Safely Managed of On–Site Sanitation

Kenya Pilot Summary Report

January 2024

About Citywise

Fresh Life is an award-winning social venture and founding partner of the [Sanergy Collaborative](#). Fresh Life partners with cities to develop and scale safe, citywide inclusive sanitation solutions for residents living in low-income urban areas using an end-to-end, full value chain approach. Informed by circular economy and climate-smart principles, Fresh Life provides access to quality toilets and waste collection services then treats and converts the waste into valuable end products, such as insect-based animal feed, organic fertilizer, and fuel briquettes. In addition, Fresh Life upgrades existing on-site sanitation facilities, operates a network of in-home toilets for individual households, and works with local entrepreneurs to consolidate and safely remove waste from other on-site sanitation facilities. Founded in 2011, [Fresh Life](#) has served as a pioneer of container-based sanitation solutions for fast growing cities, now serving about 150,000 urban residents with safe sanitation services every day.

Citywise, the consulting arm of the Sanergy Collaborative, leverages Fresh Life's proven track record of delivering sanitation and safe waste management services and command of technologies, market forces and service delivery models to support partners to design and deliver inclusive citywide sanitation. Citywise uses a systematic methodology to match sanitation needs and market conditions with potential solutions and offers clear guidance on the steps that governments, funders, service providers and technology developers can take to implement safe sanitation and waste management. Citywise has successfully conducted assessments of communities to understand their sanitation needs and preferences, engaged public and private stakeholders to identify challenges and opportunities across the sanitation value chain.

Authorship and Contact Information

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Introduction

Figure 1: Safe transport of waste from on-site facilities in an informal area of Nairobi for treatment and disposal.

Background

The SMOSS project is an initiative by the World Health Organization and UNICEF WHO/UNICEF Joint Monitoring Programme for Water Supply, Sanitation and Hygiene (JMP) to improve methods for monitoring safely managed on-site sanitation (SMOSS). With funding from the Bill & Melinda Gates Foundation, the JMP started working with national governments and international partners in 2019 to strengthen national monitoring of safely managed on-site sanitation services. To date, JMP has organized in-depth pilots in six countries—Bangladesh, Ecuador, Indonesia, Kenya, Serbia, and Zambia—across a range of socioeconomic conditions and geographies and is planning additional pilots in other countries. The primary output of the SMOSS project is a set of harmonized indicators and methods that national authorities can use to assess the extent to which excreta from on-site sanitation systems is safely managed.

The pilot in Kenya was a collaborative effort between Sanergy, Sanivation, the Ministry of Water, Sanitation and Irrigation (MoWSI), UNICEF Kenya and the JMP from April 2021 through December 2023. Each partner took the following roles for the pilot:

- **Citywise (Sanergy):** Facilitated stakeholder engagement to understand the current situation in Kenya regarding on-site sanitation and priorities for sanitation monitoring; developed indicators and data collection tools; defined criteria for pilot locations; and reported on the overall pilot development and implementation process and recommendations for uptake and scaling.
- **Sanivation:** Hired and trained enumerators; recommended pilot locations; coded instruments; managed field logistics and pilot data collection activities; oversaw data quality; and analyzed pilot data to calculate and report on indicator values.
- **UNICEF Kenya:** Selected contractors; convened formal stakeholder workshops; supported the overall implementation of the pilot and the validation of the indicators and the report.
- **MoWSI:** Supported the convening of stakeholders and permissions for data collection and advised on pertinent local indicators and how SMOSS could be integrated with other national monitoring systems.
- **JMP:** Advised on the indicators and tools and the calculation and interpretation of indicators based on the pilot data; facilitated ongoing exchange between SMOSS pilot countries.

This report summarizes the indicator development process, pilot data collection and recommendations from the SMOSS pilot in Kenya. In addition, the report provides an overview of the indicators, their definitions and calculation and provides instruction for using the SMOSS resources.

Annexed to the this summary report are:
- The **list of global and local indicators for safe management of on-site sanitation** and their calculation methods.
- The **data collection tools** developed and used for the pilot.
- The **SMOSS Kenya Final Report** prepared by Sanergy, which describes in detail the process of collaborating with stakeholders to decide on indicators and draft and validate data collection tools and methods. This report also details lessons learned from the implementation of the pilot in Kenya and recommendations both for other countries implementing SMOSS in the future and for scaling SMOSS in Kenya.
- The **SMOSS Kenya Data Collection Report** prepared by Sanivation, which details the results from analysis conducted using the pilot data as well as the key learnings and recommendations from the data collection exercise itself.

Definitions

Throughout this report, we use the JMP's definition of "on-site sanitation", which comprises all non-networked or non-sewered facilities. On-site sanitation includes:
- Improved facilities: flush or pour toilets connected to septic tanks, ventilated improved pit latrines, pit latrines with slabs, composting toilets, container-based systems.
- Unimproved: latrines without slabs, hanging latrines, bucket latrines, flush toilets connected to open drains.

While "on-site sanitation" describes the type of facility, "safely managed" refers to the service level. According to the JMP, the criteria for considering waste safely managed are:
1. People use improved sanitation facilities which are not shared with other households.

2. Excreta is either:
   - Stored, treated and disposed of in situ;
   - Stored temporarily and then emptied, transported and treated off-site; or
   - Transported through a sewer with wastewater and then treated off-site.
3. Excreta is safely managed across all steps of the sanitation service chain: containment, transport, treatment and disposal.

Within the set of global indicators, "safely managed on-site sanitation" therefore refers to the use of an improved, non-shared facility where waste is either safely disposed of in situ or is collected, transported and treated offsite by means other than a sewer. Because shared facilities are a key resource in the Kenyan context, they are captured in the local indicators for safely managed on-site sanitation. According to the Rural Sanitation and Hygiene Protocol (2022) produced by the Ministry of Health, shared use of a toilet is acceptable when the total number of users is fewer than 10-15 people.

Sanitation in Kenya

In Kenya, on-site facilities fill a critical need with regards to access to sanitation. According to the Kenya Environmental Sanitation and Hygiene Policy 2016-2030, 12% of the population use sewerage services and 5% of the wastewater is safely treated as a result of inefficiencies in the sewerage system and poor performance of treatment systems. As of 2022, JMP estimates that 31.5% of the population has safely managed sanitation. In addition to looking at the toilet facility used by the household, the JMP uses the following assumptions in absence of national data to assess the extent to which sanitation is safely managed.

Table 1: JMP assumptions for the analysis of safely managed sanitation.

	Assumption
Containment	In the absence of containment data, assume that excreta are contained in all latrines and half (50%) of septic tanks is safely contained.
Disposal In-situ	Contained facilities that have never been emptied are considered stored/treated and disposed in-situ. Contained facilities that have been emptied and buried are considered disposed of in-situ.
Emptying	If onsite is dominant, estimates are only made if data is available on emptying. If sewer connections are dominant, in the absence of emptying data, 50% of onsite systems are considered safely managed.
Transport	In the absence of transport data, assume all excreta removed by service providers are delivered to treatment facilities.
Treatment	In absence of fecal sludge treatment data: If sewer connections are more common than on-site sanitation, assume fecal sludge receives the same level of treatment as sewered wastewater. If on-site sanitation is more prevalent, no estimate is made unless data are available.

While not captured in the JMP estimates for safely managed sanitation using the global indicator definition, shared sanitation facilities are used by 24% of the population nationwide and 45% of the urban population[1].

The Sustainable Development Goals have shifted focus to assessing the safe waste management along the entire sanitation service chain—from waste generation to disposal or reuse—in addition to considering access to improved sanitation facilities. Stakeholders in Kenya are adopting this wider perspective on safe sanitation as observed in efforts to develop new tools and systems for national monitoring systems that will collect data on emptying, transport and treatment in addition to containment. At the moment though, safely managed sanitation across the full value chain is not captured in the national statistics.

The SMOSS project is a key input to addressing the data gaps across the sanitation value chain and will contribute to building an integrated monitoring system for both rural and urban settings.

Pilot Objectives

The primary objectives of the SMOSS pilot in Kenya was to develop indicators and accompanying data collection tools to enable accurate quantification of safely managed on-site sanitation across the sanitation value chain. Through our conversations with stakeholders, we learned where there were key differences in the definitions of indicators in national policy compared to the JMP global definitions. To address the need for data that aligned with national policy as well as global monitoring priorities, we proposed two sets of indicators: the "global" indicators following the JMP standard methodology and the "local" indicators which report on national statistics. The set of global indicators enables cross-country comparisons of sanitation data and supports monitoring and reporting against global goals for safely managed on-site sanitation. The local indicators provide nuanced insight into the sanitation situation in Kenya and can support national decision makers to make informed policy and resource allocations for sanitation management and system expansion. Local indicators are also designed to feed into national sanitation monitoring systems.

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[1] UNICEF, WHO. Progress on household drinking water , sanitation and hygiene 2000–2022: special Focus on gender. New York: United Nations Children's Fund (UNICEF) and World Health Organization; 2023.
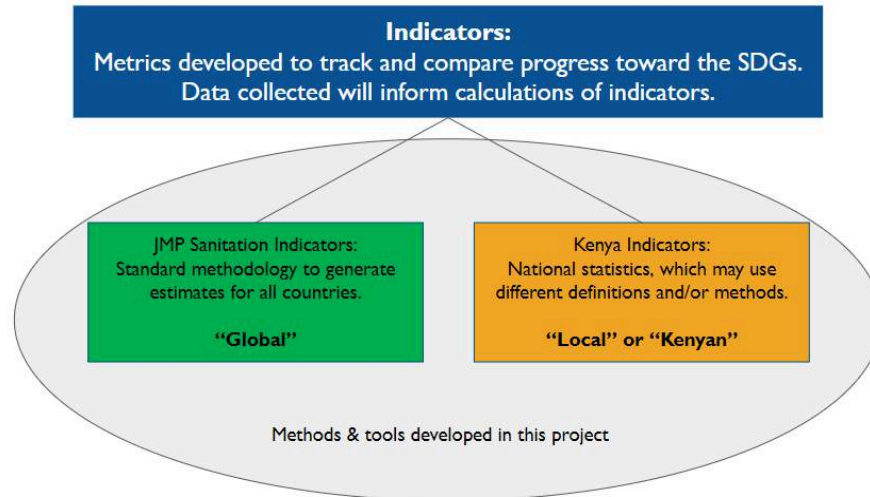
Figure 2: Schema demonstrating the intended outputs from the SMOSS pilot in Kenya.

The pilot sought to develop and validate the indicators, tools and data collection methods for Kenya. While data was collected from a small sample of respondents for the purpose of testing the tools and calculations, the pilot data collection was not meant to generate representative estimates of safely managed sanitation.

Additional information on the background and context of the SMOSS pilot in Kenya can be found in Annex 4: SMOSS Kenya Final Report.

Methodology and Implementation

Figures 3, 4 and 5: Data collection activities. Photos by Sanivation.

The implementation of this project was broken into three phases with the following objectives and activities.

Phase 1: Inception & Design (April – December 2021)

Objective: Understand existing policies, frameworks and stakeholders in the Kenyan sanitation sector.

Activities:
- Desk review focusing on existing surveys, reports and policies related to sanitation.
- Stakeholder mapping and interviews involving over 40 entities across public, NGO and private sector actors.
- National stakeholder workshop aimed at securing buy-in and discussing the vision of the project.

Phase 2: Data Collection (January – April 2022)

Objective: Develop indicators and accompanying data collection tools, integrating stakeholder priorities and available metrics, tools and resources.

Activities:
- Development of definitions and indicators for the safe management of on-site sanitation with particular attention to the Kenyan context.
- Design of data collection tools using insights from existing questionnaires and reports and lessons from other SMOSS country programs.

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- Selection of counties for the pilot exercise, aiming for diversity in geographic and demographic characteristics and existing sanitation facilities and infrastructure. Nairobi, Nakuru and Kisumu counties were selected.
- Training of enumerators and survey leads.
- Electronic data collection using KoBo Collect with 200 households, 11 healthcare facilities, 11 schools and four key informants in each of the three counties.

Table 2: Sample distribution by county for households, schools and health care facilities.

	Nairobi County				Kisumu County				Nakuru County			
	Urban	Peri-urban	Rural	**Total**	Urban	Peri-urban	Rural	**Total**	Urban	Peri-urban	Rural	**Total**
Households	75	75	50	**200**	75	75	50	**200**	75	75	50	**200**
Schools	4	4	3	**11**	4	4	3	**11**	4	4	3	**11**
Healthcare Facilities	4	4	3	**11**	4	4	3	**11**	4	4	3	**11**

Phase 3: Data Analysis (April – July 2022)

Objective: Generate indicator values from the pilot data and assess whether the data derived from the tools and data collection methods are sufficient for indicator calculations.

Activities:

- Calculation of both global and local indicators. Local indicators were developed for in-country comparisons across regions and to integrate into current monitoring systems. Global indicators enable comparison with other countries and track progress over time.
- A second national stakeholder workshop to validate the data collection tools and indicators and build momentum to scale these resources and integrate them into national monitoring systems.

Throughout all phases of implementation, a key element of the approach was extensive stakeholder consultation and engagement. The stakeholders involved included: the Ministry of Health, the Ministry of Water, Sanitation and Irrigation, the Kenya National Bureau of Statistics and the Water Services Regulatory Board, UNICEF Kenya, JMP, USAID and the Kenya Water Sector Trust Fund. The implementation team emphasized the importance of the collaborative development of indicators and tools to ensure they are applicable to the context, useful and trusted for decision making and championed for national scale up.

Additional information on the implementation of the project can be found in both Annex 4: SMOSS Kenya Final Report and Annex 5: SMOSS Kenya Data Collection Report.

Indicators

The primary indicators that guided the design of tools and data collection methods are summarized in Table 3. The full list of global and local indicators and their calculations are detailed in Annexes 1 and 2.

Table 3: Summary indicators for safe management of on-site sanitation.

	Indicator	Global	Local
Basic sanitation	% Improved sanitation facilities	▓	
	% Basic sanitation facilities	▓	
	% Basic on-site sanitation facilities	▓	
Containment	% Waste safely contained (where the risk of groundwater contamination is low)		▓
	% Waste contained	▓	
	% Limited sanitation facilities	▓	
	% Unimproved sanitation facilities	▓	
	% Open defecation	▓	
Emptying	% Waste contained, emptied	▓	
	% Waste contained, emptied and deposited in situ	▓	
	% Waste emptied and treated off-site	▓	
	% Waste safely emptied (of HH that emptied)		▓
Transport	% Waste transported	▓	
	% Waste safely transported (takes into account leakages during transportation)		▓
Disposal or Treatment	% Waste disposed	▓	
	% Waste emptied and disposed	▓	
	% Waste emptied, disposed off-site and treated	▓	
	% Waste safely treated		▓

Note: Improved sanitation facilities are those designed to separate excreta from human contact and include flush/pour flush to piped sewer system, septic tanks or pit latrines, ventilated improved pit latrines, composting toilets or pit latrines with slabs.

Global and Local Indicators

Both global and local indicators were developed for data collection and analysis purposes. The motivation behind having two sets was based on differences in the definitions and calculation methods from the global and national perspectives. In particular, the local indicators take into account key stakeholders' recommendations

and contextual information about local technologies, systems and priorities for sanitation service provision in Kenya.

While the JMP indicators and definitions are needed for global monitoring and cross-country comparisons, they did not align across all aspects of the sanitation service chain with the data that Kenyan stakeholders need to inform policy and monitor progress against national targets. The SMOSS Kenya team responded to this issue by developing locally-informed indicators to include in the SMOSS tools. Having both global and local indicators ensures that SMOSS monitoring captures the information desired by national stakeholders and increases the likelihood that the SMOSS resources will be integrated in national monitoring systems. The local indicators were developed for in-country comparative understanding across regions while addressing regional priorities and easing integration of SMOSS tools into existing systems. The local indicators focus on service delivery and infrastructure. Stakeholders agreed that it would be important to track both the local and global indicators moving forward.

Results and Calculation of Draft Indicators

Figure 6: Reviewing the SMOSS Kenya indicators during the final workshop in May 2022.

This section describes the result from analyzing the pilot data. As mentioned, the data collection exercise was not designed to collect representative data; however, using the collected data to calculate draft indicator values generated important learnings on the need for clear and exhaustive definitions and calculation methods.

Pilot Results

The pilot included respondents from 600 households across the three counties. Of these households, 570 households (95%) had improved sanitation facilities, which the JMP defines as facilities designed to hygienically separate human excreta from human contact. These include wet technologies such as flush and pour flush toilets connected to sewers, septic tanks or pits and dry technologies such as dry pit latrines with slabs and composting toilets.

In our sample, 408 households (68%) had onsite sanitation, and, for 401 households, their waste was considered contained. These included households with pit latrines with slabs, ventilated improved pit latrines, septic tanks

and urine diverting dry toilets. Further analysis of where the liquid effluent drained showed that two households' containments drained to the environment, which reduced the number of households with contained systems to 399. Nine households, all rented, did not know where the toilets were connected and thus were classified as offsite sanitation facilities.

Of the 408 households with onsite sanitation, 264 households' (65%) containments had never been emptied, 110 households' (27%) containments had been emptied, and 16 households (4%) did not know whether their containment had been emptied. Among households with improved onsite sanitation facilities, 107 contaminants had been emptied. According to the JMP guidelines, any improved not shared facility that is contained and has never been emptied is considered safely deposited in-situ. 118 households met this requirement.

Of the 110 households who reported their containment had been emptied, 53 did not know where the waste was taken after emptying while others reported that waste was buried on-site, disposed into the environment or transported off-site. In this pilot study, the reliability and availability of transport and disposal was limited.

To be considered "safely managed" under SDG 6.2, a household should use an improved sanitation facility that is not shared with other households, and the waste should be managed through one of these three pathways:
- Treated and disposed of in situ;
- Emptied and disposed of in situ; or
- Treated offsite in a treatment plant.

For the pilot, the following assumptions were used to classify sanitation as "safely managed":
- Waste that is safely contained but where the containment structure is never emptied is safely managed.
- Waste buried in safe containment structures that are abandoned is safely managed.
- Waste emptied and buried in a hole next to the original containment structure is safely managed.
- Adjustments for waste deposited in the environment during emptying and transport, and amount of waste not treated, were calculated using the assumptions in the table below. Manual emptiers and technical managers of the water service providers were not interviewed in the pilot, so adjustments were made based on the published Shit Flow Diagrams for the three pilot counties, shown in Table 4 and explained in more details in Annex 5.

Table 4: Assumptions applied in calculating safely managed sanitation from shit flow diagrams.

	Nairobi	Nakuru	Kisumu
Sewerage conveyance	80% based on 20% of waste conveyed in sewers is deposited in the environment due to bursts and leaks	75% based on 25% of waste conveyed in sewers is deposited in the environment due to bursts and leaks	80% based on 20% of waste conveyed in sewers is deposited in the environment due to bursts and leaks
Disposal into the environment after emptying	70% based on 30% of all waste emptied is deposited in the environment	Exhauster trucks in Naivasha are not known to leak or dispose waste in the environment	50% based on 50% of waste emptied manually is deposited in the environment

Treatment	88% based on 12% of waste delivered to the treatment plants is not treated.	25% based on 75% of waste delivered to the treatment plant is not treated.	95% based on 5% of waste delivered to the treatment plant is not treated.

Using these definitions and assumptions, we calculated that, among all households involved in the pilot, 157 households (26.2%) had safely managed sanitation. Additional breakdown of the results across counties and technologies are shown below in Table 5.

Table 5: Count and percentage of households with safely managed sanitation.

