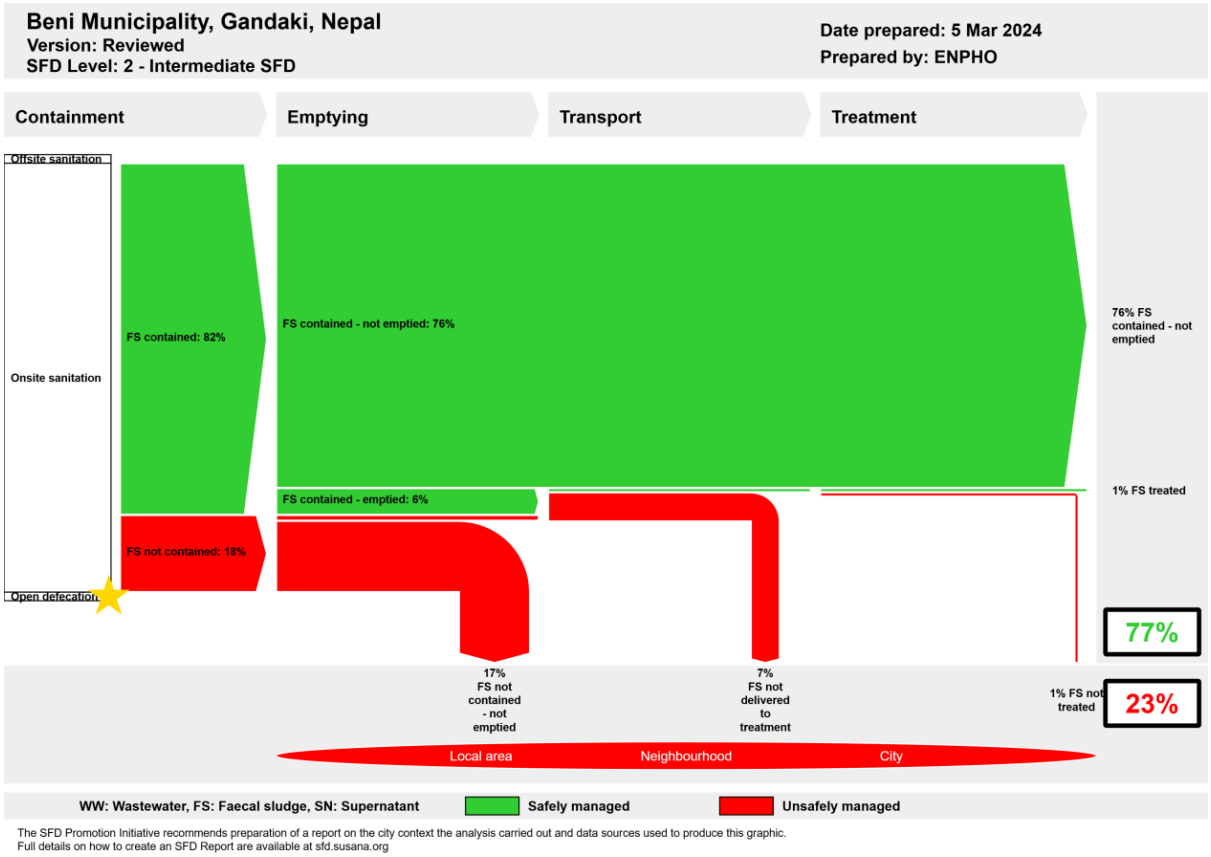
1. The SFD Graphic



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

2. Diagram information

SFD Level:

This SFD is a level 2 - Intermediate report.

Produced by:

Environment and Public Health Organization (ENPHO).

Collaborating partners:

Beni Municipality

Municipal Association of Nepal (MuAN)

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

Status:

Final SFD Report.

Date of Production:

05/03/2024

3. General city information

Beni Municipality, situated in the heart of Myagdi district within the Gandaki province of Nepal. Its name, derived from the convergence of the Kaligandaki and Myagdi rivers, symbolizes the name Beni. It was established on May 8, 2014, and operational since May 23, 2014. Beni Municipality was formed by merging several Village Development Committees (VDCs) that spreads 76.25 km^2 across 10 political wards. The municipality serve as a gateway to the Annapurna and Dhaulagiri Mountain ranges, attracting trekkers and adventurers.

According to the 2021 National Population and Housing Census, the population stood at 32,697 individuals residing in 9,336 households, with a negative annual growth rate. Variations in temperature are observed within the municipality, ranging from mild to cooler

climates. Geographically, the altitudes range from 899 metres to 2,300 metres above sea level, with coordinates of 28°22'30" latitude and 83°34'00" longitude.

4. Service outcomes

All sampled households have access to improved sanitation facilities relying on onsite sanitation system (ENPHO, 2023).

Containment:

A variety of sanitation technologies prevail: 4% of households utilize fully lined tanks, 1% utilize biogas digesters, 50% lined tanks with impermeable walls and open bottoms, and 45% had installed unlined pits. Institutional buildings show similar trends, with 23% utilizing fully lined tanks, 65% using lined tanks with impermeable walls and open bottoms, and 12% relying on unlined pits (ENPHO, 2023).

Emptying and transportation:

Among sampled households, only 8.88% have emptied their containments due to faecal sludge overflow. There are no any desludging services within municipality. 22.58% of containment has been emptied mechanically by desludging vehicles from the neighboring municipality, Baglung. The majority, comprising 64.52% of emptied containments rely on manual emptying done by traditional sanitation workers, while approximately 12.90% opt for open emptying practices during rainy seasons. Alarmingly, a significant proportion of households, particularly in wards 1 and 2, directly dispose of faecal sludge into nearby rivers, highlighting a critical sanitation issue.

Notably, only 4% of institutions are mechanically desludged highlighting a critical gap in maintenance practices in both household and institutional sanitation technology.

Treatment and Disposal:

The absence of treatment plants and mechanical desludging services in the municipality compels residents to resort to manual and open emptying practices for faecal sludge disposal. Mechanically desludged faecal sludge is applied in specific land areas or ends up contaminating forests and water bodies. Those practicing open emptying, particularly during rainy seasons, directly pollute water bodies with faecal sludge. Meanwhile, individuals engaged in manual emptying dig and dump faecal sludge or direct use in farmland, escalating environmental and public health risks within the community.

Risk Assessment:

Most of the households, around 70.82% had their own taps at home, while 12.18% used public taps, and 17% dependent on spring source for drinking water. The Beni Water Sanitation Users Committee provides piped water to about 1,120 homes, mainly in wards 2, 7, and 8. Other small committees also provide water to households in different wards. The water quality reports from various sources in Beni Municipality was checked to analyze the risk. The risk analysis was made in reference to the water quality test report provided.

The SFD graphic shows that 77% of the excreta generated are safely managed while 23% are unsafely managed. The safely managed Faecal Sludge (FS) generated by 76% of the population is temporary as this FS is only contained. So, once the containment gets filled and the FS from the containment is emptied, the percentage of unsafely managed FS would increase.

5. Service delivery context

Access to safe drinking water and sanitation has been defined as fundamental rights to every citizen by the constitution of Nepal. To respect, protect and implement the rights of citizen embedded in the constitution, the Government of Nepal (GoN) has endorsed the Water Supply and Sanitation Act 2022 which has emphasized on a right to quality sanitation services and prohibited direct discharge of wastewater and sewage into water bodies or public places.

Several policies have been in place to accomplish the sanitation need of people. Particularly, the National Sanitation and Hygiene Master Plan (NSHMP) 2011 has proved as an important strategic document for all stakeholders to develop uniform programs and implementation mechanism at all levels. It strengthens institutional set up with the formation of water and sanitation coordination committee at every tier of government to actively engage in sanitation campaigns. Currently, the municipality has no separate sanitation unit and no specific laws and policies towards the faecal sludge management.

6. Overview of stakeholders

Based on the regulatory framework for Faecal Sludge Management (FSM), the major stakeholders for effective and sustaining service delivery as presented in Table 1.

Table 1. Overview of Stakeholders.

Key Stakeholders	Institutions / Organizations
Public Institutions at Federal Government	Ministry of Water Supply
Public Institutions at Provincial Government	Ministry of Energy, Water resources and Water Supply
Public Institutions at Local Government	Beni Municipality, Beni WSUC
Non-governmental Organizations	Environment and Public Health Organization (ENPHO)
Private Sector	Public toilet operators.
Development Partners, Donors	MuAN, BMGF, UCLG ASPAC

7. Credibility of data

The major data were collected from proportionate stratification random sampling. Altogether, 353 households and 49 institutions were surveyed from 10 wards of the municipality. Primary data on emptying, transportation, and current sanitation practices in the municipality are validated from Key Informant Interviews (KIIs) with water service providers, public toilet caretaker and other different sanitation and environmental stakeholder. The overall data and findings were shared with the stakeholders of the municipality and validated through a sharing program on 14th March, 2024.

8. Process of SFD development

Data on sanitation situation is collected through household and institutional surveys (ENPHO, 2023). Enumerators from the municipality were mobilized after providing orientation on sanitation technologies, objectives of the survey and proper use of mobile application, KOBOCOLLECT for collection of data for survey. Along with this, KIIs were conducted with officers of municipality to understand the situation practices across the service chain. Types of sanitation technologies used in different locations were mapped using ARCGIS. To produce the SFD graphic, initially a relationship between sanitation technology used in questionnaire survey and SFD PI methodology was made. Then, data were fed into SFD graphic generator to produce the SFD graphic.

9. List of data sources

The list of data sources to produce this executive summary is as follows:

- ENPHO. (2023). Sanitation Survey on Beni Municipality, Beni.
- MICS. (2020). Multiple Indicator Cluster Survey, 2019. Kathmandu, Nepal: Central Bureau of Statistics.
- Beni Municipality. (2019). Municipal Profile of Beni Municipality.
- NSO. (2022). National population and housing census 2021. Kathmandu: National Statisitics Office.

SFD Beni Municipality, Nepal, 2025

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Abbreviations

AEPC	Alternative Energy Promotion Centre
BMGF	Bill and Melinda Gates Foundation
DWSSM	Department of Water Supply and Sewerage Management
ENPHO	Environment and Public Health Organization
FS	Faecal Sludge
FSM	Faecal Sludge Management
GoN	Government of Nepal
HH	Household
IRF	Institutional and Regulatory Framework
KII	Key Informant Interview
KM	Kilometres
MDG	Millennium Development Goal
MICS	Multiple Indicator Cluster Survey
MoUD	Ministry of Urban Development
MuNASS-II	Municipalities Advocacy on Sanitation in South Asia – II
MoH	Ministry of Health
MoHP	Ministry of Health and Population
MoUD	Ministry of Urban Development
MoWS	Ministry of Water Supply
MuAN	Municipal Association of Nepal
NGO	Non-Governmental Organization
NPC	National Planning Commission
NWSSP	National Water Supply and Sanitation Policy
ODF	Open Defecation Free
PPP	Public Private Partnership
RWSSNP	Rural Water Supply and Sanitation National Policy
SDP	Sector Development Plan
SFD	Shit Flow Diagram
SFD PI	Shit Flow Diagram Promotion Initiative
SN	Supernatant
UCLG ASPAC	United Cities and Local Governments Asia Pacific
UNICEF	United Nations Children's Education Fund
VDC	Village Development Committee
WASH	Water, Sanitation and Hygiene
WHO	World Health Organization
WSUC	Water Supply and User's Committee
WW	Wastewater

1 City context

Beni Municipality is situated in the headquarter of Myagdi district, Gandaki province, nestled within the foothills of the Dhaulagiri Mountain. The name Beni signifies the meeting point of two rivers: Kaligandaki and Myagdi. The municipality was announced as Beni on 8 May, 2014 and started functioning from 23 May, 2014 by merging Arthunge, Ghatan, Ratnechour, Jyamrungkot, Pulachour, Bhakkimle, Patlekhet and Singa VDCs. Beni comprises 10 political wards spread across 76.25 square kilometres of geographical area. The municipality serves as a gateway to the Annapurna and Dhaulagiri Mountain ranges, making it a popular spot for trekkers and adventurers (Beni Municipality, 2023).