	Nairobi	Nakuru	Kisumu
All improved sanitation containments never emptied	9 (4.5%)	45 (22.5%)	64 (32.0%)
Excreta emptied, buried in situ	0 (0.0%)	0 (0.0%)	6 (3.0%)
Excreta emptied and treated off-site	2 (1.0%)	0 (0.0%)	3 (1.5%)
Wastewater delivered to treatment plant	22 (11.0%)	6 (3.0%)	2 (1.0%)
Total	32 (16.0%)	51 (25.5%)	76 (38.0%)

The full results of the pilot, including the calculations of indicators, can be found in Annex 5: SMOSS Kenya Data Collection Report.

Data Collection Considerations

The pilot data collection exercise provided an opportunity not only to test the tools, indicators and calculations but also to test the sampling strategy and data collection methods. The key recommendations are listed here along with other recommendations in the annexed SMOSS Kenya Final Report and SMOSS Kenya Data Collection Report.

Data Accuracy and Robustness: Households and institutions often provided estimates or ranges, and different understanding of technical terms led to discrepancies in the data. To address potential misclassifications and inaccuracies, the SMOSS team trained enumerators not only in survey administration but also on the research objectives, types of sanitation technology and the indicators themselves. Where possible, self-reported data should be triangulated with observed indicators and supplemented with key informant interviews.

Sampling Methods: The SMOSS team used systematic sampling–selecting every tenth household–to identify respondents; however, they found that the sampling interval was too small to cover all households in the intended geographic area. Using maps or registers as a sampling frame may yield better representation, but users need to confirm whether these documents are updated to reflect present-day household distribution.

GIS Data: Retrieving coordinates in densely populated areas required enumerators to access rooftops or move into more open areas to get readings. Since accuracy can be related to the quality of devices, data collection

teams should consider the tradeoffs between using commonly accessible devices such as smartphones or investing in specialized GIS devices for increased accuracy and precision.

Mobile-Based Data Collection: Digital platforms are recommended for their time and cost effectiveness, data entry controls and data security features.

Adjustments to the Tools

Following the pilot data collection exercise and subsequent data analysis, the team recommends the following revisions to the tools.

Containment
Observations allowed enumerators to confirm self-reported data and address any misunderstandings around the names or definitions of different facilities. In the household survey, observations were only required for pit latrines. The survey team recommends adding observations of the outlet points from toilets to sewers, septic tanks, holding tanks and pits to assess safe containment, especially among respondents who do not know where their toilets connect. Observations should confirm that containment facilities do not overflow or discharge excreta directly to the surface environment.

To align with national monitoring priorities, the team has recommended a local indicator to assess the risk of groundwater contamination. Additional questions or observations are required to classify containment facilities as permeable, semi-permeable or impermeable to evaluate potential groundwater contamination via infiltration through the permeable walls or base of the containment.

Emptying
To evaluate safe emptying in accordance with national standards, we recommend adding questions to the household survey that assess how a pit or tank is emptied. The proposed additional questions include: (a) who provided the emptying services; (b) how was the emptying was done, e.g., with a bucket, gulper, mechanized-pump to lorry or exhaust truck; and (c) whether emptiers wore appropriate personal protective equipment.

Treatment and Disposal
Additional questions are needed to evaluate the capacity of the treatment plants, especially as they age and serve a larger population than that for which they were designed. For waste that is disposed of in situ, questions are needed to determine the risk of groundwater contamination before being classified as safely disposed.

Calculations of Local Indicators
After making the proposed adjustments to the tools, the team recommends developing standard calculations for the local indicators based on the definitions that were developed in consultation with stakeholders during this pilot exercise.

Further feedback on the tools and data collection methods can be found in Annex 5: SMOSS Kenya Data Collection Report.

Recommendations for SMOSS Scale Up in Kenya

A key objective of the SMOSS pilot in Kenya was to design tools that will generate comprehensive and useful data across the full sanitation value chain that decision makers can use to assess and improve the extent to which on-site sanitation is safely managed. To support the uptake of these tools and their integration into national monitoring systems, we consulted with key stakeholders to understand current challenges and upcoming priorities for sanitation monitoring in Kenya, how the SMOSS resources could support these priorities and which organizations are best positioned to own these tools moving forward.

1. Coordinate with key institutions to standardize sanitation monitoring and integrate the SMOSS tools and indicators into national systems.

NESCRA: The Kenya Environmental Sanitation and Hygiene Policy 2016–2030 calls on the Ministry of Health to establish the National Environmental Sanitation Coordination and Regulatory Authority (NESCRA) though it is not yet set up. Once operational, NESCRA can play a vital role in standardizing definitions–including promoting the wider adoption of the JMP standard indicators–and assessments of the sanitation situation, support alignment towards SMOSS indicators and address the need for better coordination and clarity of roles and responsibilities of partners in the sector.

KNBS: The Kenya National Bureau of Statistics (KNBS) has a constitutional mandate to collect data and report on sanitation coverage. With input from the National Environment Management Authority (NEMA), the Water Services Regulatory Board (WASREB) and other sector stakeholders to establish standard definitions for facility, containment, emptying, transport and treatment types, KNBS is well-positioned to adopt the role of overseeing the calculation of national and county-level estimates of on-site, safely managed sanitation. KNBS can also advise on whether SMOSS data can be collected as a part of ongoing national household and commercial surveys.

WASREB: WASREB maintains the national Water Regulation Information System (WARIS), a database and information system to gather and maintain information on water services and monitor national compliance. WASREB is currently expanding this database to cover sanitation service providers as well. While WASREB routinely collects data from the 88 wastewater service providers, data is not available on the volumes of waste moving through the emptying and transport steps of the value chain. Without service providers' data, safely managed sanitation cannot be reliably quantified. WASREB is well-positioned to collect, aggregate and contribute data from emptying, transport and disposal/treatment service providers and to ensure that on-site sanitation services are included in national monitoring systems like WARIS.

RUSH RTMIS: The Real Time Monitoring Information System (RTMIS) presents a unique opportunity for scaling up SMOSS indicators and setting national standards for data collection and monitoring. To be a comprehensive sanitation monitoring system, RTMIS must include indicators relevant to the urban context, which quantify the amounts of waste safely contained, emptied, transported and treated and identify where losses occur. While RTMIS will use secondary data to cover emptying, transportation and treatment in its initial launch, we recommend that the SMOSS indicators be adopted in later iterations to generate the full picture of the situation for safely managed sanitation in Kenya and to facilitate data-driven policymaking.

SaniTracker: SaniTracker is a cloud-based web portal and mobile application designed to connect and share data between the Eastern and Southern Africa Water and Sanitation (ESAWAS) Regulators Association, regulators and policymakers, utilities and service providers and service users. For policymakers and regulators, Sanitracker will serve as a data repository and provide data visualizations and analytics for country- and regional-level data. Service providers and clients can meanwhile use the service to request and track sanitation services and payments. Collecting data from service providers is a key gap in the existing monitoring systems, so, once operational, SaniTracker can fill a critical role collecting and aggregating data, including household plot information, costs for services, the number and frequency of service requests and the volumes of waste collected, transported and treated.

2. Develop standard, consistent and, if possible, simplified definitions and indicators for on-site sanitation facilities and technologies.

Many of the stakeholders interviewed raised the lack of standard definitions as a hindrance to monitoring on-site sanitation. When defining facility types, it is important to provide adequate detail to determine whether or not a facility is improved versus unimproved, but the definitions should be as simple as possible so enumerators or respondents can easily identify the facility type. Consistent definitions should be used across policies and monitoring frameworks at the national and county levels to generate reliable and comparable data and to assess progress against sanitation targets nationwide.

Similarly stakeholders shared that, for the SMOSS tools to be relevant and adopted for national monitoring, the indicators need to align with national policy documents. Through stakeholder consultations, we identified priority data for stakeholders and policymakers in Kenya and developed associated indicators. These local indicators are specific to Kenya, use definitions from local policies and focus on service delivery and infrastructure relevant to the Kenyan context. For example, while the JMP global indicators recognize all emptying done through manual, semi-mechanized or mechanized methods, Kenyan stakeholders recommended a local indicator that looked at whether the emptying itself was conducted safely. This indicator assesses whether emptying is conducted by authorized personnel using manual, semi-mechanized or mechanized equipment with PPE and does not pose a risk to the surrounding environment during emptying. By including this indicator, policymakers can better identify areas where unsafe emptying practices are prevalent and address these practices as needed.

Both the global and local indicators are calculated using the same SMOSS data and tools. While we acknowledge that a second set of indicators can create confusion and discrepancies between similarly named indicators, the inclusion of local indicators was necessary to build a system that would be useful to Kenyan stakeholders and which would be most likely to be adopted into national data collection and monitoring. To address potential issues, the definitions of each indicator, their calculation and the SMOSS data used for their calculation are included in the tables of indicators in Annex 1: Global Indicators and Annex 2: Local Indicators.

3. Incorporate locally relevant solutions and technologies.

Local indicators provide an opportunity to recognize and integrate sanitation solutions and technologies that are important to the context of service provision in Kenya. The inclusion of container-based sanitation

(CBS) reflects Kenya's national policy documents—such as the Kenya Environmental Sanitation and Hygiene Policy (KESHP)—which specifically reference CBS as a promising solution for informal settlements. Likewise, shared latrines are the primary sanitation facility used by 24% of the population nationwide and 45% of the urban population, so capturing data on the waste management from shared facilities is crucial to monitoring safe sanitation throughout the country.

4. Expand pilot activities to facilitate SMOSS data collection and analysis at national scale.

The objective of the SMOSS Kenya pilot was to test the indicators, tools and calculation methods. While there were valuable insights from the pilot regarding enumerator selection and training, data collection methods and sampling, we recommend a larger pilot and a phased rollout to determine which organizations are best positioned to collect, aggregate, analyze and report on the SMOSS data and to test the best methodological approaches for sample design, service provider listing and technologies for data collection. Coordination with RTMIS, SaniTracker and WASREB's WARIS is critical to create a cohesive monitoring approach while avoiding duplication of efforts and discrepancies in data and indicators. We recommend exploring options to collect SMOSS data through existing organizations focused on sanitation promotion, such as the Kenya Sanitation Alliance, which is led by the Ministries of Health and Ministry of Water, Sanitation and Irrigation with support from UNICEF, the Government of Japan and the United States Agency for International Development.

Recommendations for SMOSS Pilots in Other Countries
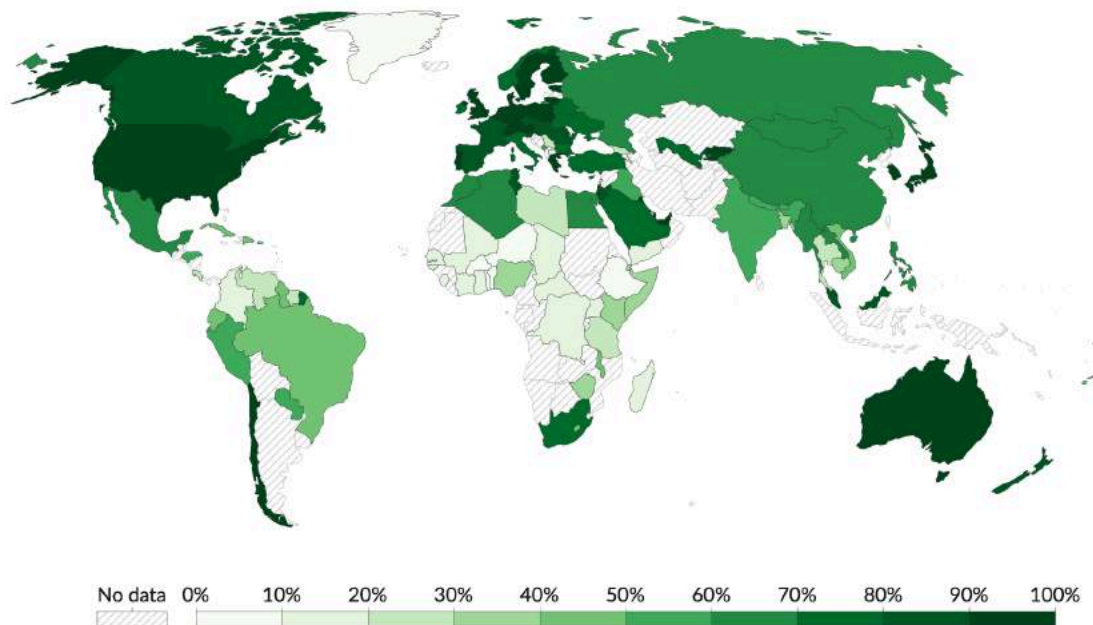
Figure 7: Share of the population using safely managed sanitation facilities (which are not shared with other households and where excreta are safely disposed of or transported and treated off-site), 2022. Data from JMP and graphic from Our World in Data.

1. Plan and budget for extensive stakeholder engagement.

Collaborative stakeholder consultation from planning through data collection and analysis is critical to the success of the project. The team sought input from stakeholders not only for the validation of indicators and the report but also to ensure that definitions and tools are relevant, accurate and likely to be integrated in national monitoring systems and see sustained implementation. Engagement with stakeholders informed the selection of pilot locations and facilitated data collection. However, preparing for and participating in productive workshop sessions and during other feedback points requires a considerable time commitment and active participation from all stakeholders, not only the research team.

2. Maintain focus on developing and testing scalable indicators and tools, and not on collecting representative data.

The pilot data collection exercise was designed to test the indicators, tools and calculations, not to generate representative estimates of sanitation facilities and service coverage in the pilot counties. Stakeholders often focused on the quantitative results of the pilot rather than the indicators and tools themselves. Additionally, the indicators and tools should be designed to capture more nuanced and complex

data as households or institutions move up the sanitation ladder while avoiding unnecessary or excessive questions.

3. Develop locally-rooted and globally relevant indicators and tools.

The global SMOSS indicators as defined by JMP are important for country comparisons and understanding the state of sanitation worldwide. To promote buy-in and update of these indicators and tools in-country, indicators should also capture the data needed by policymakers and stakeholders to make evidence-informed decisions. Designing tools that take into account locally relevant practices, technologies and data gaps can increase the likelihood of uptake and national scaling and minimizes the duplication of data collection activities.

Additional recommendations from both Sanergy and Sanivation related to the scaling of SMOSS in Kenya and the implementation in other pilot countries can be found in both Annex 4: SMOSS Kenya Final Report and Annex 5: SMOSS Kenya Data Collection Report.

Using the Tools and Reports

The following sections of the document include all indicators, tools and reports developed during the SMOSS pilot in Kenya.

Annex 1: Lists the global indicators and their definitions.
Annex 2: Lists the local indicators and their definitions.
Annex 3: Includes the data collection tools used in the pilot.
Annex 4: Includes the SMOSS Kenya Pilot Report prepared by Sanergy. This report covers the approach to engagement with stakeholders, the development of indicators and data collection tools, the design of the pilot strategy including the selection of locations for data collection, findings and lessons learned from the pilot and recommendations for uptake in Kenya as well as for future pilots in other countries. This report was prepared in December 2022 and updated in November 2023.
Annex 5: Includes the SMOSS Kenya Data Collection Report prepared by Sanivation. This report covers the pilot methodology, pre-testing of instruments, enumerator training, results from an initial analysis of the pilot data and the lessons learned and key findings from the pilot. This report was finalized in March 2023.

Annex 1: Global Indicators

Table 6: Household Indicators

#	Indicator	JMP Definition	Calculation	Source Data from SMOSS Tools
OVERALL INDICATOR				
1	% Safely managed sanitation	Improved not shared on-site facilities that are: a) disposed in situ (contained but not emptied) b) emptied and disposed c) emptied, disposed and treated off-site	% waste disposed + % waste emptied and disposed + % waste emptied, disposed off-site and treated	
BASIC SANITATION				
2	% Improved sanitation facilities	Use of sanitation facilities that are deemed improved, including flush/pour flush toilets connected to piped sewer systems, septic tanks or pit latrines; pit latrines with slabs (including ventilated pit latrines), and composting toilets.	# households using improved sanitation facilities / all households	Questions 14a and 14b on household survey Supplemented with observations of the sanitation facility type and slab
3	% Improved onsite sanitation	Improved on-site containment refers to the improved sanitation facilities that are on-site, which are all other than those discharging to sewer and those that don't know where they discharge to.	# households with flush toilets connected to septic tanks or pit latrines/ pit latrines with slabs (including ventilated pit latrines) and composting toilet / all households	Questions 14a and 14b on household survey Supplemented with observations of the sanitation facility type and slab

4	% Basic sanitation facilities	Use of improved sanitation facilities that are not shared by other households.	# households with not shared sanitation facilities / # all households * % improved sanitation facilities	Questions 14a and 14c on household survey
5	% Basic on-site sanitation facilities	Improved facilities that are on-site / # improved facilities × % not shared.	Households with flush toilets draining to a septic tank + VIP latrines + pit latrine with slabs + composting toilet + UDDT / all households * % basic sanitation	Questions 14a, 14b and 14c on household survey
CONTAINMENT				
6	% Waste contained	Households with contained on-site storage (pits/tanks) refers to the proportion of households using basic on-site sanitation facilities which prevent excreta and effluent from being discharged to the surface environment.	# households with improved on-site systems that are contained / # households with improved on-site systems * % basic on-site sanitation	Questions 14a, 14b, 16a, and 16b on household survey
7	% Limited sanitation facilities	Use of improved facilities shared between two or more households.	# households with improved facilities shared between two or more households / all households	Questions 14a, 14b, 14c, 14d, and 14e on household survey

Supplemented with observations of the sanitation facility type and slab |
| 8 | % Unimproved sanitation facilities | Use of pit latrines without a slab or platform, hanging latrines, bucket latrines or toilets disposing to open drains. | # Use of pit latrines without a slab or platform, hanging latrines, bucket latrines or latrines disposing to open drains / all households | Questions 14a and 14b on household survey

Supplemented with observations of the sanitation facility type and slab |
| 9 | % Open defecation | Disposal of human feces in fields, forests, bushes, open bodies of water, beaches, and other open spaces or with solid waste. | #HH with no facility / all households | Questions 14a on household survey |

EMPTYING				
10	% Waste emptied	All basic contained on-site systems that have ever been emptied. It does not include by who, how or how frequently it was emptied.	# households with improved on-site systems that have ever emptied / # households with improved on-site systems * % waste contained	Questions 17a on household survey
TRANSPORT				
11	% Waste transported offsite	All contained emptied facilities that are delivered off-site to a treatment site or a sanitary landfill.	# households emptied and transported to off-site treatment / # households emptied * % waste emptied	Question 20 on household survey, and possibly question 18 if needed for analysis of key informant data Question 20a on emptying and transport service provider key informant interview guide
TREATMENT AND DISPOSAL				
12	% Waste disposed	All contained facilities that have not been emptied (i.e., considered disposed of).	# households with improved on-site systems that have not been emptied / # households with improved on-site systems * % waste contained	Question 17a on household survey
13	% Waste emptied and disposed	All contained facilities that emptied and disposed of in-situ (i.e., buried in a covered pit locally.)	# households emptied and disposed on-site (buried in covered pit) / # HH emptied * % waste emptied	Question 20 on household survey Questions 20a and 20b on emptying and transport service provider key informant interview guide
14	% Waste emptied, disposed off-site and treated	All contained emptied facilities that are delivered off-site to a treatment site and both the liquid and solid fraction are treated.	# Treatment sites that provide at least secondary treatment for both solid and liquid phase / all treatment and designated disposal sites * % waste transported offsite	Question 20 on household survey Questions 20a on emptying and transport service provider key informant interview guide