Figure 1 shows the map of the municipality with its ward boundaries.

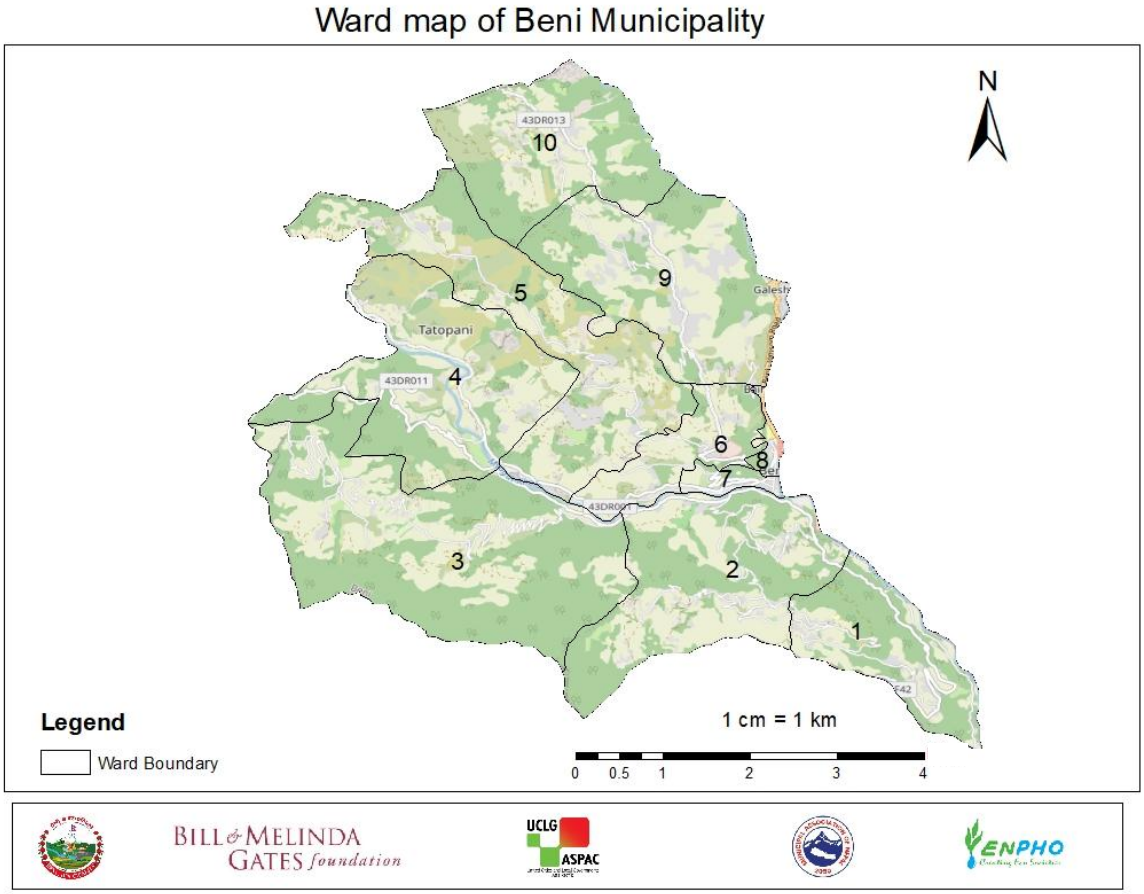

Figure 1: Map of Beni Municipality with ward boundaries.

1.1 Population

The municipality's population, according to the 2021 National Population and Housing Census was 32,697 individuals distributed across 9,336 households. The male and female populations were 15,361 and 17,336 respectively (NSO, 2021). The municipality has experienced a negative annual growth rate of -0.62% per annum, and a population density of 427.0/km² (City Population, Beni, 2021).

1.2 Climate

The temperatures in Beni Municipality vary based on elevation. In the lowlands and urban areas, temperatures can range from mild to warm throughout the year whereas in higher elevations surrounding the municipality, temperatures are generally cooler, especially in the winter months. Beni receives about 251.39 millimeters (9.9 inches) of precipitation and has 196.65 rainy days (53.88% of the time) annually. The yearly temperature is 16.01ºC (60.82ºF). The hottest month is June, with an average of 103°F (26.47°C), while the coldest month is January, with an average 0.82°C. Likewise, the wettest month is July and driest month is November (weathersandclimate, 2024).

1.3 Topography

Beni Municipality, situated in the western region of Nepal at an altitude of 899 metres to 2300 metres above sea level, has geographical coordinates of 28º 22'30'' latitude and 83º34'00'' longitude. To the east of the municipality lies Kaligandaki River, Mangala Rural Municipality to west, Raghuganga Rural Municipality to North and Baglung Municipality to its south part (Beni Municipality, 2023).

2 Service Outcomes

2.1 Overview

On September 30, 2019, the Government of Nepal declared the nation free of open defecation, marking universal access to improved sanitation facilities nationwide (MoWS, 2017). Meanwhile, Myagdi district achieved Open Defecation Free (ODF) status in 10/09/2012, initiating a new phase of sanitation management to address the challenges of treating faecal sludge collected from toilets (Beni Municipality, 2023).

Data on sanitation situation were collected through household and institutional surveys (ENPHO, 2023). To assess the sanitation status across the entire sanitation service chain, a household survey was conducted in 353 sampled households using a proportionate sampling across the 10 wards of Beni municipality (further details are presented in section 4). The results obtained after the triangulation and validation of the data with all the data sources including literature reviews, Key Informant Interviews (KIIs) and a validation workshop is presented in this section.

2.1.1 Sanitation Systems in household buildings

The National Population and Housing Census, 2021 indicated that 0.8% of the households of Beni lacks access to basic sanitation facilities (NSO, 2021). Meanwhile, findings from this survey revealed that all sampled households in the municipality had access to improved sanitation facilities. An improved sanitation facility is defined as one that hygienically separates human excreta from human contact. Improved sanitation facilities include flush or pour flush to piped sewer systems, septic tanks, or pit latrines, ventilated improved pit latrines, pit latrines with slabs and composting toilets (MICS, 2019).

In this municipality, all the households has access to improved sanitation facilities relying on onsite sanitation system. Any sanitation technology or system involving the collection and storage of excreta (referred to as faecal sludge) on the plot where it is generated is known as onsite sanitation (SuSanA, 2018). In the municipality, none of households have a well-designed septic tank. Instead, fully lined tanks with a single or double chamber were constructed in 4% of households, and 1% have built biogas. Additionally, 50% of households installed lined tanks with impermeable walls and an open bottom, while 45% built unlined pits. Table 1 illustrates the various types of onsite sanitation technologies used in the municipality and the corresponding proportion of households utilizing each.

Table 1: Sanitation system illustrating different onsite sanitation technologies installed at households in Beni Municipality (ENPHO, 2024).

Types of containment	Construction material used in the wall of the containment	Construction material used in the bottom of the containment	Number of Chambers	Number of containments	%	Recategorized as SFD	%
Biogas Digester	NA	NA	NA	NA	1%	Fully lined tank	5%
Fully Lined tank	Cemented brick/stone walls or concrete walls	PCC or plaster	One or two	NA	4%		
Lined tank with impermeable walls and open bottom	Cemented brick/stone walls or concrete walls	Soiling or nothing	One or two or more than two	NA	50%	Lined tank with impermeable walls and open bottom	50%
Unlined Pit	Mud mortar stone or brick wall	Soiling or nothing	NA	NA	45%	Unlined Pit	45%
						Total	**100%**

Biogas: A biogas digester, an effective energy conversion technology, treats household-generated faecal sludge through anaerobic digestion. This process reduces sludge size, eliminates harmful pathogens, and yields biogas and nutrient-rich slurry, biologically stable to use as a soil conditioner (Linda Strande, 2014). The Alternative Energy Promotion Centre (AEPC) has promoted biogas technology in 77 districts of Nepal, contributing to improved health and sanitation (AEPC, 2018). In the municipality, 1% of households had biogas digesters mainly found in ward 1 and ward 9 (Figure 2). When creating a SFD graphic, biogas is reclassified as SFD containment, considering it as a fully lined tank.

Fully Lined Tank: A fully lined tank is a rectangular tank with impermeable walls and a base, engineered to prevent leakage or seepage of faecal sludge into the surrounding environment. This design ensures the safe storage of faecal sludge, protecting against groundwater contamination (Linda Strande, 2014). In the municipality, 4% of households had fully lined tanks.

Lined Tank with Impermeable Walls and Open Bottom: This rectangular onsite technology involves constructing tanks with impermeable walls and a permeable base, allowing the infiltration of effluents that could potentially contaminate groundwater (Peal, et al., 2020). In the municipality, 50% of households installed this type of containment.

Unlined Pit: An unlined pit is a pit appropriately designed, constructed, and maintained, featuring permeable walls and a base for liquid infiltration. However, it poses a concern as the walls are made of materials like mud mortar stone/brick or dry stone, and the base with soiling or nothing, making it permeable resulting in the risk of groundwater contamination. 45% of the households in the municipality used unlined pits. This practice significantly increases the risk of contamination of ground water sources.

Figure 2 shows a map locating different types of conaiment in Beni Municipality.

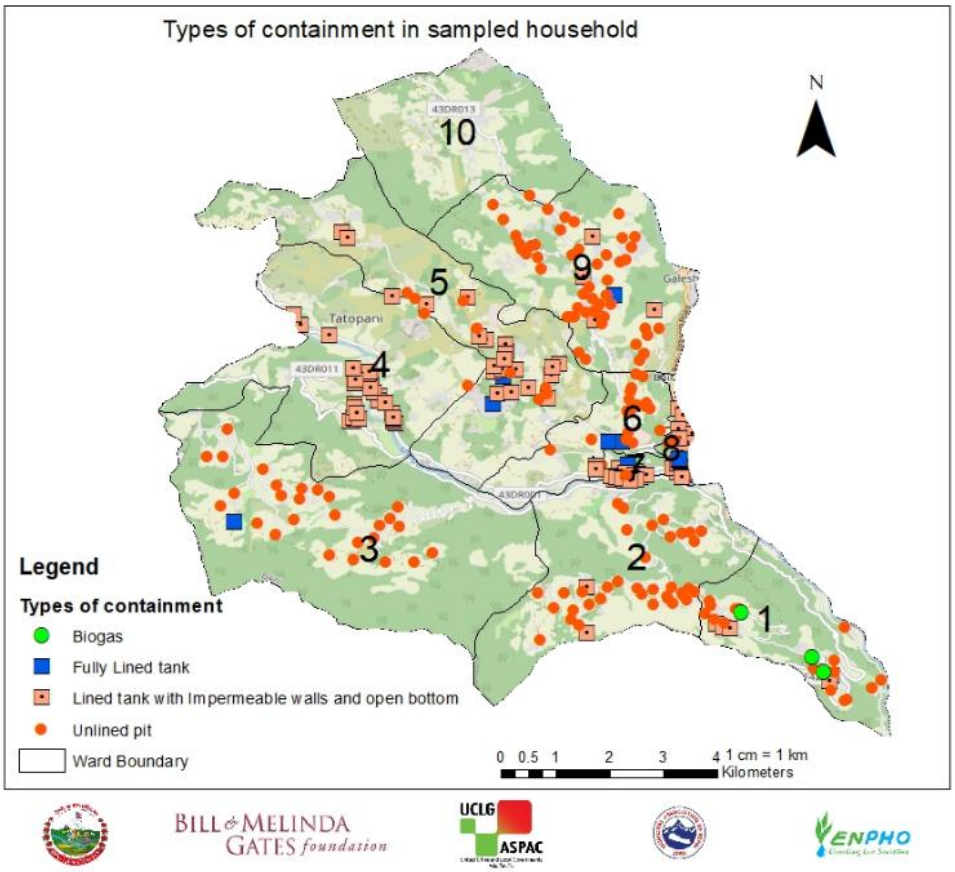

Figure 2: Map locating different types of containment in Beni Municipality.