Table 7: Healthcare Facility Indicators

#	Indicator	JMP Definition	Calculation	Source Data from SMOSS Tools
1	% Advanced sanitation facilities	Defined at national level. Defined at national level. Elements might include toilet cleanliness, toilet lighting, or patients per toilet ratios.		
2	% Basic sanitation facilities	Improved sanitation facilities are usable with at least one toilet dedicated for staff, at least one sex-separated toilet with menstrual hygiene facilities, and at least one toilet accessible for people with limited mobility.	Improved sanitation facilities are usable with at least one toilet dedicated for staff, at least one sex-separated toilet with menstrual hygiene facilities, and at least one toilet accessible for people with limited mobility / All healthcare facilities	Questions 1, 2, 5, 6 and 10 on healthcare facility survey

Observations |
| 3 | % Limited sanitation facilities | At least one improved sanitation facility, but not all requirements for basic service are met. | At least one improved sanitation facility, but not all requirements for basic service are met / All healthcare facilities | Questions 1 and 2 on healthcare facility survey

Observations |
| 4 | % No service | Toilet facilities are unimproved (pit latrines without a slab or platform, hanging latrines and bucket latrines), or there are no toilets or latrines at the facility. | Toilet facilities are unimproved (pit latrines without a slab or platform, hanging latrines and bucket latrines), or there are no toilets or latrines at the facility / All healthcare facilities | Questions 1 and 2 on healthcare facility survey |

Table 8: School Indicators

#	Indicator	JMP Definition	Calculation	Source Data from SMOSS Tools
1	% Advanced sanitation facilities	Defined at national level. Elements might include students per toilet ratios, appropriate facilities for menstrual hygiene management, or toilet accessibility for all users (to be defined at national level).		
2	% Basic sanitation facilities	Improved facilities, which are single-sex and usable at the school.	Improved facilities, which are single-sex and usable at the school / all schools	Questions 1, 2, 5, 7 and 8 on school survey Observations
3	% Limited sanitation facilities	There are improved facilities (flush/pour-flush toilets, pit latrine with slab, composting toilet), but not single-sex or not usable at time of survey.	There are improved facilities (flush/pour-flush toilets, pit latrine with slab, composting toilet), but not single-sex or not usable at time of survey / all schools	Questions 1, 2, 5, 7 and 8 on school survey Observations
4	% No service	No toilets or latrines, or unimproved facilities (pit latrines without a slab or platform, hanging latrines, bucket latrines).	No toilets or latrines, or unimproved facilities (pit latrines without a slab or platform, hanging latrines, bucket latrines) / all schools	Questions 1 and 2

Annex 2: Local Indicators

Table 9: Local indicators for Kenya

#	Indicator	Definition
1	Overall % safely managed onsite sanitation	% of waste that is safely managed throughout the entire sanitation value chain (containment, emptied, transported, treated)
2	% Waste safely **contained**	% of waste that has a low risk to the environment in its containment stage. Calculated as % fully lined pit latrines, septic tanks or unlined pit latrines and septic tanks where the risk of groundwater contamination is low. Includes composting toilets and container-based sanitation (CBS).
3	% Waste safely **emptied**	% of waste that is low risk to the environment during emptying. Calculated as % of waste emptied by authorized personnel using manual, semi-mechanized or mechanized equipment, with PPE and does not pose a risk to the surrounding environment during emptying
4	% Waste safely **transported**	% of waste that is low risk to the environment during transport. Calculated as waste transported using sewers, barrels, buckets, tanks or vacuum trucks that DO NOT leak during transportation.
5	% Waste safely **treated**	% of waste that is properly treated before being released into the environment. Calculated as a percent of the difference between the actual capacity (m^3/day) of the treatment plant and the treated flow (m^3 of wastewater and fecal sludge / day)

Note: The formulas for calculating the local indicators should be developed and standardized through further testing during the pilot expansion outlined in the section *Recommendations for SMOSS Scale Up in Kenya.*

Annex 3: Data Collection Tools

This section includes the data collection tools used for the pilot.

Table 10: Summary of the data collection tools.

Household Survey	Healthcare Facility Survey	School Survey	Key Informant Interview Guides
30 questions 7 observations	25 question 12 observations	25 questions 12 observations	4 informant categories 30 questions

Household Survey

INTRODUCTION AND VERBAL CONSENT

Introduction and Purpose of the study
Hello, my name is……………….. I am conducting a research study on behalf of UNICEF Kenya to learn about sanitation facilities and services. This research will help Kenya to identify challenges and opportunities to improve sanitation in our communities.

Voluntary Participation and withdrawal
Your participation in this study is completely VOLUNTARY. You can stop participating at any time by leaving the interview or asking us to stop the interview.

Procedures
If you agree to participate in this study, I will go ahead and use a survey to ask you some questions. Participation in the survey will take approximately 30-40 minutes. We would like to record the interview on this audio recorder, so that we can later go back, transcribe the session and write down what everyone has said. We would like to suggest that this be an open discussion. There are no right or wrong answers and you are welcome to answer in any way you like.

Risks and benefits
We anticipate minimal risk associated with participation in this study. If any questions in the survey make you feel uncomfortable, you are free to decline to answer any question you do not wish to answer or to end the interview at any time.

Privacy and confidentiality
All answers will be kept confidential to the highest degree permitted by the technology used. Any information that identifies you will be separated from your responses so that only our researchers will be able to track your answers back to you. All measures described above will be taken to protect the confidentiality of this study data. Your comments will be kept confidential. To further ensure that your information is kept private and confidential, we will later assign you a unique number which will replace your name in any transcripts and analysis that will be written after this session. The summary data will be shared publicly, but there should be no way for anyone - from the government or otherwise - to trace the data back to you.

Contact details
If you wish to end the interview at any time, you may do so. If you have any questions, please contact [...]

I am happy to answer any further questions you have about this study. Do you have any questions about this study?

Are you interested and willing to participate? Yes/No

Are you okay with the interview being recorded? Yes/No
If the respondent consents to be interviewed, please sign this consent form. (Distribute the consent forms and collect signed consents)

PART A: GENERAL INTERVIEW PROFILE	
Enumerator name:	
Date of interview:	⊔⊔/⊔⊔/⊔⊔⊔⊔ Day Month Year
Name of county:	
Name of sub-county:	
Name of ward:	
GPS Coordinates (generated by the platform):	
Urban, rural or peri-urban:	1. Urban 2. Rural 3. Peri-Urban
Is this a plot (i.e. multiple households at a single address)	1. Yes 2. No
If yes, does the plot have a unique number?	1. Yes _____ (record number) 2. No
Type of settlement:	1. Formal 2. Semi-formal 3. Informal
Part B: DEMOGRAPHIC AND HOUSEHOLD CHARACTERISTICS	
Note: Respondent should be a knowledgeable member of the household and ideally an adult. Check that the respondent is a knowledgeable member of the household and at least 18 years old before proceeding. You may only interview a child age 15-17 if there is no adult member of the household or all adult members are incapacitated. You may not interview a child under age 15.	
1. Participant Gender	1. Male 2. Female
2. Participant Age	1. 15-17 (see note above) 2. 18 - 25 3. 26 - 60 4. More than 60
2a. Participant's first and last name:	
2b. Participant's phone number:	
2c. Participant's alternative phone number:	

2d. Participant's Religion	1. Christian 2. Muslim 3. Hindu 4. Mixed 5. Other
2f. What's the main source of income of the primary decision maker?	1. Salaried employment 2. Self employed/business owner 3. Casual work 4. Unemployed/No income 5. Other
3. Are you the head of the household? [Household head is the primary decision maker on matters concerning the home]: *(If you select No, skip to 4b)*	1. Yes 2. No
4. What is the highest education level completed by the head of the household?	1. No formal education 2. Primary education 3. Secondary education 4. Tertiary education 5. Don't know
5. How many people live in your household?	[Enter number]
6. How many house units are in this plot or address? (Use 00 if they don't know)	[Enter number]
7. Do you own or rent this house? *(If you selected "Own this house", skip to question 11)*	1. Rent this house 2. Own this house
8. If you selected 'rent this house', how many landlords own this plot?	1. 1 2. Multiple 3. Not sure 4. Owner
9. If you selected 'rent this house', describe where your landlord lives?	1. In the plot 2. Outside the plot, but within this community 3. Outside the community, but within the city 4. Outside the city 5. Don't know
10. If you selected "Outside the plot, but within this community" or "Outside the community, but within the city" or ``Outside the city'' how often does the landlord come to the plot?	1. Daily 2. Several times a week 3. Once a week 4. At least once a month 5. At least once a year 6. Never 7. Not Applicable

11. Who makes sanitation decisions for this address or plot? (e.g., deciding whether to build a latrine, to have it maintained or emptied, etc.)	1. Owner 2. Landlord 3. Caretaker 4. Tenants 5. I don't know
12. Who made the one time capital expense payment for the household or plot sanitation access i.e cost for construction of the facility?	1. Owner 2. Landlord 3. Caretaker 4. Tenants 5. This household doesn't pay for sanitation 6. I don't know
13. Who makes large, occasional expenses for the household or plot sanitation access? (e.g., emptying fees)	1. Owner 2. Landlord 3. Caretaker 4. Tenants 5. This household doesn't pay for sanitation 6. I don't know

PART C: SANITATION PROFILE	
14a. What kind of toilet facility do members of your household usually use?	1. Flush to piped sewer system 2. Flush to septic tank 3. Flush to pit latrine 4. Flush to open drain 5. Flush to DK where 6. Ventilated improved pit latrine 7. Pit latrine with slab 8. Pit latrine without slab 9. Open pit 10. Composting toilet 11. Urine diversion dry toilet 12. Bucket 13. Hanging toilet/ hanging latrine 14. No facility/Bush/field 15. Other(Specify)
14b. Is there another toilet that some members of the household regularly use?	1. Flush to piped sewer system 2. Flush to septic tank 3. Flush to pit latrine 4. Flush to open drain 5. Flush to DK where 6. Ventilated improved pit latrine 7. Pit latrine with slab 8. Pit latrine without slab 9. Open pit 10. Composting toilet 11. Urine diversion dry toilet 12. Bucket 13. Hanging toilet/ hanging latrine 14. No facility/Bush/field 15. Other(Specify)

14c. Do you share this facility with others who are not members of your household?	1. Yes 2. No
14d. Do you share this facility only with members of other households that you know, or is the facility open to the use of the general public?	1. Shared with known households (not public) 2. Shared with general public
14e. How many households in total use your primary toilet facility, including your own household? **Note to enumerators: If he/she uses a private household toilet, fill in 1**	1. _____ Number of households (if less than 10) 2. 10 or more households 3. Don't know 4. 0
14f. With how many individuals do you share your primary toilet including individuals in your own household? **Note to enumerators: If he/she uses a private household toilet for only them, select 1**	1. 1-4 2. 5-10 3. 11-15 4. More than 15 5. 0
15. How do you pay to use your primary toilet facility?	1. Each HH pays the Landlord monthly 2. Each HH pays for the toilet as part of rent 3. Free 4. Each HH pays a fee directly to the local government/utility 5. Not Applicable
16a. Does the pit latrine/septic tank have an overflow line for liquid effluent?	1. Yes 2. No
16b. If you select yes in question 17a above, what does it connect to?	1. Conventional sewer 2. Open drain/surface environment 3. Soak pit/leach field 4. Other (specify) 5. Don't know
17a.Has your toilet containment been emptied before?	1. Yes 2. No 3. Don't know
17b. Approximately, how long ago was your toilet/septic tank emptied?	*Insert no of months/years*

17c. If you selected yes in question 17a above, what happened the last time it was full?	1. Emptied manually using bucket and/or barrel 2. Emptied using a pump 3. Emptied both manually and using a pump 4. Emptied using a mechanical exhauster 5. Not emptied- we dig another latrine 6. Not emptied- it is abandoned 7. It has never filled 8. Other 9. Don't know
18. Who provided the emptying service?	1. Municipality 2. Private service provider 3. Household members/neighbors 4. Other 5. Don't know
19a. What is the number of (barrels/pits/vacuum trucks) that were emptied during the last containment emptying event? *(Enumerators enter 00 for don't know)*	[Enter number]
19b. Please select the units of the number above in question 19a 　　[Select unit]	1. Barrels 2. Pits 3. Vacuum trucks 4. Don't know 5. Other _____
19c. What was the estimated volume (L) per unit that was used for emptying?	1. [Enter number] 2. Don't know 3. Not applicable
20. Where was the waste taken after it was last emptied?	1. Disposed of in situ: 2. Buried in a covered pit 3. Placed in an uncovered pit, open ground, water body or elsewhere 4. Removed and disposed of offsite 5. Other 6. Don't know

21. Who paid for emptying the toilet containment last time it was full?	1. Landlord paid on his/her own 2. It is usually factored into rent 3. Single tenant collected from the other tenants 4. Landlord and tenants jointly contributed 5. Landlord collected from tenants 6. Don't know 7. Other _____
22a. How much did each barrel/pit/vacuum truck cost the last time the toilet containment was emptied?	1. [Enter number in KES] 2. Don't know
22b. If responded answers "Don't Know" to 23a, can they estimate the total cost for the emptying?	1. [Enter number in KES]
ENUMERATOR OBSERVATIONS	
1. Can you please show me the toilet primarily used by members of your household? Observe the type of facility used by a particular household.	
2. If you observed VIP or pit latrine with slab following question 1 above, which best describes the floor of the household's latrine?	1. Concrete/ceramic slab 2. Plastic slab 3. Wood planks 4. Packed earth/mud 5. Other [detail]
3. If the observed VIP or pit latrine has a slab, is the slab damaged or in good condition?	1. Damaged 2. Good condition
4. Does the observed household facility have a superstructure which allows for privacy? *[If "No", skip to question 6]*	1. Yes 2. No
5. If the household's facility has a superstructure, does the superstructure have a roof which keeps out the rain?	1. Yes 2. No
6. If the observed household has a VIP or traditional pit latrine, which best describes the interface?	1. Seat 2. Hole 3. Squat plate
7. If the observed household has a VIP or traditional pit latrine, does the pit have a lid?	1. Yes, one that keeps all flies out 2. Yes, but it is not tightly sealed and flies could get in 3. No, it has no lid

END INTERVIEW

Healthcare Facility Survey

INTRODUCTION AND VERBAL CONSENT

Introduction and Purpose of the study
Hello, my name is……………….. I am conducting a research study on behalf of UNICEF Kenya to learn about sanitation facilities and services. This research will help Kenya to identify challenges and opportunities to improve sanitation in our communities.

Voluntary Participation and withdrawal
Your participation in this study is completely VOLUNTARY. You can stop participating at any time by leaving the interview or asking us to stop the interview.

Procedures
If you agree to participate in this study, I will go ahead and use a survey to ask you some questions. Participation in the survey will take approximately 30-40 minutes. We would like to record the interview on this audio recorder, so that we can later go back, transcribe the session and write down what everyone has said. We would like to suggest that this be an open discussion. There are no right or wrong answers and you are welcome to answer in any way you like.

Risks and benefits
We anticipate minimal risk associated with participation in this study. If any questions in the survey make you feel uncomfortable, you are free to decline to answer any question you do not wish to answer or to end the interview at any time.

Privacy and confidentiality
All answers will be kept confidential to the highest degree permitted by the technology used. Any information that identifies you will be separated from your responses so that only our researchers will be able to track your answers back to you. All measures described above will be taken to protect the confidentiality of this study data. Your comments will be kept confidential. To further ensure that your information is kept private and confidential, we will later assign you a unique number which will replace your name in any transcripts and analysis that will be written after this session. The summary data will be shared publicly, but there should be no way for anyone - from the government or otherwise - to trace the data back to you.

Contact details
If you wish to end the interview at any time, you may do so. If you have any questions, please contact [...]

I am happy to answer any further questions you have about this study. Do you have any questions about this study?

Are you interested and willing to participate? Yes/No

Are you okay with the interview being recorded? Yes/No
If the respondent consents to be interviewed, please sign this consent form. (Distribute the consent forms and collect signed consents)

PART A: HCF IDENTIFICATION AND GENERAL CHARACTERISTICS	
Enumerator name:	
Date of interview:	Day / Month / Year
Name of HCF:	
HCF code (if any):	
Name of county:	
Name of sub-county:	
Name of ward:	
GPS Coordinates (generated by the platform):	
Urban, rural or peri-urban:	1. Urban 2. Rural 3. Peri-Urban
Type of settlement in surrounding area:	1. Formal 2. Semi-formal 3. Informal
Position/Title of the respondent:	
Contact cell phone to health care facility	
How many patients visit the facility on average every month?	Number: _____
How many clinical staff are working at the facility? (e.g., doctors, nurses)	Number: _____
How many non-clinical staff are working at the facility?	
Approximate number of total female staff (all types)	Number: _____
Approximate number of total male staff (all types)	Number: _____

PART B: DATA ON TYPE AND CHARACTERISTICS OF SANITATION FACILITIES	
1. What kind of toilet facility do staff and patients typically use?	1. Flush to piped sewer system 2. Flush to septic tank 3. Flush to pit latrine 4. Flush to open drain 5. Flush to don`t knowDK where 6. Ventilated improved pit latrine 7. Pit latrine with slab 8. Pit latrine without slab 9. Open pit 10. Composting toilet 11. Urine diversion dry toilet 12. Bucket 13. Hanging toilet/ hanging latrine 14. No facility/Bush/field 15. Other(Specify)
2 .Is there another type of facility that is used?	1. Flush to piped sewer system 2. Flush to septic tank 3. Flush to pit latrine 4. Flush to open drain 5. Flush to don`t knowDK where 6. Ventilated improved pit latrine 7. Pit latrine with slab 8. Pit latrine without slab 9. Open pit 10. Composting toilet 11. Urine diversion dry toilet 12. Bucket 13. Hanging toilet/ hanging latrine 14. No facility/Bush/field 15. Other(Specify)
3. Where is the primary sanitation facility for patients located?	1. Within HCF premises 2. Outside HCF premises 3. None
4. What is the distance (in meters) of the primary sanitation facility from the main HCF building? *Note to enumerator: If toilet is inside the building, put 0; if there is no facility, enter N/A*	Insert the distance in meters: _____ 0 = inside building N/A = no facility
5. Are facilities separated by sex (i.e. separated for men and women)	1. No 2. Yes
6. Do staff (e.g., nurses) use the same facilities as patients?	1. No 2. Yes

7. How many toilet compartments are in use?	1. Only for men: _____ 2. Only for women: _____ 3. Communal for men and women: _____ 4. Staff only: _____
8. How many toilet compartments are not in use?	1. Only for men: _____ 2. Only for women: _____ 3. Communal for men and women: _____ 4. Staff only: _____
9a. Does the HCF also have urinals?	1. No 2. Yes
9b. If yes to the question above, how many urinals are in use?	Number: _____
10. Is there at least one sanitation facility accessible to persons with physical disabilities? *Note to enumerator: To be considered accessible, a toilet/latrine should be available that meets all of the following conditions: can be accessed without stairs or steps with a clear path leading to the facility; handrails for support are attached either to the floor or sidewalls; there is enough space inside for a wheelchair user to enter, turn, close the door and park by the toilet; the door is at least 80 cm wide and opens outward with minimal or no difference in floor height between outside and inside; and the door handle and seat are within reach of children using wheelchairs or crutches/sticks, including a fixed raised pan or movable wooden raised toilet seat*	1. No 2. Yes

11a. Does the sanitation containment have an overflow line for liquid effluent?	1. No 2. Yes
11b. If answered yes in the question above, what does it connect to?	1. Conventional sewer 2. Open drain/surface environment 3. Soak pit/leach field 4. Other (specify) 5. Don't know
12. Has this institution's containment been emptied before?	1. No 2. Yes 3. Don't know
13a. Approximately, how long ago was the containment emptied?	*Insert no of months/years*
13b. If you selected yes in question 12 above, what happened the last time it was full?	1. Emptied manually using bucket and/or barrel 2. Emptied using a pump 3. Emptied both manually and using a pump 4. Emptied using a mechanical exhauster 5. Not emptied- we dig another latrine/pit 6. Not emptied- it is abandoned 7. It has never filled 8. Other 9. Don't know
14. Who provided the emptying service?	1. Municipality 2. Private service provider 3. Household members/neighbors 4. Other 5. Don't know 6. N/A (never emptied)
15a. What is the number of ; barrels/pits/vacuum trucks that were emptied during the last containment emptying event? *(Enumerators enter 00 for don't know)*	[Enter number]
15b. Please select the units for the question above.	1. Barrels 2. Pits 3. Vacuum trucks 4. Don't know 5. Other _____ 6. N/A (never emptied)

16. What was the estimated volume (L) per unit that was used for emptying?	1. [Enter number] 2. Don't know 3. N/A (never emptied)
17. Where was the waste taken after it was last emptied?	1. Disposed of in situ: 2. Buried in a covered pit 3. Placed in an uncovered pit, open ground, water body or elsewhere 4. Removed and disposed of offsite 5. Other 6. Don't know 7. N/A (never emptied)
18. Who paid for emptying the toilet containment last time it was full?	1. HCF 2. Local government 3. National budget 4. Staff 5. Don't Know 6. Other: specify: _____ 7. N/A (never emptied)
19. Is there a dedicated budget line for emptying service allocated in the budget of your HCF?	1. No 2. Yes
20a. How much did each barrel/pit/vacuum truck cost the last time the toilet containment was emptied?	1. [Enter number in KES] 2. Don't know
20b. If respondent answers "Don't Know" to 20a, can they estimate the total cost for the emptying?	1. [Enter number in KES]

ENUMERATOR OBSERVATIONS	
1. Are there covered garbage bins present in the women's toilet compartments?	1. No 2. Yes
2. Is toilet paper or rinse water available in both women's and men's facilities at the time of the survey?	1. No 2. Yes
3. Are toilet seats or pit slabs made of material that can be cleaned easily (porcelain, concrete, steel, plastic)?	1. No 2. Yes
4. Do compartments have natural ventilation (window, opening for ventilation)?	1. No 2. Yes

5. Is the facility free from fecal smears on pan, wall and floor?	1. No 2. Yes
6. Is the pan free from used cleaning materials? (paper, stones and sticks)	1. No 2. Yes
7. Did you see the presence of human feces in the yard or compound?	1. No 2. Yes
8. For outdoor toilets: Is there a path to the toilet which can be conveniently used in any weather and season?	1. No 2. Yes
9. Where is the nearest hand washing facility in relation to the toilet?	1. Handwashing facility in same compartment as toilet 2. Handwashing facility within 5 m of toilet 3. Handwashing facility more than 5m from toilet 4. None
10. Is there water available at the handwashing facility?	1. No 2. Yes
11. Is there soap available at the handwashing facility?	1. No 2. Yes
12. Does the handwashing facility appear to be in use?	1. No 2. Yes

END INTERVIEW

School Survey

INTRODUCTION AND VERBAL CONSENT

Introduction and Purpose of the study
Hello, my name is……………….. I am conducting a research study on behalf of UNICEF Kenya to learn about sanitation facilities and services. This research will help Kenya to identify challenges and opportunities to improve sanitation in our communities.

Voluntary Participation and withdrawal
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Procedures
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Risks and benefits
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Contact details
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I am happy to answer any further questions you have about this study. Do you have any questions about this study?

Are you interested and willing to participate? Yes/No

Are you okay with the interview being recorded? Yes/No
If the respondent consents to be interviewed, please sign this consent form. (Distribute the consent forms and collect signed consents)

PART A: SCHOOL IDENTIFICATION AND GENERAL CHARACTERISTICS	
Enumerator name:	
Date of interview:	Day / Month / Year
Name of school:	
School code (if any):	
Name of county:	
Name of sub-county:	
Name of ward:	
GPS Coordinates (generated by the platform):	
Urban, rural or peri-urban:	1. Urban 2. Rural 3. Peri-Urban
Type of settlement in surrounding area:	1. Formal 2. Semi-formal 3. Informal
Position at school of the respondent:	
Total number of students in school	Number: _____
Number of boys in school	Number: _____
Number of girls in school	Number: _____
Number of staff in school	Number: _____
Age groups of children in school	Check all that apply: 1. Younger than 7 years 2. 7 to 11 years 3. 11 to 15 years 4. 15 years +
Number of children with physical disabilities in school	Number: _____
How old is the school building?	1. School built less than 1 year ago 2. Building 1 to 10 years old 3. Building 11 to 30 years old 4. Building 31 to 50 years old 5. Building is more than 50 years old

PART B: DATA ON TYPE AND CHARACTERISTICS OF SANITATION F	
1. What kind of toilet facility do staff and students typically use?	1. Flush to piped sewer system 2. Flush to septic tank 3. Flush to pit latrine 4. Flush to open drain 5. Flush to don`t knowDK where 6. Ventilated improved pit latrine 7. Pit latrine with slab 8. Pit latrine without slab 9. Open pit 10. Composting toilet 11. Urine diversion dry toilet 12. Bucket 13. Hanging toilet/ hanging latrine 14. No facility/Bush/field 15. Other(Specify)
2. Is there another type of facility that is used?	1. Flush to piped sewer system 2. Flush to septic tank 3. Flush to pit latrine 4. Flush to open drain 5. Flush to don`t knowDK where 6. Ventilated improved pit latrine 7. Pit latrine with slab 8. Pit latrine without slab 9. Open pit 10. Composting toilet 11. Urine diversion dry toilet 12. Bucket 13. Hanging toilet/ hanging latrine 14. No facility/Bush/field 15. Other(Specify)
3. Where is the primary sanitation facility for students located?	1. Within school premises 2. Outside school premises 3. None
4. What is the distance (in meters) of the primary sanitation facility from the main school building? *Note to enumerator: If toilet is inside the building, put 0; if there is no facility, enter N/A*	Insert the distance in meters: _____ 0 = inside building N/A = no facility
5. Are facilities separated by sex (i.e. separated for boys and girls)	1. No 2. Yes
6. Do staff (e.g., teachers) use the same facilities as students?	1. No 2. Yes

7. How many toilet compartments are in use?	1. Only for boys: _____ 2. Only for girls: _____ 3. Communal for boys and girls: _____ 4. Staff/Teachers only: _____
8. How many toilet compartments are not in use?	1. Only for boys: _____ 2. Only for girls: _____ 3. Communal for boys and girls: _____ 4. Staff/Teachers only: _____
9a. Does the school also have urinals?	1. No 2. Yes
9b. If yes to the question above, how many urinals are in use?	Number: _____
10. Is there at least one sanitation facility accessible to younger children (i.e. with smaller seats)?	1. No 2. Yes
11. Is there at least one sanitation facility accessible to children with physical disabilities? *Note to enumerator: To be considered accessible, a toilet/latrine should be available that meets all of the following conditions: can be accessed without stairs or steps with a clear path leading to the facility; handrails for support are attached either to the floor or sidewalls; there is enough space inside for a wheelchair user to enter, turn, close the door and park by the toilet; the door is at least 80 cm wide and opens outward with minimal or no difference in floor height between outside and inside; and the door handle and seat are within reach of children using wheelchairs or crutches/sticks, including a fixed raised pan or movable wooden raised toilet seat*	1. No 2. Yes

12a. Does the sanitation containment have an overflow line for liquid effluent?	1. No 2. Yes
12b. If you select yes in the question above, what does it connect to?	1. Conventional sewer 2. Open drain/surface environment 3. Soak pit/leach field 4. Other (specify) 5. Don't know
13. Has this institution's containment been emptied before?	1. No 2. Yes 3. Don't know
14a. Approximately, how long ago was the containment emptied?	*Insert no of months/years*
14b. If you selected yes in question above, what happened the last time it was full?	1. Emptied manually using bucket and/or barrel 2. Emptied using a pump 3. Emptied both manually and using a pump 4. Emptied using a mechanical exhauster 5. Not emptied- we dig another latrine/pit 6. Not emptied- it is abandoned 7. It has never filled 8. Other 9. Don't know
15. Who provided the emptying service?	1. Municipality 2. Private service provider 3. Household members/neighbors 4. Other 5. Don't know 6. N/A (never emptied)
16a. What is the number of (barrels/pits/vacuum trucks) that were emptied during the last containment emptying event? *(Enumerators enter 00 for don't know)*	[Enter number]
16b. Please select the units for the question above.	1. Barrels 2. Pits 3. Vacuum trucks 4. Don't know 5. Other _____ 6. N/A (never emptied)

17. What was the estimated volume (L) per unit that was used for emptying?	1. [Enter number] 2. Don't know 3. N/A (never emptied)
18. Where was the waste taken after it was last emptied?	1. Disposed of in situ: 2. Buried in a covered pit 3. Placed in an uncovered pit, open ground, water body or elsewhere 4. Removed and disposed of offsite 5. Other 6. Don't know 7. N/A (never emptied)
19. Who paid for emptying the toilet containment last time it was emptied?	1. School 2. Local government 3. National budget 4. Parents / families 5. Staff 6. Don't Know 7. Other: specify: _____ 8. N/A (never emptied)
20. Is there a dedicated budget line for emptying service allocated in the budget of your school?	1. No 2. Yes
21a. How much did each barrel/pit/vacuum truck cost the last time the toilet containment was emptied?	1. [Enter number in KES] 2. Don't know
21b. If the respondent answers "Don't Know" to 21a, can they estimate the total cost for the emptying?	1. [Enter number in KES]

ENUMERATOR OBSERVATIONS	
1. Are there covered garbage bins present in the girls' toilet compartments?	1. No 2. Yes
2. Is toilet paper or rinse water available in both girls' and boys' facilities at the time of the survey?	1. No 2. Yes
3. Are toilet seats or pit slabs made of material that can be cleaned easily (porcelain, concrete, steel, plastic)?	1. No 2. Yes
4. Do compartments have natural ventilation (window, opening for ventilation)?	1. No 2. Yes
5. Is the facility free from fecal smears on pan, wall and floor?	1. No 2. Yes
6. Is the pan free from used cleaning materials? (paper, stones and sticks)	1. No 2. Yes
7. Did you see the presence of human feces in the yard or compound?	1. No 2. Yes
8. For outdoor toilets: Is there a path to the toilet which can be conveniently used in any weather and season?	1. No 2. Yes
9. Where is the nearest hand washing facility in relation to the toilet?	1. Handwashing facility in same compartment as toilet 2. Handwashing facility within 5 m of toilet 3. Handwashing facility more than 5m from toilet 4. None
10. Is there water available at the handwashing facility?	1. No 2. Yes
11. Is there soap available at the handwashing facility?	1. No 2. Yes
12. Does the handwashing facility appear to be in use?	1. No 2. Yes

END INTERVIEW

Emptying & Transport Service Provider Key Informant Interview Guide

Introduction and Purpose of the study
Hello, my name is………………... I am conducting a research study on behalf of UNICEF Kenya to learn about sanitation facilities and services. This research will help Kenya to identify challenges and opportunities to improve sanitation in our communities.

Voluntary Participation and withdrawal
Your participation in this study is completely VOLUNTARY. You can stop participating at any time by leaving the interview or asking us to stop the interview.

Procedures
If you agree to participate in this study, I will go ahead and use a survey to ask you some questions. Participation in the survey will take approximately 30-40 minutes. We would like to record the interview on this audio recorder, so that we can later go back, transcribe the session and write down what everyone has said. We would like to suggest that this be an open discussion. There are no right or wrong answers and you are welcome to answer in any way you like.

Risks and benefits
We anticipate minimal risk associated with participation in this study. If any questions in the survey make you feel uncomfortable, you are free to decline to answer any question you do not wish to answer or to end the interview at any time.

Privacy and confidentiality
All answers will be kept confidential to the highest degree permitted by the technology used. Any information that identifies you will be separated from your responses so that only our researchers will be able to track your answers back to you. All measures described above will be taken to protect the confidentiality of this study data. Your comments will be kept confidential. To further ensure that your information is kept private and confidential, we will later assign you a unique number which will replace your name in any transcripts and analysis that will be written after this session. The summary data will be shared publicly, but there should be no way for anyone - from the government or otherwise - to trace the data back to you.

Contact details
If you wish to end the interview at any time, you may do so. If you have any questions, please contact [...]

I am happy to answer any further questions you have about this study. Do you have any questions about this study?

Are you interested and willing to participate? Yes/No

Are you okay with the interview being recorded? Yes/No
If the respondent consents to be interviewed, please sign this consent form. (Distribute the consent forms and collect signed consents)

PART A: GENERAL INTERVIEW PROFILE	
Enumerator name:	
Date of interview:	Day Month Year
Name of county:	
Name of sub-county:	
Name of ward:	
GPS Coordinates (generated by the platform):	
Interviewee Name:	
Interviewee phone number:	
Organization name (if any):	
Titles or positions held in organization (if any)	
License/Registration number (if any)?	
Number of any additional respondents along with their name, position and cell phone numbers	
GPS reading (Automatically generated by platform):	1. Latitude : 2. Longitude:
What is the dominant soil-type in this county/district/area?	1. Solid rock 2. Heavy clay/loam 3. Fine sand 4. Gravel or coarse sand 5. Fractured rock 6. Don't know
What is the typical groundwater depth in areas where you serve?	1. 0-5m 2. 5-10m 3. 10-20m 4. >20m
SECTION B: CAPITAL INVESTMENT	
1. What capital did you invest in providing emptying or transportation or treatment services?	1. Self financed (existing funds) 2. Received financing/external support (please specify what kind)
2. Starting date/year of business/services?	1. [Enter year]

	2. Don't know

<table>
<tr><td colspan="2" align="center">SECTION C:EMPTYING AND TRANSPORT SERVICE PROVIDER</td></tr>
<tr><td>3. Organization/department/company type:</td><td>1. Government organization
2. NGO (Non governmental organization)
3. Private company (commercial)
4. Academia and research organization
5. Individual shop/group/persons
6. CBO (community based organization)
7. Other: specify_____
8. Do not know</td></tr>
<tr><td>4. How many staff are employed by your company that specifically support sanitation services?</td><td>1. Full time _____
2. Part-time or at will ____</td></tr>
<tr><td>5. What is your employment status (as an individual)? (mark that all apply)

Probe: Do you work for yourself or for a company or for an organization?</td><td>1. Self-employed/proprietor
2. Company owner
3. Staff/worker for a private company
4. NGO staff
5. Government staff
6. Other (specify)
7. Don't know</td></tr>
<tr><td>6. Which location(s) do you /your company/department work in (describe by county, sub-county, city/area etc of the urban or rural location) or alternatively an estimate of the radius they serve (km)?

Probe: please describe all within which you are active.</td><td>1. List name(s) of service area(s):
2. List radius served (km):
3. Don't know

(Can only choose one option.)</td></tr>
<tr><td>7. What is the estimated population served by your company/organization?</td><td>1. Estimated population [note whether individuals or households]</td></tr>
<tr><td>8. Please list all other Emptying & Treatment service providers working in the same area(s)?</td><td>1. Name:
2. Number:
3. Don't know</td></tr>
<tr><td>9.What sort of containment do you/the company service?

Probe: septic tanks, pit latrines, other facilities?</td><td>Check all that apply:
1. Septic tanks
2. Pit latrines
3. Container-based sanitation
4. Other (specify)
5. Don't know</td></tr>
<tr><td>10a. What type of equipment do you use for emptying?</td><td>Check all that apply:
1. Vacuum trucks
2. Vacu Tugs
3. Small motorized pumps
4. Non-motorized hand/manual pumps
5. Hand-tools e.g., shovels, spades, buckets and</td></tr>
</table>

	6. Other (specify) 7. Don't know
10b. Of the equipment that you use, what proportion of the time do you use them?	1. Vacuum trucks _____ % 2. Vacu Tugs _____ % 3. Small motorized pumps _____ % 4. Non-motorized hand/manual pumps _____ % 5. Hand-tools e.g., shovels, spades, buckets and rope _____ % 6. Other (specify) _____ % 7. Don't know _____ % *Note to enumerator, these values should add up to 100%*
11a. What type of safety equipment do you have access to for emptying? *If they answer any of these (i.e. 1-4), continue to question 9a.*	Check all that apply: 1. Apron/body cover : 2. Hand gloves: 3. Face masks: 4. Boots: 5. Goggles/eye protection: 6. Others: 7. None
11b. Which types of safety equipment would you say you use regularly i.e. for most service events? *Note: Interviewee may need encouragement to be honest!*	Check all that apply: 1. Apron/body cover : 2. Hand gloves: 3. Face masks: 4. Boots: 5. Goggles/eye protection: 6. Others: 7. None
12. Are you satisfied with these equipment/PPE to keep you safe, or do you have any choice/suggestions/recommendations? In case you have suggestions, choice in selecting equipment; mention those.	[open answer]
13. Is there any sludge that spills/leaks to the ground during emptying?	1.Yes 2. No
14. What is the average volume of sludge (in litres) that you empty per facility type?	1. Household level septic tank 2. Household level pit latrine: 3. Commercial level containment: 4. Industrial level containment: 5. Other (please specify):
15a. What type of equipment do you use for transport?	Check all that apply: 1. Nothing (carry on person) 2. General motorized vehicle, e.g., truck or van 3. Vacuum truck with capacity of tank (specify in

	litre): 4. Vacutug (specify capacity in litre) 5. Non-motorized e.g., carts/ wheelbarrows or animal transport 6. Other (specify)
15b. If you selected 1 (Nothing), 2. (General vehicle) or 3. (Non-motorized vehicle), what is the type of container used for carrying the fecal sludge??	[Container type e.g., drum, barrel]
15c. Is the container used for carrying the fecal sludge sealed/not open or leaking during transport?	1. Sealed/not open 2. Leaking
15d. How many container units can be transported in your vehicle (motorized at non) at one time?	[Number of containers]
15e. What is the average volume, in liters, of one container as referenced above?	Volume per container……. (in liters)
16. What type of safety equipment do you use during transportation and disposal or transfer of the waste?	Check all that apply: 1. Apron/body cover : 2. Hand gloves: 3. Face masks: 4. Boots: 5. Goggles/eye protection: 6. Others:
17. On average, how many septic tanks, pit latrines and other systems (such as compost toilets) do you empty per day/week/month? *(Note: allow interviewee to decide which unit is easiest to use)*	1. Number (per day/week/month) ___per___ [unit] 2. Don't know
18. Do you discharge each truckload [or vacutug or cart load …insert as appropriate from answer] to the same location every time for all of your clients/customers?	1. Yes 2. No 3. Don't know
19. How many different sites or locations do you visit and discharge loads?	1. Number 2. Don't know
20a. If discharged in different locations as mentioned in question 16, on average, of all the trips you make, what proportion do you make to each one? Please include onsite (e.g., on the household's personal property) in your list locations, if relevant. *Note to enumerator: Encourage interviewee to be honest about this answer! Important to learn if there are non-formal sites being used (e.g., drain, waterway, field, open land, landfill, ditch). This can be an approximation*	1. Buried on site ___ % 2. Buried off site ___ % 3. Dumped in field or water body ____ % 4. Receiving facility without treatment (dump) ____ % 5. Receiving facility with treatment (wastewater treatment or fecal sludge treatment facility) ____ % 6. Other (specify) ___ %

and doesn't have to be the exact number	
20b. If you selected disposed/buried on site for question 20a above, how is it disposed?	1. Open ground 2. Covered pile on ground 3. In uncovered pit 4. In covered pit 5. Other
20c. If you did not choose treatment as an option in question 20a, do you know if there is a sludge treatment plant?	1. Yes 2. No
20d. If answer "yes" to question to 20c, is there a reason you don't dispose there?	[Open answer]
21. Do you keep a record of all household emptying & transport activities that are carried out?	1. Yes 2. No 3. Don't know
22. Please can I see records for the past one year? Note to enumerator: please confirm the year of the record provided.	[make note of status of record request and year; take photo to have list of parameters being measured]
23. How many staff working in sanitation services received formal training in either fecal sludge emptying, transportation, disposal or treatment?	
24. How is training typically provided? *Probe: For example, on-the-job, technical school, certification, etc.*	
25. Who typically contacts you to request your services?	1. Owner 2. Landlord 3. Caretaker 4. Tenants 5. Government actor 6. Other 7. Do not know
26. Who typically makes the payment for your services?	1. Owner 2. Landlord 3. Caretaker 4. Tenants 5. Government actor 6. Other 7. Do not know
27. Do you offer payment by installments? If yes, please elaborate on a typical repayment timeline.	1. Yes [please describe]: 2. No

28. How and when is the price for your services set?	1. In advance, fixed price 2. In advance, negotiated 3. On site, fixed price 4. On site, negotiated 5. Other
29. Please list the challenges (and their relative prioritization) to providing emptying and transportation services to the targeted communities. *Note to enumerator: The respondent should list challenges related to affordability of their services, Costs (e.g., fuel), and Regulation or lack of their of (e.g., no coordination of dumping sites) etc*	[open answer, list challenges in order of priority]
30. Please list your recommendations (and their relative prioritization) for providing emptying and transportation services to the targeted communities.	[open answer, list recommendations in order of priority]
31. Is there anything else you would like to share with us today?	[open answer]

END INTERVIEW

Treatment Service Provider Key Informant Interview Guide

Introduction and Purpose of the study
Hello, my name is……………….. I am conducting a research study on behalf of UNICEF Kenya to learn about sanitation facilities and services. This research will help Kenya to identify challenges and opportunities to improve sanitation in our communities.