2.1.2 Sanitation Systems in Institutional Buildings

All the surveyed 49 institutions had access to a safely managed sanitation system in the municipality. 8 educational institutes, 21 government and non-government offices, 8 health care centres and 12 hotels with lodging facilities were surveyed.

The findings showed that 23% institutional buildings had made fully lined tanks, 65% had lined tanks with impermeable walls and open bottom, and 12% had unlined pits. The proportion of different types of sanitation technologies are shown in Figure 3. Interestingly, only 4% of the institutions were emptied using mechanical desludging vehicles.

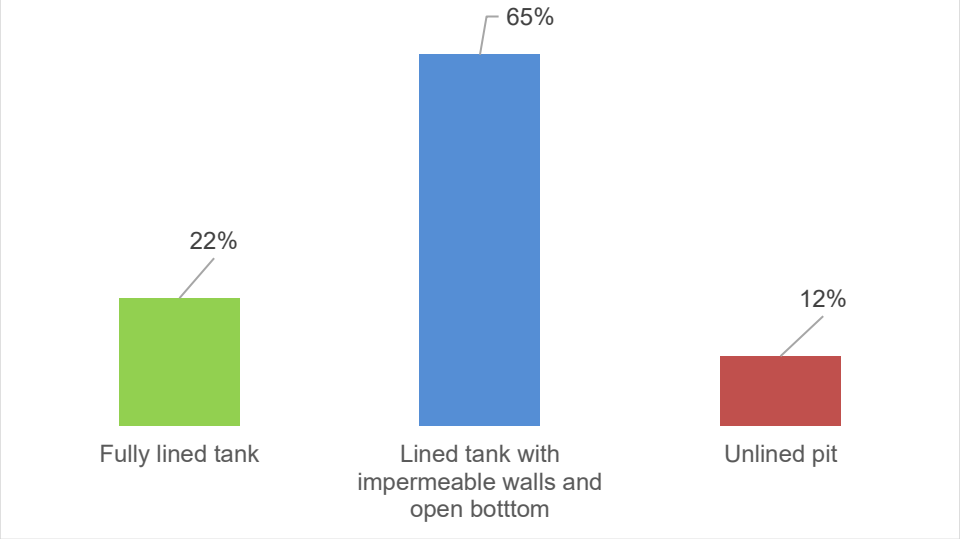

Figure 3: Containments used in institutional buildings.

2.1.3 Public Toilets

In total, there were 5 public toilets built in different areas, 2 near municipal office, 2 around buspark area, and 1 around temple premises.

Public toilet around municipal office

There are 2 public toilets around the municipal office, 1 newly renovated by Nepal red cross Society and 1 near the river premises which is not functioning properly and had low maintenance. Figure 4 shows the pictures of the public toilet near the municipal office.

Figure 4: Public toilets near the municipal office.

Public toilet in buspark area

There are two public toilets near the bus park area. One was recently constructed under the initiative of the transportation committee, while the other was built by the municipality. Each toilet facility includes separate sections for males, females, and individuals with disabilities. Caretakers have been assigned to oversee these facilities, collecting a minimal charge for service use, and to ensure the maintenance and cleanliness of the toilets. The sanitary conditions of the toilets were well-kept and maintained. Interviews were conducted with Mr. Bamber Pun and Harka Sanjel, the caretakers of the public toilets (Figure 5).

The water for the toilets is supplied from an overhead tank. These toilets are connected to a septic tank located outside the building. In terms of finances, a fee of $0.03 (Rs. 5) is charged for urination and $0.07 (Rs. 10) for defecation. However, there are no proper accounting records maintained for the fees collected daily. The collected amount is utilized for purchasing sanitary products (KII-6, 2023).

Figure 5: Public toilet near buspark area.

Public toilet near temple premises

There is a public toilet constructed near Galeswor Temple in Ward 9. The toilet was built by Galeswor Shivalaya Development Trust in coordination with the District Coordination Committee, with a budget of 573,284. An elderly lady takes care of the cleanliness of the toilets and also collects the fees for using the facilities. Separate compartments were available for males and females with toilet connected to rectangular holding tank. Not all the compartments of toilet are in use as some toilets were being used for personal item storage, and only a limited number of toilets were open for public use (Figure 6).

Figure 6: Public toilet near temple premises.

2.1.4 Emptying and Transportation Services

Emptying of containment

Emptying is one of the major components of the sanitation service chain. Regular emptying of the containment prevents sludge overflow and blockages (Strande, 2014). Of the total sampled households with containment, only 8.88% have emptied their containment (excluding biogas containment) due to faecal sludge overflow.

Currently, there are no desludging services available, neither private nor municipal. About 22.58% of the emptied containment was mechanically emptied, desludging vehicles from the neighboring municipality-Baglung provides on-demand services in Beni Municipality. The remaining 64.52% of containments were manually emptied using traditional sanitation workers. Approximately 12.90% of households opt for open emptying practices during the rainy season. Concerningly, it was observed that a significant portion of households, particularly those in ward 1 and ward 2, dispose of their faecal sludge directly into the Kaligandaki River and Myagdi River. This highlights the urgent need for improved sanitation services in the area (Figure 7).

The contributing factors for manual emptying was absence of mechanical desludging services, high cost associated with emptying containment through desludging vehicles from neighboring vehicle, and direct use of faecal sludge as fertilizer and compost in farmland (KII-1, 2023).

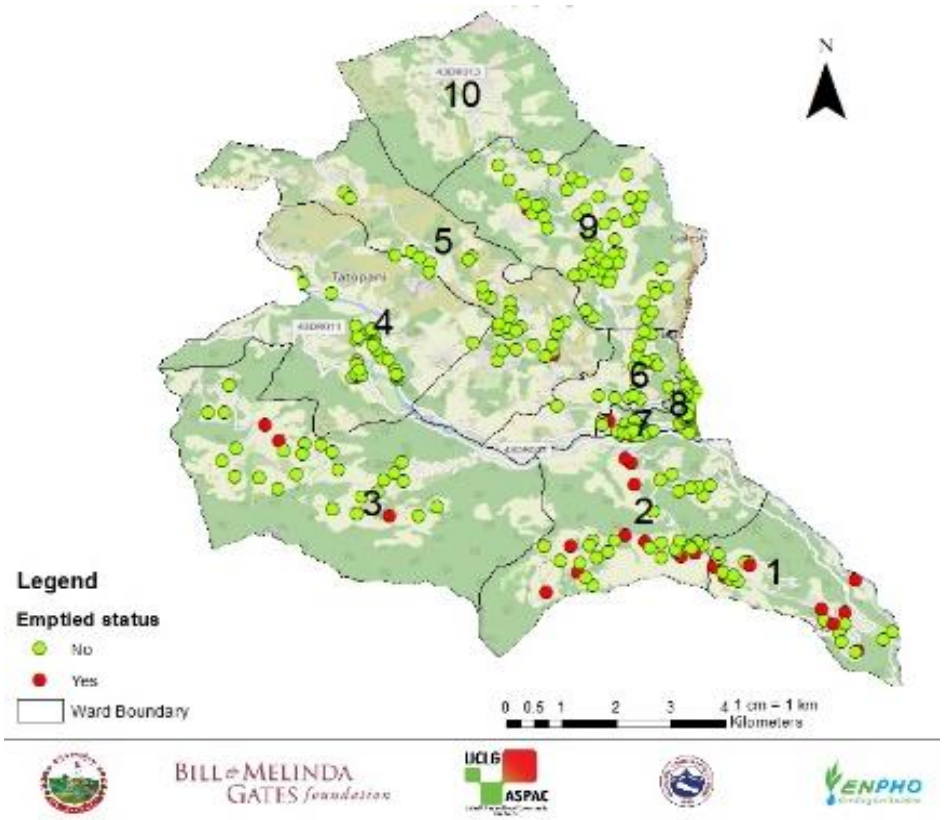

Figure 7: Status of containment emptying in households.

2.1.5 Treatment and Disposal/Reuse of Faecal Sludge

In the municipality, there is no treatment plant. Mechanically desludged faecal sludge is disposed of in separate allocated land or, in forests and water bodies (KII-3, 2023). Those who opt for open emptying during the rainy season directly dispose of faecal sludge into water bodies. Meanwhile, individuals who practiced manual emptying apply faecal sludge directly to farms, using it as compost. Moreover, due to the availability of ample space, many individuals adopt the practice of digging new pits and abandoning the old ones. This perpetuates the cycle of unsafe faecal sludge disposal and exacerbates environmental and public health risks.

2.1.6 Risk assessment of drinking water source contamination from open bottom containment

The risk of contamination was assessed based on the source of drinking water, secondary data on water quality and lateral spacing between sanitation technologies and water sources.

a. Sources of Drinking Water

As per the findings of this survey, 70.82% had private taps in their home and 12.18% relied on public taps. Likewise, 17% depended on spring source for drinking purposes. Key informant interviews (KII-2, 2023) findings indicated that Beni Water Sanitation Users Committee provide piped drinking water supply in 1,120 households mainly in ward 2, 7 and 8. There are different small WSUC that distribute water to small number of households. In ward 1 and ward 2

Jyamrukot WSUC distributes water. There are different WSUC as Adherikhola WSUC, Singa tatopani WSUC, Surkimela WSUC, Tatopani WSUC serving in ward 4, and Nildaha WSUC in ward 9 (KII-2, 2023).

For considering the contamination risk of water source and containment, different water quality test reports from sources of water within Beni Municipality was observed and analyzed. In accordance with the World Health Organization's (WHO) guidelines for drinking water quality, the presence of *E. coli* serves as an indicator of potential faecal contamination. As per the National Drinking Water Quality Standard of 2022, drinking water should be free of *E. coli*, indicated by a count of 0 colony-forming units (CFU) per 100 millilitres of water (World Health Organization WHO, 2024). Consequently, the water quality test reports from various WSUCs were analyzed (present in appendix 5), revealing *E. coli* contamination in some household taps. Thus, a thorough analysis of the risk posed by water distributed by WSUCs, particularly in terms of open-bottom containment, was analyzed. Furthermore, the proximity between spring sources and open-bottom containment is a critical factor in assessing contamination risk. Spring sources located above residential areas are deemed to pose a lower risk of contaminating drinking water compared to those situated below residential areas.

Therefore, in relation to the risk of groundwater contamination, it was estimated that 50% of the population relying on lined tanks were distributed as follows: 43% using system T1A4C10 (low risk) and 7% using system T2A4C10 (high risk). Similarly, an estimated 45% of the population relying on unlined pits were distributed as 34% using system T1A6C10 (low risk) and 11% using system T2A6C10 (high risk).