Voluntary Participation and withdrawal
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Contact details
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I am happy to answer any further questions you have about this study. Do you have any questions about this study?

Are you interested and willing to participate? Yes/No

Are you okay with the interview being recorded? Yes/No
If the respondent consents to be interviewed, please sign this consent form. (Distribute the consent forms and collect signed consents)

SECTION A: GENERAL INTERVIEW PROFILE

Enumerator name:	
Date of interview:	Day / Month / Year
Name of county:	
Name of sub-county:	
Name of ward:	
GPS Coordinates (generated by the platform):	
Interviewee first and last name:	
Organization name (if any):	
Titles or positions held in organization (if any)	
License/Registration number (if any)?	
Number of other respondents present along with their name, position and cell phone numbers	

SECTION B: FECAL SLUDGE TREATMENT

1. What inflow enters the treatment plant (Check all that apply):	1. Wastewater from sewers 2. Wastewater and FS discharged into sewer manholes 3. Fecal sludge delivered by vehicle 4. Other 5. Don't know
2a. What types of <u>fecal sludge</u> does this facility treat/receive?	1. Household pit latrine 2. Household septic tank 3. Public toilet facilities 4. Industrial/commercial toilet facilities 5. Unknown *(Check all that apply.)*
2b. Are sewerage and fecal sludge treated together, or separately at this facility?	1. Separate 2. Combined treatment

3. Where does the <u>fecal sludge</u> delivered by service providers from households or commercial and industrial premises come from and in what proportions? *Probe: Do you have records to verify these figures?*	1. Proportion from households/domestic (%)_____ 2. Proportion from commercial (%)_____ 3. Proportion from industrial (%)_____ *(Note whether a record is provided.)*
4. Where does the <u>wastewater</u> delivered by sewers come from and in what proportions? *Probe: Do you have records to verify these figures?*	4. Proportion from households/domestic (%)_____ 5. Proportion from commercial (%)_____ 6. Proportion from industrial (%)_____ *(Note whether a record is provided.)*
5. Which emptying/transportation service providers deliver to this treatment works? Please list all service providers. *Probe: Do you keep a record of all deliveries to the treatment plant? If so, can I please see it?*	1. Name of provider 2. Name of provider 3. [...] *(Note whether a record is provided.)*
6. Approximately how many different service providers are there in total within the treatment catchment area?	_____ no. service providers
7. What is the approximate size of the population that the treatment plant currently serves? *Probe: Do you have records to verify these figures?*	1. _____ no. households 2. _____ no. commercial 3. _____ no. industrial 4. Don't know *(Note whether records are provided.)*
8. What is the daily volume of inflow that is received by the treatment plant? *Probe: do you have records that could verify these flows? How do you calculate/monitor it ?*	Currently receives _____ (cubic meter/day)/(trucks per day) *If data is only available on number of trucks, ask for an estimate of average truck volume to calculate daily flow (Note whether a record is provided.)*
9. What is the daily capacity of the treatment plant based on its design? (a.k.a. hypothetical capacity)	Design Capacity _____(cubic meter/day)
10. What proportion of inflows bypass the treatment/do not get treated?	% not treated _____(cubic meter/day)
11. Does the answer provided in question 9 above vary across the year?	1. Yes 2. No

12. Where is the treated <u>fecal sludge</u> (solids) disposed (or given/sold) to?	1. Remains stored covered on-site 2. Remains stored un-covered on-site 3. Reused as compost/soil conditioner in agriculture … 4. Reused as fuel … 5. Disposed in water [note where] 6. Disposal as Landfill or safe burial [note where] 7. Other [specific] 8. Unknown
13. Are the liquid and solid fractions first separated or are they treated in the same way?	1. Separated 2. Treated together
14. If answer to Question 13 is "Separated," is the liquid fraction of the fecal sludge treated? If answer "treated," please specify method. If answer "not treated," please skip to question 18	1. Yes…………………… (specify treatment methods…) 2. Not treated 3. Don't know
15. Is the quality of treated liquid fraction tested before disposal/reuse?	1. Yes 2. No
16. If you selected yes in question 15 above, what proportion of treated liquid product (annual average) complies with national discharge standards?	_____ % treated liquid fraction complies with national standards
17. Where is the treated liquid fraction disposed? *Note to enumerator: Note whether liquid effluent discharge site can be observed (if any)*	1. Disposed to land or water bodies, not used for food production nor bathing/recreational use 2. Disposed to land or water bodies where food production, bathing or recreation may occur 3. Given/sold or piped for reuse 4. Long ocean outfall 5. Groundwater recharge 6. Other 7. Don't know
18. If answered "not treated" to question 14, where is <u>untreated</u> liquid fraction disposed?	1. Disposed to land or water bodies, not used for food production nor bathing/recreational use 2. Disposed to land or water bodies where food production, bathing or recreation may occur 3. Given/sold or piped for reuse 4. Long ocean outfall 5. Groundwater recharge 6. Other 7. Don't know

19.Select the treatment processes used at this facility for fecal sludge (i.e., not sewered wastewater). *Note to enumerator: If FS and WW are combined, then answer this question based on the combined treatment.*	Check all that apply: 1. Anaerobic reactors / biodigesters 2. Incineration 3. Mechanical dewatering 4. Settling/thickening ponds and tanks (these require another step to be considered secondary) 5. Sludge drying could be split into unplanted and planted drying beds, or left as one 6. Lime stabilization 7. Ammonia treatment 8. Chemical conditioning 9. Safe burial (e.g., deep row entrenchment) 10. Land disposal (contained, covered) 11. Land disposal (uncontained, uncovered)
20. What type of equipment do you use for transport of fecal sludge on site? (If relevant)	Check all that apply: 1. Nothing 2. Small motorized pumps 3. Non-motorized hand/manual pumps 4. Hand-tools e.g., shovels, spades, buckets and rope 5. Other (specify)
21. What type of safety equipment do you have access to? *If they answer any of these (i.e. 1-4), continue to question 9a.*	Check all that apply: 1. Apron/body cover : 2. Hand gloves: 3. Face masks: 4. Boots: 5. Goggles/eye protection: 6. Others: 7. None
22. Which types of safety equipment would you say you use regularly? *Note: Interviewee may need encouragement to be honest!*	Check all that apply: 1. Apron/body cover : 2. Hand gloves: 3. Face masks: 4. Boots: 5. Goggles/eye protection: 6. Others: 7. None
23. Do you think these equipment are enough for you, or do you have any choice/suggestions/recommendations? In case you have suggestions, choice in selecting equipment; mention those.	[open answer]
24. How many staff received formal training in either fecal sludge emptying, transportation, disposal or treatment?	1. Emptying ____ 2. Transportation ____ 3. Disposal ____ 4. Treatment ____

25. How is training typically provided? *Probe: For example, on-the-job, technical school, certification, etc.*	[open answer]
26. What sort of health hazard/diseases have workers in the area of emptying, transportation, disposal or treatment experienced in the last three years? *Probe: For example, diarrhea, cholera, injury from sharp objects, etc.*	[open answer]
27. Please list the <u>challenges</u> (and their relative prioritization) to providing treatment services to the targeted communities. *Probe: For example, clogging, level of rubbish, inadequate capacity, electricity issues, flooding*	[open answer, list challenges in order of priority]
28. Please list your <u>recommendations</u> (and their relative prioritization) for providing treatment services to the targeted communities.	[open answer, list recommendations in order of priority]
29. Is there anything else you would like to share with us today?	[open answer]
SECTION C: FACILITY TOUR / OBSERVATION	
30. Please may I take a look at the treatment plant? If so, can I take photos of the facility? Just like the rest of the information this will also remain strictly confidential and anonymous. *Note to enumerator: Ask the interviewee to provide a tour, if possible! Note down additional observations or details provided by the interviewee.*	
31. Take a look at the treatment plant *Note to enumerator: If permission has been given by the service provider, take photos of the list provided and any additional elements that appear interesting/unusual/relevant.* Confirm the treatment steps indicated above.	1. Fecal sludge acceptance/receiving location 2. Inlet of the fecal sludge treatment plant 3. Each step of the fecal sludge treatment processes 4. Liquid fraction treatment processes 5. Outlet/discharge of the liquid effluent 6. Disposal or storage of the treated solid fraction
32. Enumerator Observations: Do any areas/sections appear to be damaged or non-functional? *e.g., damage or cracks to structures, overflowing or leaking liquid or solid waste, treatment steps that are unused/empty or visibly not functioning properly*	[Note observations]

33. Enumerator Observations: Note any unusual or surprising observations.	[Note observations]
34. Enumerator Observations: Note any other observations or specifications provided by the interviewee during your tour of the site.	[Note observations]

END INTERVIEW

County Official Key Informant Interview Guide

Introduction and Purpose of the study
Hello, my name is……………….. I am conducting a research study on behalf of UNICEF Kenya to learn about sanitation facilities and services. This research will help Kenya to identify challenges and opportunities to improve sanitation in our communities.

Voluntary Participation and withdrawal
Your participation in this study is completely VOLUNTARY. You can stop participating at any time by leaving the interview or asking us to stop the interview.

Procedures
If you agree to participate in this study, I will go ahead and use a survey to ask you some questions. Participation in the survey will take approximately 30-40 minutes. We would like to record the interview on this audio recorder, so that we can later go back, transcribe the session and write down what everyone has said. We would like to suggest that this be an open discussion. There are no right or wrong answers and you are welcome to answer in any way you like.

Risks and benefits
We anticipate minimal risk associated with participation in this study. If any questions in the survey make you feel uncomfortable, you are free to decline to answer any question you do not wish to answer or to end the interview at any time.

Privacy and confidentiality
All answers will be kept confidential to the highest degree permitted by the technology used. Any information that identifies you will be separated from your responses so that only our researchers will be able to track your answers back to you. All measures described above will be taken to protect the confidentiality of this study data. Your comments will be kept confidential. To further ensure that your information is kept private and confidential, we will later assign you a unique number which will replace your name in any transcripts and analysis that will be written after this session. The summary data will be shared publicly, but there should be no way for anyone - from the government or otherwise - to trace the data back to you.

Contact details
If you wish to end the interview at any time, you may do so. If you have any questions, please contact [...]

I am happy to answer any further questions you have about this study. Do you have any questions about this study?

Are you interested and willing to participate? Yes/No

Are you okay with the interview being recorded? Yes/No
If the respondent consents to be interviewed, please sign this consent form. (Distribute the consent forms and collect signed consents.)

PART A: GENERAL INTERVIEW PROFILE	
Enumerator name:	
Date of interview:	Day / Month / Year
Name of county:	
Name of sub-county (if relevant):	
Name of ward (if relevant):	
GPS Coordinates (generated by the platform):	
Name of interviewee (i.e. county official):	[Create list if interviewing multiple officials simultaneously]
Title of official (s):	[Create list if interviewing multiple officials simultaneously]
Number of years in this position:	[Create list if interviewing multiple officials simultaneously]
Department:	
Ministry:	
PART B: FULL QUESTIONNAIRE	
1. Please describe the function of your department as it relates to safe sanitation:	[open answer]
2. Please describe your role within the department:	[open answer]
3. What is the size of the population (number of households) within your county (or sub-county)?	[open answer]
4. What is the percent of urban, rural and peri-urban populations within this [sub]county? Note to enumerator: Estimates are acceptable if official statistics are unavailable.	1. Urban _____ 2. Rural _____ 3. Peri-urban _____ *Note whether respondent is giving these as "official" or estimates.*

5. Does your department <u>have</u> a plan or policy in place for the next 5 years in regards to the following sanitation-related issues (see list)? [Note to enumerator: If respondent answers yes, ask them if they can provide detail as to whether there is a document available or additional resources you can access to learn more.]	Fill in for all that apply (yes/no): 1. Sewer coverage: specify_____ 2. Septic tank coverage: specify _____ 3. Latrine coverage: specify _____ 4. emptying: specify_____ 5. transportation: specify_____ 6. disposal: specify_____ 7. Treatment: specify _____ 8. reuse: specify_____ *Note whether other documents or insights shared about the policies related to the above.*
6. What (if any) is the <u>target</u> for your county in regards to achieving safe access/treatment within each of these areas (see list)? [Note to enumerator: If respondent answers yes, ask them if they can refer you to where you can find this target.]	Note the target units, e.g., %, # households for each answer. Fill in for all that apply: 1. Sewer coverage: specify_____ 2. Septic tank coverage: specify _____ 3. Latrine coverage: specify _____ 4. emptying: specify_____ 5. transportation: specify_____ 6. disposal: specify_____ 7. Treatment: specify _____ 8. reuse: specify_____
7. What is the percentage of sanitation coverage in your county across the following types? [Note to enumerator: Ask respondent if they can refer you to a source for these values/estimates.]	1. Sewer connection: _____ 2. Septic tanks (onsite): _____ 3. Latrines (onsite): _____ 4. Other _____ 5. No sanitation (i.e. OD or equivalent): _____
8. What is the <u>current</u> level of coverage in your county with regard to achieving safe sanitation access/treatment across each of these areas (see list)? [Note to enumerator: Ask respondent if they can refer you to a source for these values/estimates.]	Note the target units, e.g., %, # households for each answer. Fill in for all that apply: 1. safe storage: specify_____(units _____) 2. emptying: specify_____(units _____) 3. transportation: specify_____(units _____) 4. disposal: specify_____(units _____) 5. treatment/reuse: specify_____(units _____)
9. What is the amount of budget allocation for the department in regard to <u>last</u> year? [Note to enumerator: If the respondent is unable to provide budget amounts, ask them to rank from highest to lowest (i.e. highest = 1) the amount of budget allocated for each.]	Year: _____ Insert budget amounts for all that apply: 1. safe storage: specify_____ 2. emptying: specify_____ 3. transportation: specify_____ 4. disposal: specify_____ 5. treatment/reuse: specify_____

10. What is the general trend of the budget allocation for the department, e.g., is increasing, decreasing or staying the same? [Note to enumerator: Please ask the respondent to specify whether it is increasing,decreasing or remaining the same.	Insert budget trends for all that apply: 1. safe storage: specify_____ 2. emptying: specify_____ 3. transportation: specify_____ 4. disposal: specify_____ 5. treatment/reuse: specify_____
11. If funding levels were higher in each of these categories, what would be the highest priorities for implementation?	Note priorities that would be implemented for each technical area, if budget were higher: 1. safe storage: specify_____ 2. emptying: specify_____ 3. transportation: specify_____ 4. disposal: specify_____ 5. treatment/reuse: specify_____
12. What are the other departments with responsibilities for safe sanitation in your county?	List any relevant departments across all that apply: 1. safe storage: specify_____ 2. emptying: specify_____ 3. transportation: specify_____ 4. disposal: specify_____ 5. treatment/reuse: specify_____
13. Please describe how your department monitors progress against its sanitation targets.	[open answer]
14. Does your department monitor sanitation progress in the absence of targets? If so, please describe how they do this?	[open answer]
15. Is there a way for me to see/access records of your progress against targets? If so, where?	[note whether document or website is shared, etc.]
16. Are you required…How often are you required to report against these targets?	[open answer]
17. To what department or ministry are you accountable for reporting sanitation data? (e.g., line ministry, statistical office)	[open answer]

18a. Does your department carry out inspections for quality of construction or performance of on-site sanitation systems or containments for any of these types of settings (see list)?	Check all that apply: 1. Households (domestic) 2. Commercial 3. Industrial
18b. If yes, which of these characteristics does your department inspect?	Check all that apply: ● Impermeability ● Number and dimensions of chambers ● Proximity to groundwater and watercourses ● Proximity to water supply sources ● Septic tank location ● Presence of discharge opening ● Presence of ventilation cover ● Regular disinfection after emptying ● Spillage from the pit ● Septic tank overflow ● Quality of wastewater ● Conditions for regular emptying ● Conditions for connection and discharge into public sewer ● Environmental protection ● Other (specify): _____
19. To whom are the inspection results reported (e.g., county department)?	[open answer]
20. How frequently are inspections conducted?	[open answer]
21. What steps are taken (if any) if/when an inspection fails?	[open answer]
22. Where does sewer wastewater typically go among connected residents in your county?.	[open answer; create list]
23. Where does faecal sludge emptied by a service provider typically go among those that hire such services in your county?	[open answer;create list]
24. Please describe the 'state' of wastewater treatment in your county (e.g., functioning well, partial functionality, meets effluent discharge standards, etc.), and why?	1. Sewer wastewater collection at treatment plants….. 2. Sewer wastewater treatment performance before discharge…… 3. Fecal sludge collection at designated disposal sites or treatment facilities…… 4. Performance of treatment at faecal sludge treatment facilities…… *Note: Please indicate the state of each of the above choices*

25. Are you aware of any <u>good practice examples</u> in your local self-government unit regarding the disposal, emptying, transport or treatment of fecal sludge of septic and holding tanks and small-scale sewage systems? Please describe them.	[open answer]
26a. Are you aware of any <u>bad practice examples</u> in your local self-government unit (or other local units) regarding the disposal, emptying, transport or treatment of fecal sludge of septic and holding tanks and small-scale sewage systems? Please describe them.	[open answer]
26b. If there is no treatment plant, where do trucks dispose of their emptied sludge?	[open answer]
27. Do you know if households empty their containments to drains/open spaces?	[open answer]
28. What <u>measures</u> has the local self-government unit taken to prevent environmental pollution originating from fecal substances from households or institutions that are not connected to the public sewerage system? Please describe them.	[open answer]
29. What are the key challenges faced by your department with regard to ensuring safe sanitation in your [sub]county? Why? *Probe: For example, institutional clarity, human capacities, financing, political priority, etc.*	[open answer]
30. What does your department require to be more effective in carrying out its sanitation mandate?	[open answer]
31. Is there anything else you would like to share with me today, or other persons with whom you recommend I meet to answer some of these questions?	[open answer]

END INTERVIEW

Annex 4: SMOSS Kenya Final Report

This report was prepared by Sanergy and describes in detail the process of collaborating with stakeholders to decide on indicators and draft and validate data collection tools and methods. The report also details lessons learned from the implementation of the pilot in Kenya and recommendations both for other countries implementing SMOSS in the future and for scaling SMOSS in Kenya.

SMOSS Kenya Final Report

July 2022 (updated December 2023)

Ruthie Rosenberg, Independent Consultant

Acknowledgements

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INTRODUCTION

The Joint Monitoring Programme (comprised of the World Health Organization and UNICEF) has secured a 3-year grant from the Bill & Melinda Gates Foundation to bring together selected national governments and international partners to develop and test indicators and data collection methods in urban and rural locations in up to 10 low-, middle- and high-income countries in Africa, Asia, Middle East and Latin America. The primary output of the project will be a recommended set of harmonized indicators and methods that national authorities can use to assess the extent to which excreta from on-site sanitation systems is safely managed (SMOSS). The SMOSS project aims to provide direct support to at least 10 countries to systematically collect data and to generate estimates for safe management of sanitation services by 2023, and indirect support to a further 75 countries by rolling out the indicators and tools through UNICEF and WHO regional and country offices and partners. Kenya has been selected among the 6 initial pilot countries.

Sanitation is a significant challenge in Kenya, which did not meet the Millennium Development Goal (MDG) targets for sanitation or drinking water in 2015. The World Health Organization (WHO) and UNICEF MDG Assessment concluded that while "good progress" was made towards the MDG target for drinking water, "limited or no progress" was made with respect to sanitation.[1] Almost 10% of the population still practices open defecation and only 29% has access to basic sanitation services.[2] Thus far, the country has no available estimates for safely managed sanitation services mainly due to lack of data collection methods, standardized definitions and availability of an integrated, national monitoring system. With the deadline for the 2030 Sustainable Development Goal (SDG) to achieve 100% coverage of safely managed sanitation rapidly approaching, Kenya must plan and make significant investments in sanitation products and services or risk missing the target yet again.

Throughout this report, we rely on the JMP's definition of on-site sanitation as depicted by the figure on the right, which highlights the types of facilities considered on-site, whether unimproved or improved. The JMP is designated as the official custodian agency for monitoring for SDG 6.2, and is expected to "lead the ongoing development of indicators and standardized methods for data collection and analysis, to establish mechanisms to compile data collected by national authorities, and to maintain global databases which can be used for global SDG reporting."[3]

Source: JMP, 2021

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[1] JMP, 2017
[2] JMP, 2021
[3] JMP, 2021

1

While on-site sanitation describes the type of facility - which can be either improved or unimproved - within the scope of the SMOSS project, safely managed refers to the service level that is achieved. The JMP states that there are three main ways to meet the criteria for use of a safely managed sanitation service:

1. People should use improved sanitation facilities which are not shared with other households
2. The excreta produced should either be:
    a. Treated and disposed on-site
    b. Stored temporarily and then emptied and transported to treatment off-site
    c. Transported through a sewer with wastewater and then treated off-site, and
3. Human waste needs to be safely managed across the entire sanitation service chain

Thus, safely managed, on-site sanitation refers to use of an improved, non-shared facility where waste is either safely disposed of in situ or is collected, transported and treated offsite by means other than a sewer (e.g. vacuum truck).

On-site sanitation is the norm for most urban residents in Kenya, as less than 20% have access to sewerage services (WASREB, 2015). Transport and treatment services are very poor across all kinds of facilities. Nationally, only 12% of the population use sewerage services, and only 5% of the national sewage is effectively treated due to failures of the sewerage system and inadequate wastewater treatment processes (KESHP, 2016). For urban areas, the eight Water Services Boards have an estimated 3,267,246 connections to the sewerage system, with coverage rates ranging between 2% and 32% of their service area (WASREB, 2015).

There are approximately 43 sewerage systems in Kenya and wastewater treatment plants in 15 towns (serving a total population of 900,000 inhabitants). The operational capacity of these wastewater treatment plants is estimated at 16% of design capacity, due to inadequate operation and maintenance, as well as low connection rates to sewerage systems (WASREB, 2015). These are often neglected and characterized by blockages owing to intermittent water supply (KESHP, 2016).

On-site sanitation services and access to transport and treatment services for on-site sanitation in urban areas are equally poor. Shit Flow Diagrams have been produced for Kisumu, Nakuru (Furlong, 2016) and Nairobi (Sanergy, 2017) indicating that over 60% of excreta produced ends up in the environment untreated, due to inefficient transport and treatment services.

Additionally, at present there are no consolidated nor up-to-date data on coverage, availability or quality of transport and treatment services for wastewater and sludge in rural or urban Kenya. For rural areas, recent progress has been made toward tracking coverage with safe containment, but an absence of data on safe emptying, transport and treatment persists. The existing monitoring platform developed by the Kenya Ministry of Health (MOH) and UNICEF, the Community-Led Total Sanitation (CLTS) Real-Time Monitoring Information System (RTMIS), provides information on rural sanitation—however, this currently focuses on containment and does not collect data on emptying, transport and treatment. As such, safely managed sanitation is not captured in the current national statistics.

In July, 2021 the JMP published its 2000-2020 Progress on Household Drinking Water, Sanitation and Hygiene,[4] which summarized each country's progress against the SDG target to achieve universal access to safely managed sanitation by 2030. The report included the figure below:

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[4] JMP, 2021

In 2020, 120 countries had estimates for safely managed sanitation services
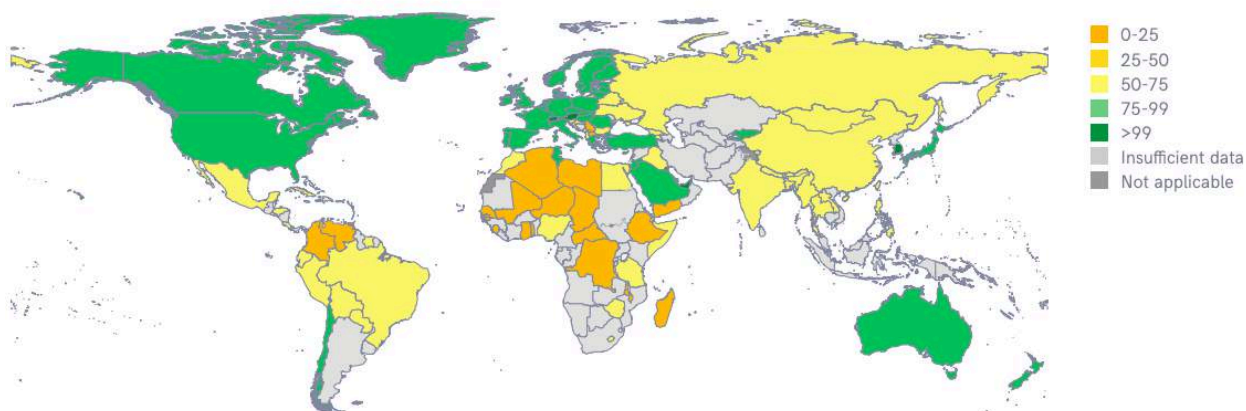
FIGURE 7 Proportion of population using safely managed sanitation services, 2020 (%)

According to the JMP, Kenya was listed as having "insufficient data" and thus is not included in the list of 120 countries that had estimates for safely managed sanitation services. Examining the sources compiled by the JMP for generating indicators for Kenya, only one report - a survey conducted by World Vision Kenya in 2017 - shed light on whether waste was safely managed, but it was for rural areas only.

Without adequate data on coverage, the government of Kenya cannot allocate sufficient and appropriately directed resources toward improving sanitation in areas with need, thus hindering the country's progress towards achieving the SDGs. Data sources and collection methods—including household surveys, technical inspections and service provider data—need to be strengthened both for rural and urban settings to collate those estimates.

The objective of the SMOSS project is to develop tools that enable the accurate quantification of safely managed, on-site sanitation in Kenya in accordance with the JMP's categorization. This effort is bolstered by the Kenya National Bureau of Statistics (KNBS) 2018-2022 Strategic Plan, which states, *"The SDGs have enormous data requirements, including comprehensively disaggregated data, for assessment of the 232 global SDG indicators. The [Kenya National] Bureau [of Statistics] will endeavor to integrate and actualize the aspirations of the SDGs in its operations."* [5]

Project Background and Context

While the SDGs have shifted the focus from only addressing access to sanitation facilities and containment of excreta to considering safe waste management along the entire sanitation service chain—from waste generation to disposal or reuse—this shift has not yet happened in Kenya. The SMOSS project aims to help bridge that gap to monitor the proportion of on-site sanitation waste that is safely contained, emptied, transported, treated and disposed for the first time in many countries globally—all in a concerted effort to understand and address the challenges faced within safely managed on-site sanitation worldwide.

Since April 2021, an independent consultant has led the implementation of the SMOSS Kenya project, whose primary objective is to confirm a set of harmonized indicators and methods that national authorities can use to assess the extent to which excreta from on-site sanitation systems is safely managed, coupled

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[5] KNBS, 2018

with the development of data collection tools to ensure streamlined, effective methods for gathering this information.

The project was broken into three key phases as mapped out below:

	Phase 1: Inception & Design	Phase 2: Data Collection	Phase 3: Data Analysis
Key Deliverable(s)	- Stakeholder Mapping & Interviews - Literature Review - Stakeholder Workshop - Inception Report	- First draft of data collection tools - Recruit data collection firm - Apply for ethical review/approval - Final draft of data collection tools; handover to data collection firm - Conduct data collection	- Clean & analyze data - Present findings to stakeholders in final workshop - Recommend next steps
Date(s)	April - Dec 2021	Jan - Apr 2022	Apr - Jul 2022

During Phase 1 of the project, the SMOSS Kenya team (i.e. the consultant and UNICEF Kenya Office) completed an in-depth desk review of available literature, policies and tools in addition to extensive consultations with key stakeholders, including the Kenyan Ministry of Health (MoH), Kenyan Ministry of Water, Sanitation and Irrigation (MoWSI), United States Agency for International Development (USAID), Kenya National Bureau of Statistics (KNBS), the Kenya Water Services Regulatory Board (WASREB), the Kenya Water Sector Trust Fund among others. Based on insights from these actors in addition to collaboration with other SMOSS country pilot programs, the SMOSS Kenya team developed a draft set of indicators which were validated during a key stakeholder workshop held in mid-July 2021.

Broadly, the purpose of the inception and design phase of the SMOSS Kenya activity was to determine:
1. What are the current monitoring systems for household level and institutional sanitation in Kenya? How reliable are they?
2. To what extent do the current monitoring systems enable *accurate* measurement of the proportion of on-site sanitation that is safely managed?
3. What are the decisions and policies at the county and national level pertaining to safe management of on-site sanitation? How are they similar and/or different? How well are they enforced?
4. What are the current challenges faced that prevent accurate measurement of safe management of on-site sanitation?
5. What are the incentives and disincentives within the existing monitoring systems, policies and government bodies that should be considered?
6. What are the most vital indicators that need to be measured to enable accurate reporting of on-site sanitation? What are the most ideal indicators?

4

To get reliable data, first we must establish:

Standard definitions for indicators & technologies

To enforce standards, we must have:

Reliable data to map the needs and allocate resources, via monitoring

To achieve our goal, we need:

Enforcement of onsite containment, emptying, transport and treatment standards

The big goal:

Safely managed sanitation for all of Kenya

SMOSS Project: Define standards, and design and test data collection tools to enable monitoring of these standards

JMP report

During Phase 2 of the project, the SMOSS Kenya team embarked on drafting a set of data collection tools incorporating feedback from the first key stakeholder workshop. These tools were then reviewed and approved by the JMP team and a data collection firm was identified to conduct data collection across selected counties across Kenya.

Data collection tools consisted of a household-based survey, institution-based survey (i.e. schools and healthcare facilities) in addition to focus group discussions (FGDs) and key informant interviews (KIIs) of sanitation service providers and administrative officials—which included rural, peri-urban and urban areas in the selected counties across Kenya (Nairobi, Kisumu and Nakuru).

The surveys were designed to collect information targeting an understanding of the current conditions of on-site sanitation in the sample areas—all across the sanitation value chain of containment, emptying, transport and treatment. The ultimate goal of the project was to develop tools and indicators that national stakeholders can consistently and sustainably use to accurately quantify the proportion of waste from on-site sanitation facilities that is safely managed at each of these stages. The objective of data collection within the context of this project was to test the data collection tools in a sample that is representative of key characteristics of Kenya's diverse geographies, such that the tools and indicators can eventually (i.e. post-project) be scaled to the sub-national (i.e. county) and national level.

Therefore, for the purposes of piloting the data collection tools, it was not expected that the data collected would be county or nationally representative—rather, the goal was that the tools will be validated for effective use across the country through integration with existing monitoring tools such that nationally representative data can be collected *using* these validated tools.

The final phase, data analysis, involved conducting analysis of collected data to generate summary statistics and initial insights on what the indicators and tools have the capacity to render. This was then followed by a final stakeholder workshop where a majority of the same stakeholders who participated from the first workshop returned to learn about what their feedback and insights led to in terms of final tool development, indicator development, county selection and initial learnings. The final workshop served as an opportunity to present the findings from data collection, validate the data collection tools and indicators and build additional momentum for the scale-up of the finalized tools, setting the stage for progress toward sustained, regular collection and consolidation of nationally representative data on SMOSS in Kenya.

APPROACH/METHODOLOGY

PHASE 1: INCEPTION AND DESIGN

Desk Review

The SMOSS team conducted a detailed desk review of the various surveys, reports, databases, tools, publications, policies and organizations that relate to sanitation in Kenya, with a focus on those that specify roles and responsibilities related to monitoring. While this review continued throughout the inception period as new information was uncovered, the majority of the desk review was completed prior to engaging stakeholders to inform which stakeholders should be interviewed, and which data was to be collected. Emphasis was placed on understanding the policy and legal framework for sanitation monitoring in Kenya, to ensure that any subsequent recommendations take these frameworks into account. A summary of the key findings are provided below, in addition to a list of research reviewed, is provided in Appendix A.

Stakeholder Mapping

A list of relevant stakeholders was created through a joint effort between the SMOSS Kenya team and UNICEF Kenya—this was then supplemented by inputs from other stakeholders to build a comprehensive list of individuals and organizations with relevance to the sanitation sector in Kenya. In particular, the Ministry of Water, Sanitation and Irrigation (MoWSI) not only contributed a significant portion of their time to suggest stakeholders for interviews, but made introductions and interview requests on behalf of the team. Over 40 stakeholders were identified across the public sector, NGO, private sector, funders and the SMOSS Kenya team was able to complete key informant interviews (KIIs) with 14 of these stakeholders. Further, five additional organizations attended the workshop for a total of 19 unique organizations engaged. A list of these stakeholders is provided in Appendix B.

Stakeholder Interviews

The purpose of stakeholder interviews was twofold; 1) to gather information on the existing and planned systems for monitoring on-site sanitation as well as the data that are already available, and 2) to build stakeholder buy-in for the development of future indicators and measurement tools.

Stakeholder interviews were guided by a set of questions in an effort to standardize information gathered. Conversations focused on some questions more than others, but efforts were made to ensure that all topics were covered. In addition to the questions described under the Background & Context section of this report, questions included the following:

> - What are the key national OR county sanitation targets in Kenya for on-site sanitation?
>   1. Probe: What role (if any) does your organization/department play in driving toward these goals?
> - What policies exist for promoting adoption of improved on-site sanitation products/facilities?
>   1. Probe: Policies might include subsidies, penalties, tax exemptions, etc.
> - Are there specific technologies that are recognised in the national OR county policy / strategy for on-site sanitation? If so, what are they?
>   1. Probe: Do promoted technologies differ in rural and urban areas?
>   2. Probe: Are any of these technologies especially suitable for low-income households?

- Are there existing standards to ensure the quality of products and services for on-site sanitation on the market?
    1. Probe: What are these standards and who enforces them? What are the barriers to enforcement?
    2. Probe: Do you believe these standards may have any unintended negative consequences (e.g. reducing access for the poor or marginalized, reducing quality)?
- Whose responsibility is it - in your opinion - to monitor on-site sanitation coverage? To enforce?
- What data do you currently use / have access to regarding coverage with and/or safety of on-site sanitation?
    1. Probe: How do you access this data? What are the challenges (if any) you face accessing this data?
- What data would you like to have in order to inform your work? What do you do in the absence of this data?

First National Stakeholder Workshop

Following the stakeholder interviews, completion of the desk review and in close consultation with UNICEF and JMP stakeholders, the SMOSS Kenya team conducted the first national Stakeholder Workshop on July 15th, 2021 at the Crowne Plaza in Nairobi. This workshop served as an additional opportunity to identify any remaining data sources or ongoing monitoring efforts, to solicit feedback on the proposed indicators and data collection strategy and to gain critical buy-in from key stakeholders to facilitate the project moving forward in a smooth, coordinated way, as well as build additional momentum for post project scale-up through intentional stakeholder integration. This stakeholder buy-in and integration has been a key priority of this project—the development of indicators and tools is critical, but the involvement of key players and incorporating their feedback is of utmost importance to ensure that the design is well-informed and in conjunction with those in positions for true scale. We cannot stress this facet enough, as it is just as important—if not more important—than the development of the tools and indicators themselves.

In addition to stakeholder being at the center of project development, the objectives for the workshop were as follows:

1. Alignment on the purpose and vision for SMOSS;
2. Buy-in and ownership among stakeholders for the long-term vision of SMOSS;
3. Setting/validating indicators and pilot data collection plan that will enable stakeholders to scale accurate, useful data on management of on-site sanitation;
4. A roadmap for stakeholder roles in realizing the vision of reliable, timely data.

Additionally, feedback was gathered to determine the criteria for county selection based on key considerations raised by stakeholders. Stakeholders identified key characteristics they wished to see represented across the counties in which pilot data collection would take place in order to ensure that the tools would be appropriately validated for rollout across all counties. This input informed the subsequent

step of county selection in which we ensured that the characteristics—even if not the specific counties stakeholders suggested—were represented.

The vision for SMOSS moving forward was presented as: *The next seminal WASH monitoring reports, i.e. the JMP Progress Report, the Kenya National Census and the KIHBS, will include reliable, timely data for on-site sanitation in Kenya provided/endorsed by the Kenya national government.*

In total, 31 participants were in attendance, with the majority of participants actively engaging throughout the day and completing the discussion activities. The participants list and agenda for the first stakeholder workshop are provided in Appendix C and Appendix D.

PHASE 2: DATA COLLECTION

Development of Definitions and Indicators

Broadly, the Kenya team's approach to the development of definitions and indicators was a strong emphasis on stakeholder engagement, with front-loading of interviews, meetings and workshops to

ensure buy-in for the indicators defined based on that engagement.

The intention was to identify available data, ongoing data collection efforts, and stakeholder priorities in order to develop indicators and accompanying data collection tools stakeholders will be motivated to champion.