2.2 SFD Selection Grid

The SFD grid consists of different containment technologies used in list A and its connection in list B. Sanitation technologies selected in the SFD grid in Beni Municipality are shown in Figure 8. The vertical column on the left side of the SFD selection grid has a list of technologies to which the toilet is connected to, and households without toilet resorting to open defecation. Similarly, horizontal row at the top of the selection grid shows options for connection made for the outlet or overflow of discharge from the toilet.

As per the containment definition by Shit Flow Diagram Promotion Initiative (SFD PI), various containments are kept into different SFD categories. For example, biogas is reclassified as a fully lined tank, given that the walls and bottom of the biogas structure are water-sealed and share similar features with a fully lined tank. However, fully lined tanks, lined tanks with impermeable walls and open bottom and unlined pits do not require reclassification and remain unchanged. After the reclassification of these containments, the types of sanitation technologies and their connections are chosen in the SFD selection grid, as illustrated in Figure 8.

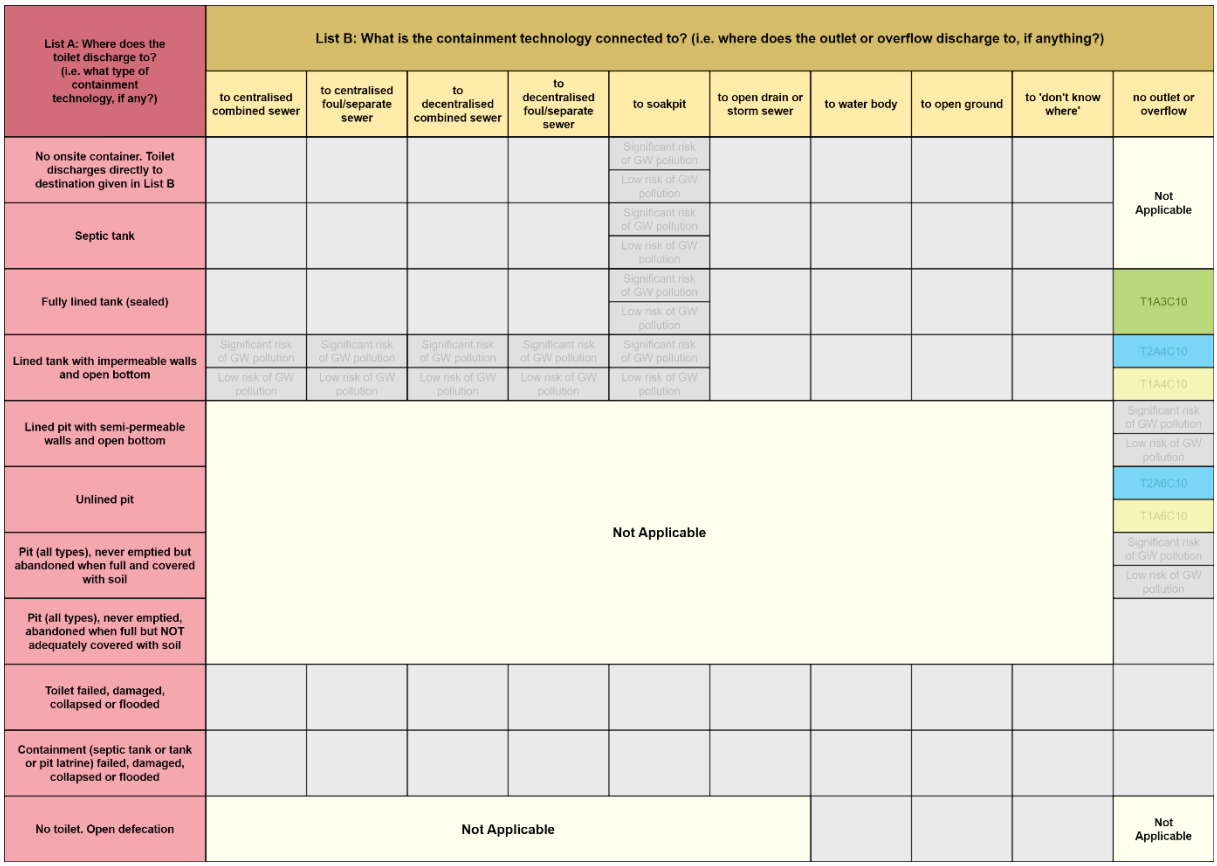

Figure 8: SFD selection grid for Beni Municipality.

A brief explanation of terms used to indicate different frames selected in the SFD selection grid is explained in Table 2.

Table 2: Explanation of terms used to indicate frame selected in the SFD selection grid.

T1A3C10	A correctly designed, properly constructed, and well maintained fully lined tank with impermeable walls and base. Since the tank is not fitted with a supernatant/effluent overflow this system is considered contained.
T1A4C10	A correctly designed, properly constructed and well-maintained lined tank with sealed, impermeable walls and an open, permeable base, through which infiltration can occur. However, since the tank is not fitted with a supernatant/effluent overflow this system is considered contained.
T2A4C10	A correctly designed, properly constructed and well-maintained lined tank with sealed, impermeable walls and an open, permeable base, through which infiltration can occur - the excreta is therefore likely to be partially treated. The tank is not fitted with a supernatant/effluent overflow but since there is a 'significant risk' of groundwater pollution this system is considered not contained.
T1A6C10	This is a correctly designed, properly constructed and well-maintained unlined pit with permeable walls and base, through which infiltration can occur. The tank is NOT fitted with a supernatant/effluent overflow, so this system is considered contained.
T2A6C10	This is a correctly designed, properly constructed and well-maintained unlined pit with permeable walls and base, through which infiltration can occur. The tank is NOT fitted with a supernatant/effluent overflow but since there is a 'significant risk' of groundwater pollution this system is considered NOT contained.

2.3 SFD matrix

2.3.1 Proportion of faecal sludge from types of sanitation technologies

In the second step of developing an SFD graphic, the proportion of faecal sludge (FS) in each type of sanitation technology is calculated. Following detailed instructions in SFD PI, a default "100%" value is applied when onsite containers are connected to soak pits, water bodies, or open ground, representing the entire contents as faecal sludge, with a portion being periodically emptied.

For onsite containers connected to a sewer network or open drains, a "50%" value is used, indicating that half the contents are modelled as faecal sludge, with periodic emptying. The remaining fraction contains faecal sludge in the container and infiltrates (for open-bottomed tanks), while the other half is modelled as supernatant discharging into the sewer network or open drains. The formula for calculating FS proportion is provided below:

$$\frac{(Onsite\ container\ connected\ to\ soak\ pit, no\ outlet, water\ bodies\ or\ open\ ground) * 100 + (Onsite\ container\ connected\ to\ sewer\ network\ or\ open\ drain) * 50}{Onsite\ Container}$$

The calculated FS proportion in each type of sanitation technologies are:

i. The proportion of FS in septic tanks is 0% as there are no containments used.
ii. The proportion of FS in fully lined tanks is calculated as 100% as there are no connections made to an open drain; the tank maintains a 100% FS proportion.
iii. The FS proportion from lined tanks with open bottoms and all types of pits is 100%, as there are no connections of lined tanks with impermeable walls and open bottoms to open drains.

After determining the proportion of FS in each type of sanitation technology, the corresponding population proportions from the selected technologies in the SFD selection grid are set. Figure 9 illustrates the SFD matrix of the municipality.

Beni Municipality, Gandaki, Nepal, 5 Mar 2024. SFD Level: 2 - Intermediate SFD
Population: 32697
Proportion of tanks: septic tanks: 0%, fully lined tanks: 100%, lined, open bottom tanks: 10(

Containment				
System type	Population	FS emptying	FS transport	FS treatment
	Pop	F3	F4	F5
System label and description	Proportion of population using this type of system (p)	Proportion of this type of system from which faecal sludge is emptied	Proportion of faecal sludge emptied, which is delivered to treatment plants	Proportion of faecal sludge delivered to treatment plants, which is treated
T1A3C10 Fully lined tank (sealed), no outlet or overflow	5.0	25.0	67.0	95.0
T1A4C10 Lined tank with impermeable walls and open bottom, no outlet or overflow	43.0	3.0	0.0	0.0
T1A6C10 Unlined pit, no outlet or overflow	34.0	11.0	0.0	0.0
T2A4C10 Lined tank with impermeable walls and open bottom, no outlet or overflow, where there is a 'significant risk' of groundwater pollution	7.0	10.0	0.0	0.0
T2A6C10 Unlined pit, no outlet or overflow, where there is a 'significant risk' of groundwater pollution	11.0	6.0	0.0	0.0

Figure 9: SFD Matrix of Beni Municipality.

2.3.2 Proportion of faecal sludge emptied (F3)

The column labelled "Population (Pop)" in Figure 9 displays the proportion of contents for each type of onsite container (fully lined tanks (sealed), lined tanks with impermeable walls and open bottom, and unlined pit). The variable F3 represents the proportion of contents in each type of onsite container that undergoes at least one emptying after construction. The calculation of the proportion of faecal sludge emptied (F3) is based on the percentage of containment emptied (ENPHO, 2023) and the amount of faecal sludge (FS) emptied during the process.

According to findings from household surveys and Key Informant Interviews (KII-3, 2023), approximately 80% of the FS in the containment is emptied. This is attributed to most containments getting filled due to groundwater intrusion, resulting in a high liquid content that

can be easily pumped out by desludging vehicles. However, an average of 20% of the FS in the containment, characterized by high thickness and poor water solubility, remains un-removed during emptying. The calculation of the emptied proportion of FS is adjusted accordingly as follows (Table 3).

$$Actual\ Proportion\ of\ FS\ emptied\ (F3) = percentage\ of\ containment\ emptied \times proportion\ of\ FS\ removed\ during\ emptying$$

Table 3: Sanitation technologies and proportion of emptied faecal sludge (ENPHO[1], KII_3, 2023[2]).

SN	Sanitation Technologies	SFD Reference Variable	Percentage of Emptied Containment (1)	Emptied Proportion of FS during emptying (2)	Actual Proportion of Emptied FS (F3)
1	Fully lined tank (sealed), no outlet or overflow	T1A3C10	32%	80%	25%
2	Lined tank with impermeable walls and open bottom, no outlet or overflow (High Risk)	T2A4C10	13%	80%	10%
3	Lined tank with impermeable walls and open bottom, no outlet or overflow	T1A4C10	4%	80%	3%
4	Unlined pit, no outlet or overflow	T1A6C10	14%	80%	11%
5	Unlined pit, no outlet or overflow, where there is a 'significant risk' of groundwater pollution (High Risk)	T2A6C10	8%	80%	6%

2.3.3 Proportion of FS emptied which is delivered to treatment plant (F4 and F5)

The municipality does not have any treatment plant for faecal sludge treatment. Operational biogas digester is classified as treated (F5). In the provided SFD matrix, 5% of fully lined tanks, including 1% with functioning household biogas digesters, are considered treated with 95% efficiency (F5=95%).

2.4 Summary of assumptions

Onsite Sanitation Systems:

- ✓ The proportion of FS in septic tanks was set to 0%, the proportion of FS in fully lined tanks was set to 100% and the proportion of FS in lined tanks with impermeable walls and open bottom and all types of pits was set to 100% according to the relative proportions of the systems, as per the guidance provided by SuSanA.
- ✓ Variables F3, F4 and F5 for all onsite sanitation systems were derived from the household survey and cross-checked with KIIs conducted.
- ✓ 25% of the emptied FS from fully lined tank connected to no outlet (system T1A3C10) is delivered to treatment and treated in the FSTP (F4 = 67% and F5 = 95%).