Below is a summary of the proposed indicators that guided our data collection:

Indicator	Summary
Proportion of waste in on-site sanitation that is safely **contained**	# households with safe on-site containment / # households with on-site containment
Proportion of waste contained in on-site sanitation that is safely **emptied**	# households with on-site containment that is safely emptied / # households with on-site containment
Proportion of waste from on-site sanitation that is safely **transported**	# households with on-site containment whose waste is safely transported / # households with on-site containment
Proportion of waste from on-site sanitation that is safely **treated**	# households with on-site containment whose waste is safely treated / # households with on-site containment

Design of Data Collection Tools

Following the submission of the Inception Report to UNICEF, the SMOSS Kenya team proceeded to design the data collection tools, incorporating the lessons learned from other SMOSS country programs in addition to the insights generated from the stakeholder interviews and first workshop.

The team drew upon the following tools (non-exhaustive) to define specific questions for data collection:

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- **PMA2020 WASH Questionnaire** - Performance Monitoring and Accountability is a multi-country, nationally-representative survey that briefly developed and tested a set of questions to evaluate fecal sludge management (FSM) practices at the household level in Kenya.
- **SFD Reports & Guides** - The Shit Flow Diagram (SFD) Promotion Initiative has sparked the development of numerous SFDs globally, including five in Kenya, that include accompanying reports and lessons learned relevant to SMOSS. While the SFD is an advocacy tool based on many assumptions, the county-level data in addition to the data collection guides was useful to design the SMOSS methodology.
- **SMOSS Indonesia & SMOSS Bangladesh Questionnaires** - the Kenya team benefited greatly from the experience of its SMOSS counterparts in other countries that have developed and shared their tools for data collection.

The table below shows the tools used in data collection and the respective stage of the service chain each tool covers:

Tool	Facility type	Containment	Emptying	Transport	Treatment	Re-use
Household survey	�	▓	▓	▓		
School survey	▓	▓	▓	▓		
HCF Survey	▓	▓	▓	▓		
Emptying and transport service provider KII			▓	▓	▓	
Treatment service provider KII					▓	
County officials KII						

Selection of Counties

The SMOSS Kenya team has been very intentional in ensuring that key stakeholders play a critical role throughout all three phases, including in determining the criteria for county selection. In the July 2021 SMOSS workshop, stakeholders provided input on the characteristics they wanted to see represented in the counties in which pilot data collection took place. Stakeholders agreed that data should be collected across urban, peri-urban and rural areas, which enables comparison with other SMOSS countries, and increases the likelihood of covering areas with varying types of on-site sanitation products and services. For the same reasons, within urban settings, at least one pilot data collection county should have a substantial number of households residing in informal settlements (i.e. slums). In addition geographical/regional diversity, presence of on-site containment, availability of relevant and quality data and county level buy-in were also considered as key factors. Nairobi, Nakuru and Kisumu counties were selected based on consensus among key stakeholders, representation of prioritized characteristics and discussions with UNICEF Kenya. They were recommended and confirmed with the data collection firm as well.

The key criteria identified by key stakeholders included:
- Urban/peri-urban/rural spread*
- Diversity of containment type

- Geographic/regional diversity*
- Terrain diversity (e.g. coastal, mountainous)
- County-level government buy-in, capacity*
- Presence of on-site containment*
- Availability of relevant, quality data*
- Presence of informal settlements*
- Existing treatment capacity/facilities
- Existing emptying/transport capacity

While all of the above were considered important to take into account for selection of counties, the priority criteria have an asterisk (*) designating their selection.

Counties and Criteria Met

Nairobi County

Nairobi is one of the 47 counties in Kenya. It hosts the city of Nairobi, which is the capital city of Kenya. Nairobi County is the third smallest, yet the most populous of all the counties in Kenya. The county covers an area of 696 km2 with a population of 4,397,073 people (KNBS, 2019). It has the highest urbanization rate at 4% growth per annum (KNBS, 2019). Sewerage coverage in Nairobi is at 51% compared to a water coverage of 79% (WASREB, 2021). on-site sanitation systems are highly used in Nairobi, with open defecation reported mostly in the informal settlements.

Image Source URL: https://privatesafaris.co.ke/sub_destinations/masai-mara-game-reserve-4/nairobi-map/

Nairobi was selected due to the high presence of informal settlements, the availability of administrative records, the presence of on-site sanitation containment and the geographical/regional diversity. In addition, the SMOSS Kenya team has established strong relationships and networks with local county officials and key stakeholders.

Nakuru County

Nakuru is another of the 47 counties in Kenya. It hosts the city of Nakuru, which is the newest city in Kenya. The county covers an area of 7496 km2 with a population of 2,162,202 people (KNBS, 2019). Sewerage coverage in Nakuru is at 17%, compared to a water coverage of 82% (WASREB, 2021). on-site sanitation systems are most used in Nakuru.

Image Source URL: https://learn.e-limu.org/topic/view/?t=1516&c=468

Nakuru county was selected due to the county level buy-in, the urban and peri-urban spread, the availability of relevant, quality data and the geographical/regional diversity. Nakuru county also has a high presence of informal settlements in addition to being one of the few counties with a functional sanitation policy. Our thought partner, Sanivation, who were contracted to

conduct data collection suggested Nakuru county as well due to their strong networks with various county officials and stakeholders.

Kisumu County

Kisumu County is located in Western Kenya, and hosts the third largest city in Kenya, after Nairobi and Mombasa. It is growing rapidly. It has a population of 1,155,574 people (KNBS, 2019).Sewerage coverage in Kisumu is at 20% compared to a water coverage of 85% (WASREB, 2021).

The final county to be selected, Kisumu met similar criteria to Nairobi and Nakuru counties i.e. Presence of on-site sanitation containment types, Urban and peri-urban spread, geographical/regional diversity and county official buy-in. In addition, the SMOSS Kenya team has a strong working relationship with county-level and city officials through a partnership with KIWASCO, the water and sanitation utility in Kisumu.

Image Source URL: mci.ei.columbia.edu/millennium-cities/kisumu-kenya/kisumu-maps-and-population-data/

Recruitment of a Data Collection Agency

The UNICEF Kenya country office recruited a consultancy company responsible for conducting data collection in three counties in Kenya with the dual objective of collecting quality data and of assessing the appropriateness and effectiveness of the data collection tools themselves. While Nairobi, Kisumu and Nakuru counties were suggested, the data collection firm was tasked with making a final recommendation for selected counties.

Data Collection Process

The focus for data collection was to test and, if necessary, inform the revision of the data collection tools and indicators such that stakeholders could eventually scale them up and integrate them into routine data collection in the future.

The SMOSS Kenya team agreed with UNICEF Kenya and the JMP team that it was not feasible within the timeline and budget constraints of the SMOSS pilot to collect nationally representative data, which similar to county selection, stakeholder involvement was also crucial in this stage. The team maintained this by:
1. Engaging stakeholders on the content of the tools as well as the indicators they would yield and;
2. Emphasizing qualitative feedback from the data collection firm in addition to identifying a firm that would function as engaged thought partners around this collection and process.

The identified data collection firm was able to administer interviews to 200 households, 11 healthcare facilities, 11 schools and 4 key informant interviews in each of the three counties.
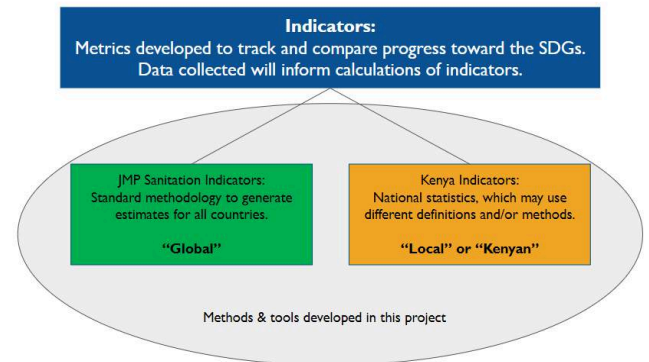
PHASE 3: DATA ANALYSIS

The primary objective of the data analysis phase was to generate indicator values from the collected data to ensure that the information derived from the tools was sufficient for indicator calculations. Indicators were grouped into two sets—global as a universal set of indicators and local tailored to the Kenyan context—which we describe in more detail below. This phase was led by the data collection firm, Sanivation, which was responsible for feeding the data collected into defined equations and methods of calculation following direction from JMP and Kenyan stakeholders to generate these indicator values.

Global vs. Local Indicators

Both global and local indicators were developed for data collection and analysis purposes. The motive behind having two sets was based on differences in the calculation methods from a global versus national perspective, which takes key stakeholder recommendations and local context into account. While the JMP definitions are certainly the global standard and are accepted by Kenyan stakeholders, the SMOSS Kenya team acknowledged that there exists a wide variation in technical design and nomenclature—meaning that the data in which stakeholders are interested in to monitor their progress did not always perfectly align with JMP definitions. The SMOSS Kenya team responded to this by developing locally-rooted indicators to ensure that these indicators and tools successfully capture information desired by key stakeholders in Kenya. For example, the percentage of households with safe containment was similar in both contexts, but local context led to Kenyan stakeholders believing the certain cases should be included that did not necessarily align with the global JMP definition. Ultimately, having both sets of indicators carried the goal of ensuring that the final indicators and tools handed over to stakeholders yield data that can be used to report Kenya's national progress in addition to being considered alongside data from other countries. In the Kenyan context, local indicators were developed for in-country comparative understanding across regions while addressing regional priorities and identifying inequalities along the sanitation service chain in a way that could also easily integrate into current monitoring systems. These focused on the service delivery as well as infrastructure. Global indicators were developed collaboratively following several discussions with JMP. With Kenya being one of the countries that lacked estimates for safely managed sanitation in the 2021 JMP progress report, having global core indicators enables comparison with other countries and tracks progress over time. Though focus was heavily placed on the locally defined indicators, stakeholders were in agreement that it would be important to track both the local and global indicators moving forward.

Second National Stakeholder Workshop

Toward the end of the data analysis phase, the SMOSS Kenya team conducted a final national workshop on 31st May, 2022 at the Windsor Hotel in Nairobi bringing together the same stakeholders from the first workshop to validate the first set of data collection tools used in the data collection process and to build

momentum for the scale-up of these tools. It cannot be under-emphasized that a key element of the SMOSS Kenya approach was an emphasis on continuous stakeholder engagement throughout the entirety of the project as they are the best positioned to scale these tools.

During the final stakeholder workshop, the SMOSS Kenya team was able to achieve the following core objectives:

1. Re-establish alignment on the purpose and vision for SMOSS;
2. Validate indicators and data collection tools for scale-up;
3. Review lessons learned during data collection and analysis;
4. Build momentum for national scale-up of SMOSS tools.

In total 16 participants were in attendance, with participants actively engaging throughout the day and completing interactive and discussion-based activities designed to foster rich conversation about the indicators, tools and their potential to scale across Kenya. The participants list and agenda for the final stakeholder workshop can be found in Appendix E and Appendix F.

The final workshop served as an important opportunity to "close the loop", to share results, acknowledge stakeholders' valuable input into the project and to share recommendations for SMOSS moving forward.

DATA COLLECTION RESULTS

Data collection for the pilot was conducted by Sanivation. As referenced in earlier sections, the data collected in this study was accurate, but was not meant to be representative of the three counties or the country as a whole. Instead, the purpose of the data collection process was to serve as an exercise for utilizing the data collection tools and indicators, confirming their functionality and recommending adjustments to prep these materials for nationwide scale-up. A description of data collection activities, calculations and analysis of indicators using the pilot data and recommendations from the pilot data collection activities can be found in the SMOSS Kenya Data Collection Report prepared by Sanivation.

FINDINGS & LESSONS LEARNED

The following findings and lessons learned are a result of all three phases of project implementation and the SMOSS Kenya team's reflection on the project at-large. *In part, the below has been developed by the project's data collection firm, Sanivation.*

1. Households and institutions often responded with estimates and ranges, and without data to support them. Given the uncertainty of respondents, key informant interviews and empowered enumerators were critical for obtaining robust, meaningful data.

There is often a great deal of uncertainty at the household and institutional level in regards to the quality and accuracy of responses provided. Indeed, we found that most respondents who were not considered key informants gave rough estimates. Accuracy of data is further complicated by the absence of direct observation, which can be helpful because many—if not most—households are not familiar with the technical definition of a septic tank and may report having a septic tank when in reality, they have an unlined pit. Thus, relying solely on self-reported data from households and institutions may not always generate values that are meaningful or accurate.

During the desk review process, we found that there were major discrepancies in the proportion of facilities that have septic tanks, between the national census and the Performance Monitoring and Accountability (PMA) survey, despite having been conducted only one year apart as shown in the table below. While the KPHC estimated that 21.1% of the urban population had a septic tank, PMA reported only 12.6% This likely points to a very common challenge—encountered globally—in which "septic tank" is used as a general term to describe on-site sanitation. This finding was further supported by our SMOSS colleagues in Bangladesh who encountered this challenge. Direct observation of a subset of facilities, by trained enumerators able to distinguish between the different facility types, is lacking from current practices.

Facility type estimates	Kenya Census, 2019			PMA2020, 2018		
	Urban	Rural	Nat'l	Urban	Rural	Nat'l
Improved	93.5	75.4	82.5	85.6	43.8	54.6
Sewer	24.6	0.3	9.7	24.8	0.1	6.5
Septic	21.1	1.7	9.2	12.6	0.5	3.6
Other	47.8	73.4	63.6	48.2	43.3	44.5
Open defecation	0.8	11.5	7.4	0.7	10.1	7.7

To address these challenges, the SMOSS Kenya team was intentional in supplementing the data collected through surveys by involving strategic stakeholders through key informant interviews (KII) and encouraging enumerators to share observations.

We made a point of ensuring that enumerators were not only trained to administer the surveys, but that they also understood what we sought to learn. By emphasizing this alongside that surveys should be conducted with precision and according to protocol, enumerators were encouraged to make and share observations. Through this, we were able to leverage their presence in the field conducting surveys as a supplemental source of insights.

Most key informants interviewed provided information and data that was comprehensive and detailed, demonstrating their WASH knowledge, expertise and experiences. This expertise could not be collected solely from households or institutions—and as previously noted, most respondents who were not considered key informants gave rough estimates of some data. An example is the community-based organization offering formalized pit emptying services in Nairobi's Mukuru kwa Njenga that wasn't certain how many households or institutions they serve due to a lack of recordkeeping. These respondents were aware of the existence of the data but did not have any records to support their estimates. This echoes back the importance of involving key informants, whose expertise can help supplement the incomplete or estimated data from other parties to help SMOSS countries form a more accurate and comprehensive picture.

Additionally, key informant interview guides were kept succinct, taking an average of 30 minutes to complete. This supported respondents in making sufficient time amidst busy schedules, and allowed for the conversation to flow easily without the need for breaks. This was in part possible because interviews were scheduled in advance, allowing respondents to sufficiently prepage for the interviews. This worked well for the SMOSS Kenya team and should be considered when implementing KIIs in future SMOSS countries.

2. Proactive engagement of community members and consideration of external factors that might affect openness to data collection are critical in ensuring success.

As reported by the data collection firm Sanivation, the SMOSS Kenya team encountered distrust from some respondents—especially at the household level—because of their previous experience with other organizations carrying out research in the area. The respondents did not trust that their information being given to field officers would be confidential—especially during the electioneering period in Kenya—which led to some respondents choosing to withhold information.

When creating an implementation timeline for data collection, it's important to be mindful of external factors such as election periods and context that might lead to skepticism or distrust. To increase respondent confidence and avoid fraud suspicion by the community and institutions, it is recommended that research personnel be given field identification cards and high visibility vests—clearly labeled with the respective project stakeholders' logos within each county for an added layer of legitimacy.

Additionally, engaging trusted members of the community in honest conversations and taking additional time to build trust with relevant stakeholders is critical amidst such conditions. From our team's experience and Government Relations team's work during challenging political times in Kenya, engaging local chiefs and community elders can mitigate the disruption caused by such periods.

On this note of the importance of engaging local community leaders for trust-building amidst periods of uncertainty or distrust, this is also key to overall acceptance into many communities worldwide. In addition to local leaders, elders and community chiefs, this includes the importance of engaging local WASH coordinators and local administrative leaders, which the data collection firm in Kenya emphasized for successful data collection activities within communities. WASH focal persons, community health volunteers and village elders were included alongside field personnel and would specifically accompany enumerators during data collection. The County Public Health Officers and WASH Coordinators in all three counties were also sensitized on the upcoming research study, and permission to proceed was granted.

3. Trade-offs & Tips

A. There is no perfect sampling method.

Maps and registers, which might ideally be used in sampling methods for household data collection, are often inaccurate and/or outdated in informal settlements due to the rapid nature of development and the long timeline for collecting, analyzing and publishing data. Though less extreme, this can also be the case in rural areas. For this reason, the SMOSS Kenya team instructed enumerators to sample by skipping a set number of households between survey respondents. We found that the instruction to skip ten households did not enable the field officers to cover the full geography of initially intended locations, as the required number of surveys was reached after enumerators covered around 75% of the given areas (i.e. it would have been preferable for enumerators to skip a larger number of households to effectively cover the entirety of the designated areas). Utilizing maps or registers to select respondents might yield better representation, but it is important to bear in mind that these resources involve a tradeoff as they are often not truly reflective of present-day household distribution.

B. GIS data is useful, but may be more trouble than it is worth.

As shared by the data collection firm, retrieving coordinates in some densely populated areas proved challenging. Enumerators were either required to move long distances or access rooftops to capture GPS coordinates. This was experienced in areas with tall buildings, especially in Nairobi. This can be related to the quality of the device used, which requires a tradeoff for consideration—either use commonly accessible devices such as smartphones in which small distances do not always register, or invest in high-quality, expensive devices. This should be considered by future SMOSS implementing countries—

C. Investing in enumerator training and practice can be a viable substitute for extensive, expensive translation of data collection tools.

In the case of Kenya, it was noted by the data collection firm that not all respondents were comfortable with English and Swahili as primary spoken languages during interviews. Though it might be possible to identify enumerators who are fluent in local languages, it is likely challenging—if not impossible—to find enumerators fluent in all commonly spoken languages throughout the country for the purposes of SMOSS pilot implementation. For this reason, while it may be appealing to deploy the same enumerators across all geographies for the sake of consistency in data collection, the Kenya team recommends hiring local enumerators and investing in their training and practice.

Picture 1

Given the large number of local languages in Kenya, it would be neither feasible nor logical to attempt to translate written data collection materials into all languages. Instead, we opted to invest in enumerator training such that enumerators were comfortable enough with the English and Swahili tools to provide live translations for respondents who were only comfortable in a local language. To ensure enumerators feel prepared—and for the sake of consistency—we recommend building in time in training for enumerators to practice conducting interviews in local languages. Naturally, words that can be challenging to translate will

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come up, and enumerators can collaboratively develop a glossary to streamline and guide enumerators on such key terms.

D. Mobile-based data collection application is preferable as it significantly saves on costs and time.

The data collection firm utilized the KoBo Collect mobile platform for digital response collection to save on printing costs and time, as data no longer needs to be transcribed from paper to a digital format before being analyzed. Additionally, this format minimized errors and ensured consistency across all three counties, with streamlined inputs and data. Though there might be some additional time required to input information into the application and train enumerators on its functions, this ultimately saves time, reduces costs and maximizes accuracy and consistency.

E. Build in more time than you think you need for the ethical review process and other required research permits and permissions.

The ethical review process delayed the data collection process by two months. Future projects should give enough buffer time (up to three months or more depending on local context) for this process, as well as other permits required such as the National Commission for Science, Technology and Innovation permit in the case of Kenya, and from various Ministries, for the case of institutional interviews.