- ✓ Emptied FS from lined tanks with impermeable walls and open bottom, no outlet or overflow (system T1A4C10) is 3% but no FS is delivered to treatment and treated (F4 = 0% and F5 = 0%).
- ✓ Emptied FS from unlined pits, no outlet or overflow (system T1A6C10) is 11% but no FS is delivered to treatment and treated (F4 = 0% and F5 = 0%).
- ✓ Emptied FS from lined tanks with impermeable walls and open bottom, no outlet or overflow, where there is a 'significant risk' of groundwater pollution (system T2A4C10) is 10% but no FS is delivered to treatment and treated (F4 = 0% and F5 = 0%).
- ✓ Emptied FS from unlined pits, no outlet or overflow (system T2A6C10) where there is significant risk of groundwater pollution is 6% but no FS is delivered to treatment and treated (F4 = 0% and F5 = 0%).

2.5 SFD Graphic

Figure 10 presents diagrammatic representations of the excreta flow within Beni Municipality. The color scheme signifies the nature of sanitation systems, with green indicating safely managed systems and red denoting unsafely managed ones.

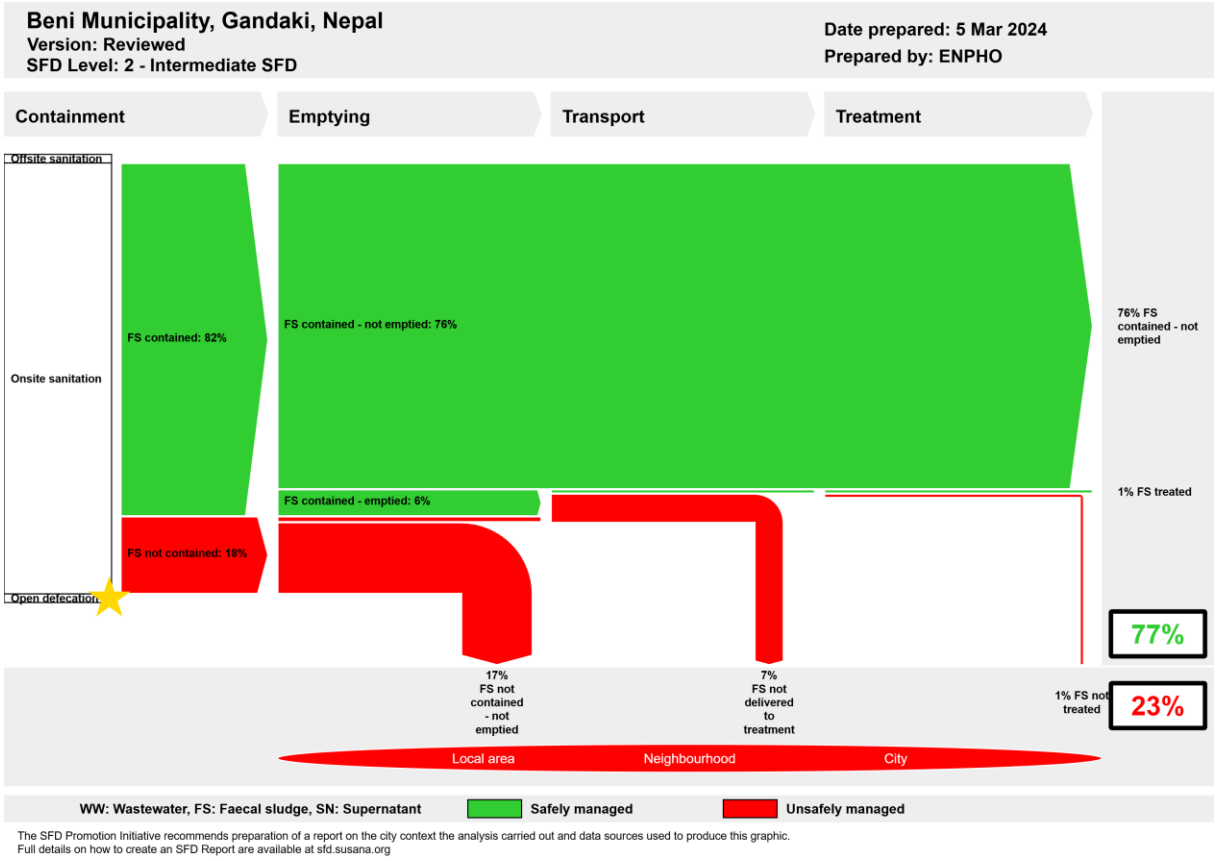

Figure 10: SFD Graphic of Beni Municipality.

The SFD graphic reveals that FS generated by 77% of the population is safely managed, represented by "Green" arrowheads, indicating FS stored in containment without significant risk to groundwater. Initially, FS generated by 82% of the population is safely contained. However, this proportion drops to 76% which can be considered safe until emptied. Out of the 6% safely contained FS which has been emptied, only 1% is treated, and this comes from a biogas digester.

Conversely, FS from 23% of the population is unmanaged, represented by "Red" arrowheads. This signifies FS that are not safely contained and openly dumped in an open environment without treatment are considered unsafe. The diagram illustrates four different factors across the sanitation value chain, arranged from left to right.

2.5.1 Onsite Sanitation

All the households in Beni Municipality utilize onsite sanitation technologies. Among them, FS from 82% of the population is appropriately stored in technically effective containment, as depicted by "FS contained" in the SFD graphic. FS from the remaining 18% of the population is stored in unsafe containment, represented as "FS not contained."

FS contained

The term 'FS contained' refers to faecal sludge within an onsite sanitation technology that ensures a safe level of protection from excreta, limiting pathogen transmission to the user or the public. These containments, such as tanks or pits, are correctly designed, properly constructed, fully functioning, and pose little to no risk of polluting groundwater used for drinking (SuSanA, 2018). FS generated by 82% of the population is contained.

The value of FS contained (82%) is derived from the summation of the percentage of the population using the following containment systems: fully lined tank without outlet or overflow (T1A3C10), lined tank with impermeable walls and open bottom without outlet or overflow (T1A4C10), and unlined pit, no outlet or overflow (T1A6C10).

FS not Contained

The term 'FS not contained' refers to faecal sludge within an onsite sanitation technology that does not ensure a safe level of protection from excreta, with a likely risk of pathogen transmission. These containments, such as tanks or pits, are incorrectly designed, poorly constructed, poorly functioning, and/or pose a 'significant' risk of polluting groundwater used for drinking (SuSanA, 2018). FS generated by 18% of the population is not contained.

The value of FS not contained (18%) is obtained from the summation of the percentage of the population using the following containments: lined tank with impermeable walls and open bottom without outlet (T2A4C10) and unlined pit, no outlet or overflow, where there is a 'significant risk' of groundwater pollution (T2A6C10).

FS contained - not emptied

It is faecal sludge that is contained within an onsite sanitation technology but not removed which may persist within the container or infiltrate into the ground, depending on the type of sanitation technology in use (SuSanA, 2018). The value of 76% is obtained from the proportion of the population using sanitation systems where the FS is contained and have not emptied their containment. However, this 76% of safely managed FS should be temporarily considered

safe, as most of the pits and tanks have not yet filled up and the FS generated remains ‘not emptied’. Therefore, these systems will require emptying services in the short and medium term as they fill up.

FS contained - emptied

It is faecal sludge which is removed from an onsite sanitation technology where it is contained and can be emptied, utilizing either mechanical or manual emptying equipment. 7% is obtained from the population using sanitation systems where the FS is contained and have emptied their containment.

FS not contained - not Emptied

It is faecal sludge that is not contained within onsite sanitation technology and not removed. It may persist within the container or infiltrate into the ground, depending on the type of sanitation technology in use. The value of 17% is obtained from the proportion of the population using sanitation systems where the FS is not contained and not emptied.

FS not delivered to treatment

The proportion of FS not delivered to treatment, i.e. 7%, is the summation of FS contained - emptied and FS not contained - emptied. Since there is no FSTP, FS are not delivered to treatment plants. The emptied FS is disposed of untreated to farmlands or disposed of in water bodies. Therefore, this proportion of disposed FS possess risk to local area and neighbourhood.

3 Service delivery context description

3.1 Policy, legislation, and regulation

The constitution of Nepal 2015 has established right to access to clean drinking water and citizen as fundamental right. In Article 35 (4) related to right to health recognizes citizen's rights to access to clean drinking water and sanitation. In addition, Right to Clean Environment, Article 30 (1) recognizes that every person shall have the right to live in a healthy and clean environment (GoN, 2015). To respect and promote the right of citizens to wards accessing clean drinking water and sanitation services, the government has promulgated and amended necessary laws. The most relevant legislation for the promotion of safe sanitation services is discussed here.

Local Government Operation Act, 2017

Local Governance Operation Act 2017 has promulgated to implement the rights of local government and promote co-operation, co-existence, and co-ordination among federal, provincial, and local government. The act defined roles and responsibility of municipalities along with provision and procedure for approving laws and regulations at local level. Regarding the management of sanitation, the act entitles local government to conduct awareness campaigns, design and implement sanitation programs at the local level.

Environment Protection Act, 2019

Environment protection act 2019 is promulgated to prevent and control pollution from different development activities. It defines "Pollution" as the activities that significantly degrade, damage the environment, or harm the beneficial or useful purpose of the environment, by changing the environment directly or indirectly because of wastes, chemical, heat, noise, electrical, electro-magnetic wave, or radioactive ray. It provides the mechanism for appointing environmental inspectors to control pollution by federal, provincial, and local government.

Water Supply and Sanitation Act, 2022

The act was promulgated to ensure the fundamental right of citizens to easy access on clean and quality drinking water, sanitation services and management of sewage and wastewater. It defines sewerage and wastewater management as construction of sewer networks and treatment plants to preserve sources of water. It is entitled federal, provincial, and local level for the operation and management of water and sanitation services. The act also explicitly defines the responsibility of every citizen to preserve, conserve and maintain the sources of water and use responsibly.

Environment Friendly Local Governance Framework 2013

The environment-friendly local governance framework 2013 has been issued to add value to environment-friendly local development concept encouraging environmental protection through local bodies. The framework has set basic and advanced indicators for households, settlement, ward, village, municipality, and district levels for declaration of environment friendly. The use of water sealed toilets in households as basic indicators for sanitation and health. Provision of toilet with safety tank and use as advanced indicators for sanitation. Provision of gender, children and disabled friendly public toilets in parks, petrol pumps and main market as basic indicator for municipal level. Advance indicators such as drainage

discharged only after being processed through biological or engineering technique. While it has failed to identify the necessity of faecal sludge treatment plants as it has assumed septic tanks in the households is sufficient for treating faecal sludge.

Institutional and Regulatory Framework for Faecal Sludge Management, 2017

Ministry of Water Supply through its Department of Water Supply and Sewerage Management (DWSSM) articulated and endorsed Institutional and Regulatory Framework (IRF) for Faecal Sludge Management in Urban Areas of Nepal in 2017. The main objective of the IRF is to define the specific roles and responsibilities of key institutions for the effective management and regulation of FSM. The framework primarily envisioned featuring FSM in the national policy and issuing policy directives into local government to incorporate FSM in their urban planning along with strengthening and enhancing the capacity of the local government to deliver effective services. A local government has been endowed with overall responsibility to plan, implement, and regulate the FSM services within its jurisdiction. The provision of the ability to engage the private sector and other relevant stakeholders such as the Water and Sanitation Users Committee (WSUC) in the framework reflects a participatory approach that would help in sustaining the interventions.

Total Sanitation Guideline, 2017

Total Sanitation Guideline was promulgated by the Ministry of Water Supply in April 2017 after the successful implementation of National Sanitation and Hygiene master Plan (NSHMP) 2011. It provides guidelines for sustaining ODF outcomes and initiating post-ODF activities through an integrated water, sanitation and hygiene plan at municipalities and districts. The guideline redefined sanitation as management of services and facilities to safely dispose of/reuse faecal sludge, collection and treatment of solid waste and wastewater to establish a hygienic environment and promote public health. Indicators are set to guide total sanitation movement with an arrangement for resource management, monitoring and evaluation, capacity building.

3.1.1. Policy

Historically, the National Sanitation Policy (1994) was the guideline for the planning and implementation of sanitation programs. The policy had promoted sanitation issues together with issues on water supply in rural communities. Also, Rural Water Supply and Sanitation National Policy (RWSSNP) 2004, has set a new target to provide safe, reliable, and affordable water supply with basic sanitation facilities. The policy focused on delivering quality services on water and sanitation to the marginalized and vulnerable groups. Participatory approach, community leadership project development, optimization of local resources and installation of locally appropriate technologies were major principles in the policy. (DWSSM, 2004) However, it was unable to address the complex operational issue of urban water supply and sanitation service delivery. (DWSSM, 2009) Thus, the National Urban Water Supply and Sanitation Sector Policy (NUWSSSP) was formulated and enforced in 2009. It focused on achieving coherent, consistent, and uniform approaches of development in urban areas with the involvement of different agencies and institutions. Both these policies were limited to addressing emerging issues and challenges in the rural and urban areas. Thus, the National Water Supply and Sanitation Policy (NWSSP) was formulated in 2014 by GON to address the

emerging challenges and issues with the adoption of new approaches and resolve the inconsistency in RWSSNP and NUWSSSP.

The goal of the NWSSP was to reduce urban and rural poverty by ensuring equitable socio - economic development, improving health and the quality of life of the people and protection of the environment through the provision of sustainable water supply and sanitation services. It adopted innovative technologies and knowledge emerged in the sector. Remarkably, it was the first official document that recognized discharge of untreated wastewater and dumping of septic sludge heavily polluted the surface water sources in urban areas.

Nepal is a signatory of the historical resolution of 2010 United Nations General Assembly on the Human Right to Water and Sanitation. Nepal committed to Millennium Development Goals (MDGs) for 2000- 2015 The goal was accomplished through declaration of the country as free from open defecation on 30th September 2019. National Sanitation and Hygiene Master Plan, 2011 was developed for coordinated planning and implementation of National Sanitation Campaign. The campaign strengthened the institutional setup tier of government in a participatory approach. In an alignment total sanitation campaign was initiated formally to sustain ODF. The guideline set various indicators to assess the sustainability of sanitation services. Remarkably, it extended sanitation definition as management of services and facilities to safely dispose of/reuse faecal sludge, collection and treatment of solid waste and wastewater to establish the hygienic environment and promote public health (NPC, 2017)

Similarly, Nepal Water Supply, Sanitation and Hygiene Sector Development Plan (SDP 2016-2030) was formulated in 2016 for sector convergence, institutional and legal reforms, capacity development and establishing coordination and harmonization in the sector. The SDP classified service system and delineated roles and responsibilities for effective and sustainable service delivery. The SDP highlighted that majority of households rely on onsite sanitation system (70%) that requires effective treatment of faecal sludge. However, there is a lack of concrete policies, guidelines, and indicators on faecal sludge management in the sector for effective planning, implementation, and service delivery. Nepal was declared ODF nation on September 23, 2019, (MoWS, 2017) however, the target of 90% households with toilets connected to sewer system or proper FSM is yet to be achieved.

There has been no specific policy made on sanitation and faecal sludge management. However, activities related to solid waste management are being carried out by municipality.

3.1.2. Institutional roles

Federal, provincial, and local government are entitled for implementation of water and sanitation programs to ensure the rights on access to safe water and sanitation.

At Federal Government

National Planning Commission: At the federal government, the National Planning Commission is the specialized and apex advisory body for formulating a national vision, developing policy, periodic plans, and sectoral policies. The NPC assesses resource needs, identifies sources of funding, and allocates budget. It serves as a central agency for monitoring and evaluating development policies, plans and programs. It supports, facilitates, and coordinates with federal, provincial, and local governments for developing policy plans and implementation.

Ministry of Water Supply: Ministry of Water Supply is the lead ministry responsible for planning, implementation, regulation, and monitoring and evaluation of sanitation programs in the country (GoN, 2015). Under the MoWS, Department of Water Supply and Sewerage Management (DWSSM) plan and implement water and sanitation projects funded by foreign donors or inter provincial projects or serves at least 15,000, 5,000 and 1,000 people in terai, hilly and mountain region respectively (GoN, 2015). The organizational structure of DWSSM is shown in Figure 11.

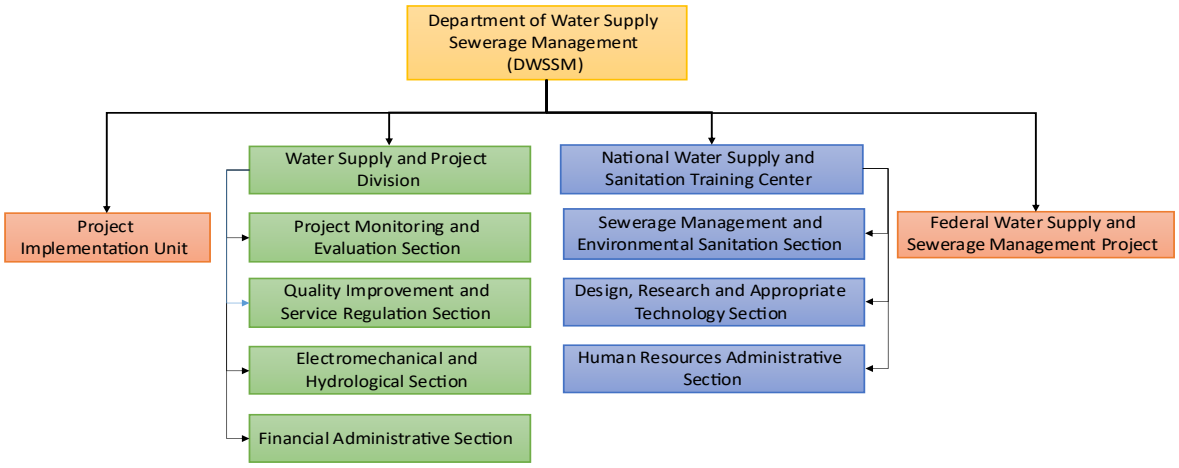

Figure 11: Organizational Structure Department of Water Supply and Sewerage Management (DWSSM).

At Provincial Government

Ministry of Energy, Water Resources and Water supply: Ministry of Energy, Water Resources and Water supply of provincial government in Gandaki Province is major executing body for planning, developing, and implementing water supply and sanitation programs. Planning and implementation of water supply and sanitation infrastructure in the province is executed through Drinking Water, Irrigation and Energy Development Office (DWIEDO). DWIEDO implements the water and sanitation programs meeting the following criteria:

i. Inter local government projects.

ii. Beneficiaries between 5,000 to 15,000 in terai region, 3,000 to 5,000 in hilly region and 500 to 1,000 in Himalayan region.

At Local Government

Municipal council: Figure 12 shows the proposed organography of the municipality. There is no specific sanitation section. However, the sanitation related works come under the Environment and disaster Management Section.

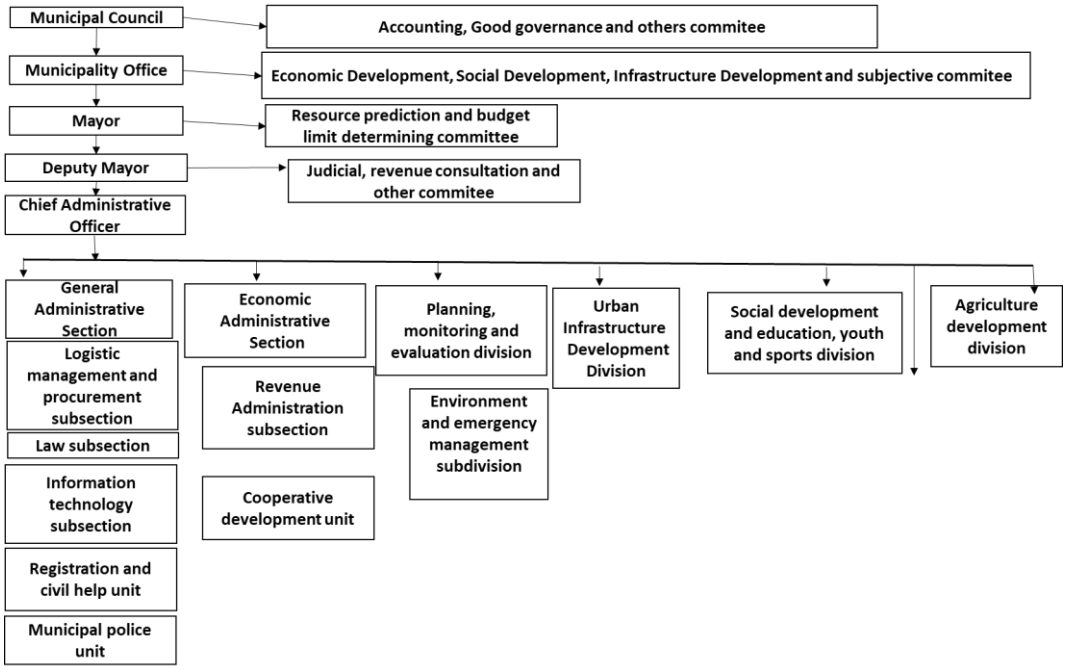

Figure 12: Organogram of Beni Municipality.

3.1.3. Service provision

Urban Water Supply and Sanitation Policy 2009 emphasized the Public-Private Partnership (PPP) in water supply and sanitation to improve service delivery (MoPIT, 2009). Also, the Public-Private Partnership Policy, 2015 encourages private sector investment in the development and operation of public infrastructure services for comprehensive socioeconomic development. The policy has aimed to remedy challenges such as structuring of projects, land acquisition, coordination and approval, payments to private sectors and approval for environment impact (MoF, 2015).

3.1.4. Service standards

The sanitation service standards have set by Nepal Water Supply, Sanitation and Hygiene Sector Development Plan (2016-2030). It classifies sanitation services as high, medium, and basic based on sanitation facilities in place. The sanitation service levels with indicators are shown in Table 4. However, FSM specific standards have yet to be developed and implemented.

Table 4: Sanitation Service Level and its Components.

S.N.	Service Components	Service Level		
		High	Medium	Basic
1	Health and Hygiene Education	✓	✓	✓
2	Household Latrine	✓	✓	✓
3	Public and School Toilets	✓	✓	✓
4	Septic tank sludge collection, transport, treatment, and disposal	✓	✓	✓
5	Surface drains for collection, transmission, and disposal of grey water	✓	✓	✓
6	Small-bore sewer collection for toilet and septic tank effluent, low-cost treatment, and disposal		✓	
7	Sanitary sewers for wastewater collection, transmission, non-conventional treatment, and disposal	✓		
8	Sanitary sewers for wastewater collection, the transmission of conventional treatment and disposal	✓		
9	Limited solid waste collection and safe disposal	✓	✓	✓

4 Stakeholder Engagement

4.1 Key Informant Interviews (KIIs)

During the study, Key Informant Interviews (KIIs) were conducted to gather insights from different key stakeholders working in the sanitation sector of Beni Municipality. The objective was to obtain a comprehensive understanding of current sanitation service practices. Ms. Jyoti Lamichhane, Deputy mayor of Beni municipality, was interviewed specifically regarding sanitation service practices, covering technical, institutional, and financial aspects. Additional interviews were conducted with different stakeholders as mentioned below (Table 5).

Table 5: List of Key Informant Interviewed personnel.

S.N.	Name	Designation	Organization/ Company	Purpose of KII	Date
1.	Jyoti Lamichhane (KII-1)	Deputy mayor	Beni Municipality	Sanitation status, Ongoing projects on Sanitation, Policies, and plan for Sanitation development	5th October 2023
2.	Madhav Prasad Regmi (KII-2)	Chairperson	Beni WSUC	Water supply services	5th October 2023
3.	Chandan Subedi, Lila Gautam (KII-3)	Municipal Staff	Beni Municipality	Sanitation status, Ongoing projects on Sanitation, Policies, and plan for Sanitation development	5th October 2023
4.	Hari Sanjel, Putali, Bamber Pun (KII-4)	Caretaker	Public toilet, Beni Municipality	Sanitation status of toilet	5th October 2023

4.2 Household Survey

Household survey was conducted in all wards of the municipality through mobilization of local enumerators selected by the municipality. The enumerators were given two days orientation about sanitation technologies and methods for conducting the household survey. The household survey was conducted using the mobile application “KOBOCOLLECT” after orientation. SFD team member went on field visits in households to encourage enumerators and observe household sanitation status. Mrs. Jyoti Lamichhane, the deputy mayor of the municipality, provided encouragement and motivated the enumerators before the survey. The pictures below depict the group photo featuring the SFD team members along with the enumerators (Figure 13).

Figure 13: Glimpses of SFD orientation to enumerators in municipal hall.

4.2.1 Determining Sample Size

The number of households to be sampled in the municipality was determined by using Cochran (1963:75) sample size formula $no = \frac{z2pq}{e2}$ and its finite population correction for the proportion $n = n_o/(1 + (n_o-1)/N)$.

Where,

Z	1.96	At the confidence level of 95%
p	0.5	Assuming that about 50% of the population should have some sanitation characteristics that need to be studied (this was set at 50% since this percentage would yield the maximum sample size as the percentage of the population practising some form of sanitation is not known at the intervention sites).
q	1-p	
e	+/-5%	Level of precision or sampling error.
N		A total number of population (households in the municipality).

This is followed by proportionate stratification random sampling such that each ward in the municipality is considered as one stratum. The sample sized required in each ward is calculated as $n_h = (N_h/N)*n$, where N_h is a total population in each stratum. Thus, a total of 353 households were sampled from 9,336 households distributed in 10 wards with proportionate stratification random sampling. The household samples surveyed in the municipality is shown in Figure 14.

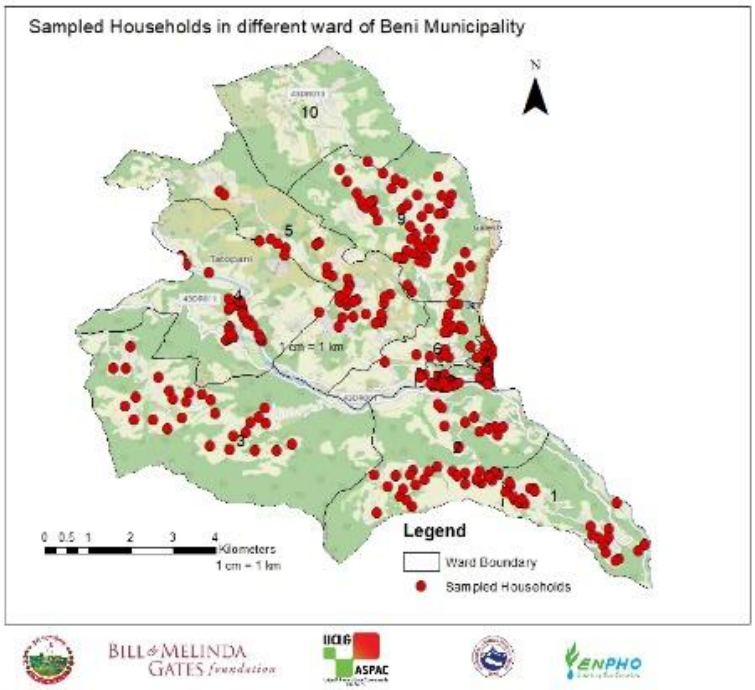

Figure 14: Distribution of sampling points in different wards of Beni Municipality.

4.3 Direct Observation

Various sanitation technologies in the households in all the wards were observed and visual references were kept. Also, observation of the different water sanitation users committee, public toilet status was done.

4.4 Sharing and Validation of Data

The Shit Flow Diagram Sharing and Validation workshop was conducted in the municipality to share the findings of the sanitation situation survey and receive suggestions from municipal stakeholders. Altogether, 25 participants including the mayor, deputy mayor, CAO, ward chairpersons and other members from the municipal executive council, sectoral staff etc. actively participated in the workshop and provided valuable suggestions. The list of participants with their designation is attached to Appendix 2.

Figure 15: Discussion on SFD by stakeholder of the municipality in validation sharing program.

5 Acknowledgements

We would like to acknowledge the organizations involved in the Municipalities Advocacy on Sanitation in South Asia – II (MuNASS-II) project for their collaboration and coordination, namely the United Cities and Local Governments Asia-Pacific (UCLG ASPAC) as the executing agency and the Municipal Association of Nepal (MuAN) as the implementing agency, for their coordination with the municipality.

We extend our sincere appreciation to the individuals who provided invaluable support and guidance during the study: Mr. Surat KC, Mayor; and Ms. Jyoti Lamichhane, Deputy Mayor of Beni Municipality for continuous support in the study. We would also like to thank Mr. Netra Prasad Poudel, Chief Administrative Officer of the municipality; and Ms. Lila Gautam, from Health section, for facilitating the enumerators and continuous support throughout the study.

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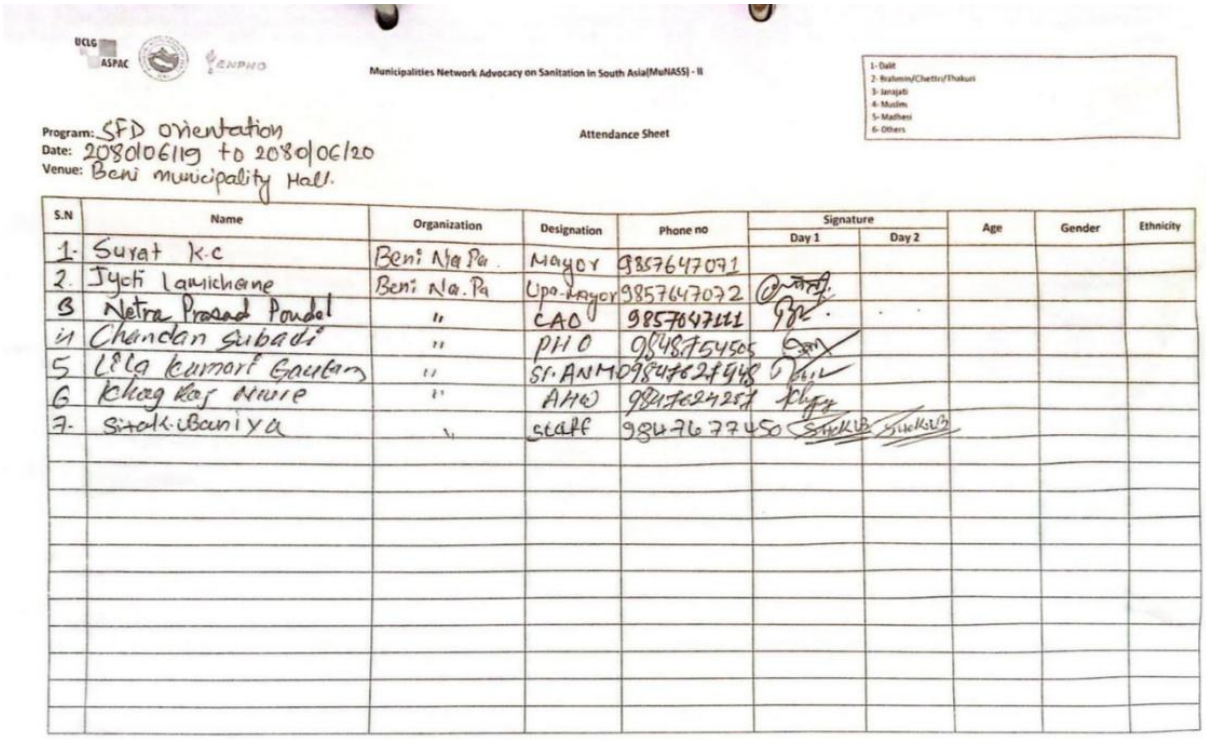
7 Appendix

Appendix 1: Roles and Responsibility of Various Tiers of Governments Delineated in Drafted SDP 2016 – 2030

System Classification		Minimum Key HR Required	Regulation & Surveillance	Financing & Construction	Ownership of System	Service Delivery	
Size	**Sanitation**					**Provision**	**Production**
Small	Onsite sanitation	Water Supply and Sanitation Technician (WSST)	Federal and or Provincial Government	User+/ community+/ other			
Medium	Septage Management	Sub-engineer	Federal and or Provincial Government	Provincial+/ Local Govt+/ Community+/ Private Sector		Local Govt	Users committee/ Utility manager
Large	Septage or FSM Management	WASH Engineer + finance & admin staff	Federal and or Provincial Government	Provincial+/ Local Govt+/ Community+/ Private Sector		Local Govt	Utility Manager
Mega	Septage/ FSM Management	WASH Engineer + finance & admin staff	Federal and or Provincial Government	Provincial+/ Local Govt+/ Community+/ Private Sector		Local Govt	Utility Manager

Appendix 2: List of enumerators in SFD orientation



UCLG ASPAC | ENPHO

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

1- Dalit
2- Brahmin/Chettri/Thakuri
3- Janajati
4- Muslim
5- Madheni
6- Others

Attendance Sheet

Program: SFD orientation
Date: 2080/06/19 to 2080/06/20
Venue: Beni municipality Hall.

S.N	Name	Organization	Designation	Phone no	Signature		Age	Gender	Ethnicity
					Day 1	Day 2			
1.	Surat K.C	Beni Na.Pa.	Mayor	9857647071					
2.	Jyoti Lamichane	Beni Na.Pa	Upa.Mayor	9857647072					
3	Netra Prasad Poudel	"	CAO	9857047111					
4	Chandan Subadi	"	PHO	9848754505					
5	Lila kumari Gautam	"	Sr. ANM	9847627948					
6	Khag Raj Nwie	"	AHW	9847624257					
7.	Sitak.Baniya	"	staff	9847677450					

Appendix 3: List of Participants present in Sharing and Validation meeting of SFD

UCLG ASPAC ENPHO

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

1. Dalit
2. Brahmin/Chettri/Thakuri
3. Janajati
4. Muslim
5. Madhesi
6. Others

F: 1
M: 3

Attendance Sheet

Program: MuNASS - Survey on SFD orientation

Date: 2080/06/19 to 2080/06/20

Venue: Beni Municipality Hall

S.N	Name	Organization	Designation	Phone no	Signature Day 1	Signature Day 2	Age	Gender	Ethnicity
1.	अञ्जना शर्मा चौरसाल	ward-9	Volunteer	9847642111			39	महिला	2
२	[illegible]	ward-7	"	9866059597			24	पुरुष	6
३	सीता थापा कुंवर	ward-4	"	9848574851			35	महिला	2
४	[illegible]	ward-2	"	[illegible]			25/24	महिला	2/1
५.	[illegible] थापा	ward-3	"	9867669224			25	पुरुष	3
६.	संगिता हेन्त्याल पुन	ward-1	"	9867973607			31	महिला	3
७	नवराज खत्री	ward-6	"	9867889236			25	पुरुष	2
८.	[illegible]	ward-8		[illegible]			21	महिला	3
९.	पूजा खत्री	ward-5	"	9818433212			23	महिला	2
१०.	सरिता गर्बुजा	ward-10	"	9821621182[illegible]			31	महिला	3
११	अस्मिता राजेन्द्र	BPH student (Asian College)		9840510217			21	female	2
१२	संस्कृया शर्मा	BPH Student (Asian College)		9860408708			24	female	2
~~13~~	~~[illegible]~~	~~ward-7~~		~~9866059597~~					
~~१३~~	~~नवराज खत्री~~	~~ward-6~~	"	~~9867889236~~					
१३	[illegible]	ENPHO	A.P.O	9861960529					
१४	Buddha Bajracharya	"							

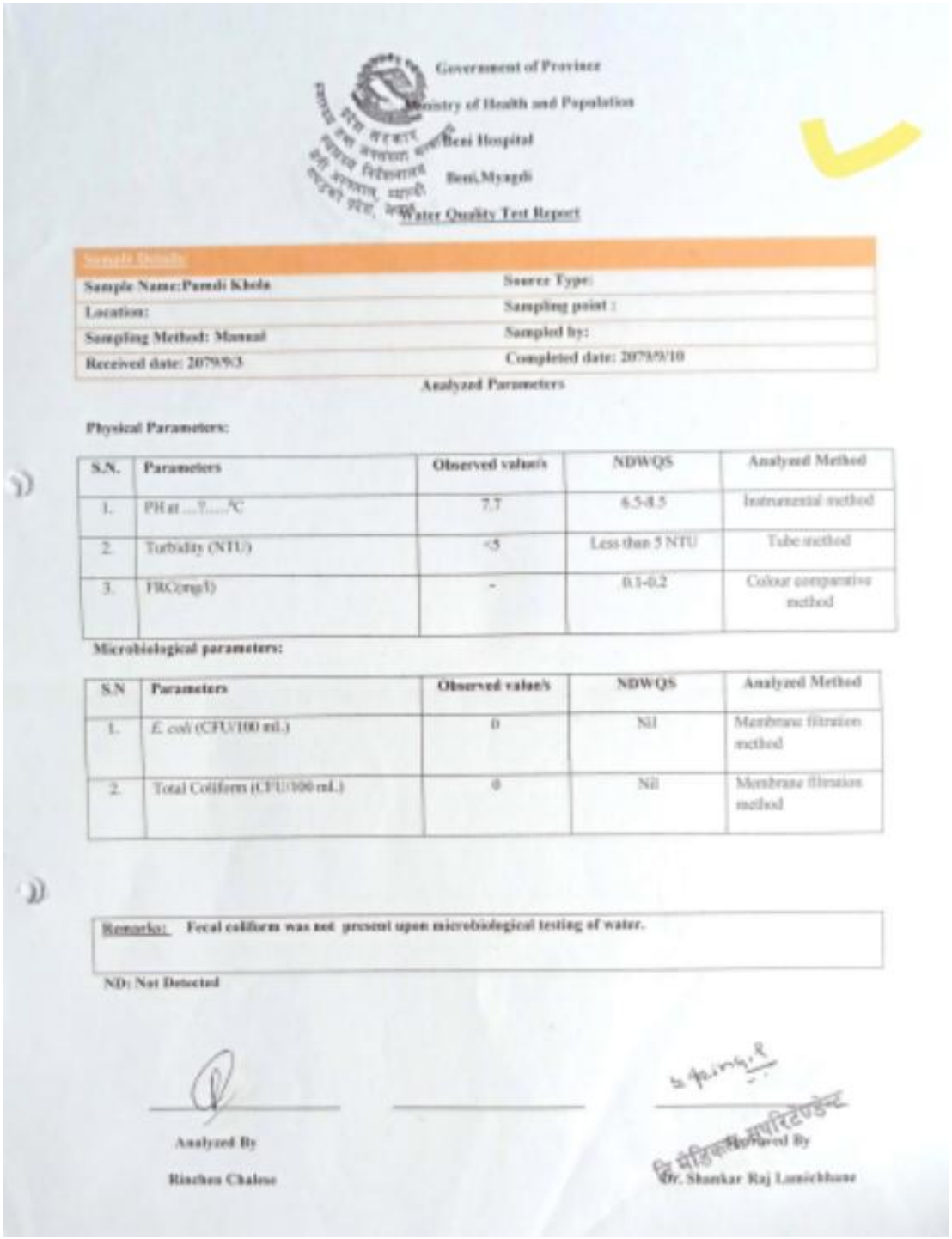
आज मिति २०८० साल चैत्र १ गतेका दिन बेनी नगरपालिकामा नेपाल नगरपालिका संघको आयोजनामा वातावरण र जनस्वास्थ्य संस्था (एन्फो)को प्राविधिक सहयोग, The United cities - Local Government Asia Pacific (CUCLG-ASPAC) को सहकार्यमा र Bill and Mellanda Gates Foundation (BMGF) को आर्थिक सहयोगमा मानव मलमुत्र रेखा प्रवाह चित्र (Shit-flow Diagram-SFD) सम्बन्धि छलफल तथा प्रमाणीकरण कार्यक्रममा निम्न अनुसारको सरोकारवालाहरूको उपस्थिति रहेको छ।

क्र.स	नाम	पद	कार्यालय	फोन नं	हस्ताक्षर
१.	सुरत के.सी	नगर-प्रमुख	बेनी नगरपालिका	9857647071	
२.	ज्योती लामिछाने पौडेल	नगर-उपप्रमुख	बेनी नगरपालिका	985764707[illegible]	
३.	नेत्रप्रसाद पौडेल	प्रमुख प्रशासकीय अधिकृत	बेनी नगरपालिका	9857047111	
४.	हेमचन्द्र पौडेल	उपसचिव	बेनी न.पा.	[illegible]	
५.	[illegible] ब. खड्का	वडा-अध्यक्ष	बेनी [illegible]	[illegible]	
६	उत्तम कर्माचार्य	वडा अध्यक्ष	बेनी न.पा. ८	[illegible]	
७	[illegible] कुमारी कर्की	कार्यपालिका सदस्य	बेनी ४	[illegible]	
८	आकृती दुंगाना	कृषि शाखा प्रमुख	बे.न.पा.	[illegible]	
९	प्रतिमा देवी शर्मा	महिला विकास निरीक्षक	बेनी न.पा.	9847647[illegible]	
१०	रिमा ब. क्षेत्री	सूचना प्रविधि अ.	”	9860661698	
११.	डुलचन्द्र [illegible]	रोजगार संयोजक	”	98576317[illegible]	
१२	नन्दन सुवेदी	[illegible]	”	[illegible]	
१३.	सुदिप गौतम	इन्जिनियर	”	9857651055	
१४	सुजता श्रेष्ठ	कार्यपालिका सदस्य	बेनी नपा ६	[illegible]	
१५	याम बहादुर पौडेल	कार्यालय सहयोगी	बेनी न.पा.	[illegible]	
१६	कृष्ण [illegible]	[illegible]	[illegible]	[illegible]	
१६	[illegible]	वडा अध्यक्ष	बेनी न.पा. १०	9857647070	
१८	चन्द्र बहादुर के.सी.	वडा अध्यक्ष	बे.न.पा. ९	[illegible]	
१९	गोविन्द [illegible]	” ”	” ” -२	[illegible]	
२०	पदम बहादुर पुन	” ”	” ” -३	[illegible]	
२१	[illegible] थापा	”	” ” -१	[illegible]	

क्र.सं	नाम	पद	कार्यालय	फोन नं	हस्ताक्षर
२२	याम ब. [illegible]	वडा अध्यक्ष	बे.न.पा.२	[illegible]	
२३	रमेश कुमार श्रेष्ठ	” ”	” ” ” ६	[illegible]	
२४	तिला गौतम	स्वास्थ्य प्र.	बेनी न.पा	[illegible]	
२५	श्यामभक्त जैसी	का.स.	बे.न.पा	[illegible]	
२६.	अस्मिता श्रेष्ठ	A.P.O	ENPHO	9861960577	
२७	रुपक श्रेष्ठ	Engineer	ENPHO		
२८	बुद्ध बज्राचार्य	PC	ENPHO		

Appendix 4: Glimpses of KII with different stakeholders

Appendix 5: Water Quality Test Report



Government of Province
Ministry of Health and Population
Beni Hospital
Beni,Myagdi
Water Quality Test Report

Sample Details	
Sample Name:Pandi Khola	Source Type:
Location:	Sampling point :
Sampling Method: Manual	Sampled by:
Received date: 2079/9/3	Completed date: 2079/9/10

Analyzed Parameters

Physical Parameters:

S.N.	Parameters	Observed value/s	NDWQS	Analyzed Method
1.	PH at ....?.....°C	7.7	6.5-8.5	Instrumental method
2.	Turbidity (NTU)	<5	Less than 5 NTU	Tube method
3.	FRC(mg/l)	-	0.1-0.2	Colour comparative method

Microbiological parameters:

S.N	Parameters	Observed value/s	NDWQS	Analyzed Method
1.	*E. coli* (CFU/100 ml.)	0	Nil	Membrane filtration method
2.	Total Coliform (CFU/100 ml.)	0	Nil	Membrane filtration method

Remarks: Fecal colliform was not present upon microbiological testing of water.

ND: Not Detected

Analyzed By
Rinchen Chalose

Approved By
Dr. Shankar Raj Lamichhane

Government of Province

Ministry of Health and Population

Beni Hospital

Beni,Myagdi

Water Quality Test Report

Sample Details:	
Sample Name: Chipleti Mul	**Source Type: Mul**
Location:	**Sampling point :**
Sampling Method: Manual	**Sampled by:**
Received date: 2079/9/18	**Completed date: 2079/9/20**

Analyzed Parameters

Physical Parameters:

S.N.	Parameters	Observed value/s	NDWQS	Analyzed Method
1.	PH at ...?.....°C	7.9	6.5-8.5	Instrumental method
2.	Turbidity (NTU)	10	Less than 5 NTU	Tube method
3.	FRC(mg/l)	-	0.1-0.2	Colour comparative method

Microbiological parameters:

S.N	Parameters	Observed value/s	NDWQS	Analyzed Method
1.	*E. coli* (CFU/100 mL)	20	Nil	Membrane filtration method
2.	Total Coliform (CFU/100 mL)	55	Nil	Membrane filtration method

Remarks: **Fecal coliform was present upon microbiological testing of water. Proper methods of disinfection should be followed before using the water for drinking purpose.**

ND: Not Detected

Analyzed By

Rinchen Chalese

Approved By

Dr. Shankar Raj Lamichhane

SFD Beni Municipality, Nepal, 2025

Produced by:

Asmita Shrestha, ENPHO

Buddha Bajracharya, ENPHO

Rupak Shrestha, ENPHO

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Sabuna Gamal, ENPHO

Anita Bhuju, ENPHO

This Executive Summary and the SFD Report are available from:

www.sfd.susana.org

SFD Promotion Initiative