From the SMOSS Kenya team's experience, institutions such as schools and healthcare facilities might require permission in advance of interview visits. Some public schools and healthcare facilities required a letter from the Ministry of Education and Health, respectively, before committing to interviews. These schools were excluded from the pilot study as a result. Future SMOSS countries should consider obtaining such permits and build these processes into the project timeline to facilitate smooth entry into these institutions.

F. If using an external data collection agency, engage them as early as possible to enable them to serve as a thought partner, bringing additional insights, skills and relationships to the table.

The SMOSS Kenya team brought on Sanivation, a data collection firm, which brought deep connections and experience in a selected county for pilot testing—Nakuru—as well as a strong understanding of the global conversation around safely managed on-site sanitation and the objectives of the SMOSS project. This was additive to the overall progression of the project, and this collaboration made the SMOSS Kenya team stronger. However, given that the indicators and tools were developed before the firm was selected, there were some losses both in terms of efficiency and continuity. In other SMOSS pilot countries, a single firm conducted the full scope of the project—including data collection—which eliminated the need for training, handover and coordination between two firms. This also meant that those administering the data collection tools had been involved in their creation. If procurement or other factors necessitate the engagement of an external data collection firm, engaging the firm as early as possible and either building in time for them to participate in—or at a minimum observe—the development of both the indicators and tools is ideal.

4. Key institutions and opportunities in the Kenyan context

A. NESCRA—when it exists—will be critical to the successful scale-up of SMOSS
The Kenya Environmental Sanitation and Hygiene (KESH) policy, one of Kenya's national policy documents, calls for the Ministry of Health to establish, by legislation, the National Environmental Sanitation Coordination and Regulatory Authority (NESCRA). To date, five years after the KESH policy

was released, the National Environmental Sanitation Coordination and Regulatory Authority (NESCRA) is still not in place. NESCRA can play a vital role in addressing many of the sanitation challenges, and could support progress toward alignment for SMOSS. Stakeholder interviews and the workshop underpinned the need for better coordination to set standard definitions and clarify roles and responsibilities. Sanitation policy experts do warn, however, that "functional boundaries between NESCRA and other regulatory agencies need to be clearly defined and demarcated (coordination) in a wider context in which national and county-level powers and responsibilities are contested, and compliance of informal sanitation providers and users is in doubt (cooperation)."[6] Establishing NESCRA will not be the silver bullet towards monitoring at-scale, however it is an important next step towards achieving the rest of the Government of Kenya's development objectives. Several stakeholders also referenced NESCRA as a key actor that will facilitate the setting of standards, but it was unclear from sector officials when NESCRA will launch.

B. The Kenya National Bureau of Statistics (KNBS) is poised to play a key role in regular reporting on safely managed, on-site sanitation.

When the Kenyan Constitution was revised in 2010, it transferred the primary responsibility of sanitation service delivery to the 47 county-level governments. The central government, however, retained policy and strategy, resource mobilization, monitoring and evaluation, standard-setting and research. Within the fourth schedule of the constitution, it specifically states that "statistics on population, the economy and society generally is the responsibility of the National Government," thus providing the Kenya National Bureau of Statistics (KNBS) its mandate to collect and report on sanitation coverage. Beyond conducting the national census every ten years, the KNBS specifically references its role in generating data to inform Kenya's progress against its development objectives. With input from the National Environment Management Authority (NEMA) to establish standard definitions for facility, emptying, transport and treatment types, KNBS is well-positioned to adopt the role of monitoring for on-site, safely managed sanitation in Kenya. KNBS will need to work closely with WASREB to build out its routine data collection systems to include a broader range of on-site sanitation indicators, especially for urban sanitation. WASREB is Kenya's national regulator, and sits within the Ministry of Water, Sanitation and Irrigation. WASREB routinely collects data from the 88 wastewater service providers (WSPs) across the country to generate data on coverage levels for networked and on-site sanitation. Once more, it's worth noting the language used by the KNBS in its Strategic Plan, *"The SDGs have enormous data requirements, including comprehensively disaggregated data, for assessment of the 232 global SDG indicators. The [Kenya National] Bureau [of Statistics] will endeavor to integrate and actualize the aspirations of the SDGs in its operations."*[7]

C. Data on emptying and transport are not well-captured by existing data sources.

A variety of existing surveys, including Kenya's national census, collect household-level data on sanitation access, typically capturing whether the household has a facility—and if they do, whether it is connected to a sewer, septic tank or pit latrine. In addition, WASREB and several of the 88 wastewater treatment facilities in Kenya report having data on the volume of fecal sludge that is disposed at their site. There is a major gap,

TRANSPORT (including transfer stations) INDICATOR: Proportion		
# households with onsite containment whose waste is safely transported / #		
No.	Data to Collect	Monitoring system
T-1	Type of transport technology	Nun-
T-2	Year technology built/purchased	None.
T-3	Capacity of transport technology (e.g. L per truck or L per day)	Kl-n-
T-4	Average volume fecal waste managed per day, month (L)	now
T-5	Estimate of leakage	None.

[6] Mason, 2018
[7] KNBS, 2018

however, in the volumes of waste that are moving through the middle of the service chain (i.e. the emptying and transport). There were no examples found through the desk review nor stakeholder interviews of regular data collection that included service providers. Several organizations (e.g. WSUP) have project-level data about emptying volumes, however there is no national-level monitoring that captures the volumes of waste being emptied, the type of emptying technology, whether there is leakage and—perhaps most importantly—to where that waste is then transported. Performance Monitoring and Accountability (PMA) and other surveys have found that households cannot be relied upon to provide accurate information on where or how waste is transported from their on-site facility. Without collecting data from service providers for emptying and transport, safely managed sanitation cannot be reliably quantified.

D. The Real Time Monitoring Information System (RTMIS) may present a unique opportunity for scale-up of SMOSS indicators.

As we look to the future of SMOSS and understanding the safely managed sanitation landscape in Kenya, pursuing opportunities for scaling up the collection of data and calculation of indicators is a critical next step. A specific ongoing project in Kenya may present a unique opportunity for this integration: UNICEF Kenya has engaged a consultant (Stitching Akvo) to establish a comprehensive web-based national sanitation and hygiene real-time monitoring and information system (RTMIS). The RTMIS project includes both the technical component of building the monitoring/data collection platform itself and the practical component of resourcing for national scale-up. The former is expected to be completed in July 2022, and the latter—including capacity building of County Ministry of Health teams on RTMIS and ongoing support for Sanitation Monitoring Hubs embedded in county-level MoH teams—will begin later in 2022. UNICEF Kenya made efforts to overcome the challenges of integrating outputs across two separate projects supported by different donors to build the SMOSS tools for data collection and indicator calculation into the RTMIS platform. Unfortunately, despite significant effort and creativity from UNICEF Kenya and the SMOSS and RTMIS consultants, this was not possible. However, the SMOSS Kenya team believes that with a marginal investment, the final SMOSS tools can be integrated into the RTMIS platform and RTMIS training and support can be supplemented to ensure that RTMIS champions are equipped to champion and support the successful implementation of SMOSS as a component of RTMIS. We have the stakeholder buy-in, the final SMOSS data collection and indicator calculation tools, and a fleet of embedded County teams and Sanitation Monitoring Hubs positioned to support the national scale-up of sanitation and hygiene monitoring.

RECOMMENDATIONS

Recommendations for Future SMOSS Implementing Countries

The following recommendations are for all future countries implementing the SMOSS project—from the development and testing of tools to nationwide scale-up—based on the SMOSS Kenya team's experience as an initial pilot country. By following the below recommendations, we believe implementing countries will have a jumpstart and additional support through integration of integrating our key insights.

1. Plan budget and project duration to account for the pace of stakeholder engagement—a critical component of project success.

The SMOSS Kenya team required a longer timeline than expected and in reflecting on the initial stages of the project, believes that building in sufficient time for stakeholder engagement—and including the appropriate budget to account for this—is necessary. Substantial stakeholder engagement to maximize buy-in and project acceptance by government stakeholders is critical—and their engagement in workshops, conversations and general relationship building is required for more than just approval, but for receiving crucial input required for accuracy, likelihood of uptake and sustained implementation.

The SMOSS Kenya team engaged stakeholders to collaboratively define criteria to determine pilot locations. This not only increased buy-in and provided the team with an informed criteria list for selecting key counties for pilot implementation and comprehensive data collection tool testing, but also uncovered connections and insights that the SMOSS Kenya team could leverage in gaining increased access to these counties. This made for a smoother phase two of the project, and ensured that stakeholders were comfortable with the testing environment to increase their confidence that the findings regarding tool usability were accurate and reliable. Utilizing these key stakeholder connections and insights to determine which areas made the most sense for comprehensive testing purposes was ultimately a great success and the same is encouraged in future SMOSS implementing countries.

As part of this recommendation, we encourage incorporating more key stakeholder touch points along the way to expedite the project's uptake—especially from the project's inception and design. Stakeholder workshops were just as important—if not more important—than the development itself for uptake and ensuring that an informed process, tools and indicators were developed that can be truly utilized for nationwide scale-up. In preparation for and to make the most of the initial stakeholder workshop, we recommend investing sufficient time on stakeholder prep meetings and engagement prior to the first workshop to ensure even further familiarization with SMOSS, as well as building in prep work in between (such as requesting that stakeholders come prepared with key ideas on behalf of their institution, a comprehensive understanding of existing monitoring efforts, etc.).

The initial workshop was engaging and productive, but also jam-packed with critical content. Overall, it was successful in achieving its core objectives—however, the team believes that through additional preparation and intimate conversations in advance of the workshop, the workshop could have been even more productive with more key insights being shared during this critical moment together. The team recommends focusing in on fewer objectives during the workshop and building in touchpoints to tackle other key objectives in advance—which involves mindful planning and preparation when constructing a project timeline, accounting for the pace at which stakeholder engagement often moves.

2. Maintain focus on developing key indicators and tools that can be scaled for sustained, regular collection and analysis at a national scale, and beware the appeal of data as a distraction from this goal!

As emphasized throughout this report, the purpose of the data collection and analysis was to test the tools and ensure they capture what's needed to analyze key information on the confirmed indicators in a way that is acceptable to respondents and practical for enumerators. This exercise is of utmost importance in developing tools that are truly scalable, easy to use in various contexts within a country and capture what matters most. This process, along with the final stakeholder workshop, created a critical opportunity for tool validation and utmost confidence in the potential and readiness of such tools to scale across Kenya. As noted, these activities were never meant to be nationally—or even locally—representative in the regions where data was collected. The process of confirming that the survey instruments were usable in various local contexts and rendered the key data points required to calculate the indicators was the key objective during these phases. Meanwhile, the actual data derived from these activities is secondary, with the tools being the primary deliverable—we again recommend emphasizing this with key stakeholders throughout the process, to ensure this does not get lost in the lure of data!

A challenge faced by the SMOSS Kenya team was the continuous draw of the data derived by the data collection tools and indicators. The team was very consistently asked about the data outcomes despite the minimal significance of these figures themselves—not nationally or locally representative of the areas which were included in the pilot study, but instead meant as a "check" to ensure that the proposed indicators and tools were appropriate to scale up in order to collect nationally representative data. Despite agreement across stakeholders of the objective of testing the tools, hard numbers can be compelling and often drew the focus away from the tools themselves.

The key to sustainably solving the challenge of no SMOSS data in Kenya—and through this, addressing the lack of safely managed on-site sanitation—is developing indicators and tools while effectively building buy-in for scale to enable the collection of comparable, nationally representative data. This will be especially useful for other SMOSS countries to keep in mind (i.e. remaining focused—while encouraging other parties to do the same—on the core long-term objective of the project).

In addition, we note that opportunities for conducting data collection can be tempting in terms of wanting to seize the opportunity to collect additional, interesting and *potentially useful* data. However, we recommend balancing this with what is *required* for the calculations at-hand, and what will truly be utilized. Being both mindful of this balance and respectful of respondent time can benefit the overall project by focusing on the questions and data points that truly matter—avoiding exhaustion or interviewee fatigue from long, drawn-out conversations that are ultimately not necessary if not utilized in the future. In the case of the SMOSS Kenya team, the data collection firm noted that of the data collected from surveys and key informant guides, a majority of this information was not required to calculate SMOSS indicators. This data could be useful for other SMOSS monitoring purposes—such as on the cost of emptying, the ability to pay for emptying services and more—but if the scope of the data collection tools is realistically intended to be used for SMOSS indicator monitoring only, we recommend retaining only the relevant questions.

3. The importance of locally-rooted indicators should be considered for comprehensive relevance to key stakeholders and to accurately illustrate the situation on-the-ground—and develop data collection tools that can calculate both sets of indicators (global and local).

Universally agreed upon indicators that can depict the status of SMOSS globally are important for comparison and to paint a comprehensive understanding of the state of sanitation worldwide, while local indicators and the process of developing them had its benefits and this should be embedded into the project from the design phase. The JMP definitions are the global standard and are accepted and honored by Kenyan stakeholders—at the same time, wide variation in technical design and nomenclature can mean that the data in which stakeholders are interested to monitor their progress may not align perfectly with JMP definitions. The SMOSS Kenya team responded to this by developing locally-rooted indicators to ensure that the indicators and tools would capture information desired by key stakeholders in Kenya—taking the local landscape fully into account alongside the interests of critical players.

Engaging officials in this exercise involved reflection, information sharing and consensus-building on what SMOSS means in a Kenyan context. The defined local indicators were not just useful for stakeholder buy-in in the project and future SMOSS monitoring efforts, but also to ensure the indicators reflect what is relevant for stakeholders on a national level. The specific nuances of the local context (for example on safe emptying) as well as including definitions from local policy—such as from the KESH policy and SFD guidelines—made local indicators more specific to the Kenyan context. As long-term, sustained collection of relevant data is the ultimate objective, we recommend defining local indicators that yield information that stakeholders desire—even if they do not perfectly align with the global indicators.

Additionally, developing tools that collect the appropriate data to calculate *both* sets of indicators—including those which are important to stakeholders today alongside the global indicators—can increase the likelihood that the data will be collected and minimize the risk that data collection loses momentum in the event that global indicators do not seem immediately relevant to key stakeholders. To reiterate, this should be completed with one, streamlined set of tools to map both sets of indicators with one data collection exercise. In the case of the SMOSS Kenya team, the data collection tools mapped well onto both sets of indicators, allowing future implementers to calculate both the JMP-reported statistics as well as the locally-relevant data points.

We recommend that future implementing countries partake in a similar exercise of mapping what SMOSS indicators would look like on a local level and believe this is a very worthwhile process for ensuring that the tools developed capture what matters to local stakeholders and relevant actors alongside global definitions—this additional layer of validation and assurance that what is developed covers all local needs, incorporating factors such as local and national government policy, current monitoring initiatives, local definitions and context, increases the chances of nationwide scale-up through existing efforts.

4. Consider the funding required to scale up SMOSS upon completion of the pilot—and build this in from the start of the project.

When scoping such a project, including the budget required for scale-up can make all the difference for project sustainability and national implementation. The pilot phase of the SMOSS project is critical for many reasons—but truly implementing SMOSS at a national level does not end there. Upon finalizing the data collection tools, indicators and in validating their preparedness to scale SMOSS across Kenya, the SMOSS Kenya team finds it critical to build off of this momentum and stakeholder engagement to enter

the next phase of SMOSS. Without the appropriate resources and funding lined up to effectively scale SMOSS post-pilot close, future SMOSS countries risk an immense lost opportunity of bringing the project to full fruition. We highly recommend intentionality when it comes to preparing the appropriate budget and funding to ensure that the entire project scale-up—and not just the pilot phase—are possible.

Recommendations for Scaling SMOSS in Kenya

The following recommendations are based on challenges and opportunities specific to the Kenyan context. While they are not directly applicable in other contexts, we encourage all future countries implementing the SMOSS project to consider similar challenges and opportunities in their own context to which these might apply to some degree.

1. Stakeholders must collaborate across ministries and institutions to agree on standard, consistently defined and—to the extent possible—simplified definitions for on-site sanitation and facility and/or technology types.

Nearly every stakeholder interviewed raised the lack of standard definitions as a key challenge preventing monitoring of on-site sanitation. From our desk review, we found that the KESH policy presents a robust set of definitions and facility types that is closely aligned with the JMP definitions, however it includes subcategories that may introduce more complication than is necessary for reliable data collection. For example, pit latrines without slabs must meet five additional criteria to qualify as improved sanitation under the KESH policy, relative to the JMP classification. While a granular level of detail is ideal for understanding the unique characteristics of sanitation nationwide, it does not add sufficient value to merit the increased resources required to capture the additional data. Instead, standard definitions across the national and county-level policies and frameworks should be applied.

A key gap that was raised consistently during stakeholder interviews and the first workshop was the inconsistent application of technology types. It is important that the list of facility types provide adequate nuance to determine whether or not a facility is improved versus unimproved, however the list must be as simple as possible such that enumerators are able to easily and quickly identify the facility type. This is particularly important in the context of identifying a national-level, public actor that must incorporate the new definitions into a routine monitoring system, which is a chief purpose of the SMOSS project. The list of facility types provided in [Appendix I](#) blends the PMA and KPHC questionnaires. The PMA questionnaire has been designed and tested for the Kenyan context—therefore, we felt this was a reliable basis for the facility categorization, with the addition of the urine-diverting dry toilet (UDDT) umbrella category for composting and container-based toilets. In particular, the inclusion of container-based sanitation (CBS) reflects Kenya's national policy documents which specifically reference CBS as a promising solution for informal settlements—and thus will continue to be featured prominently as an urban solution.

2. Leverage the existence of multiple skilled, committed stakeholders to align and progress with efficiency, direction and collaboration.

The National Environmental Sanitation Coordination and Regulatory Authority (NESCRA) has been called for by legislation in the KESH policy, but is still not yet in place. The Kenya National Bureau of Statistics (KNBS) clearly establishes itself as the responsible actor for collecting data to track Kenya's progress towards the SDGs, and that the national government has the mandate to ensure that regular monitoring

takes place. With input from NEMA to establish standard definitions for facility, emptying, transport and treatment types, KNBS is well-positioned to adopt the role of monitoring for on-site, safely managed sanitation. WASREB and several organizations (e.g. WSUP) are well-positioned to contribute to integration of data from service providers (e.g. vacuum truck operators, masons) into monitoring efforts. A comprehensive web-based national sanitation and hygiene real-time monitoring and information system (RTMIS) which includes both the technical component of building the monitoring/data collection platform itself and the practical component of resourcing for national scale-up aligns nearly perfectly with the timing of SMOSS scale-up, and includes capacity building of County Ministry of Health teams on RTMIS and ongoing support for Sanitation Monitoring Hubs embedded in county-level MoH teams. We have the stakeholder buy-in, the final SMOSS data collection and indicator calculation tools, and a fleet of embedded County teams and Sanitation Monitoring Hubs positioned to support the national scale-up of sanitation and hygiene monitoring. We have a call to establish NESCRA, and the skilled KNBS with national footprint and a clear, accepted mandate to monitor sanitation at the national level. Kenya has so many pieces in place, and with collaboration and determination, is positioned to make tremendous progress toward the shared goal of monitoring coverage of safely managed on-site sanitation and, in doing so, to accelerate progress toward safely managed sanitation for all Kenyans.

APPENDICES

A. Desk Review: Itemized List of Research Utilized

No.	Author and/or Org	Year	Title	Type
1	Adrian Mallory et al	2021	Understanding the role of informal pit emptiers in sanitation in Nairobi	Research
2	Fredrick Owino et al	2019	Pit latrine fill up rates	Research
3	FSM Toolbox	2019	FSM Rapid questionnaire	Other
4	Gambrill / World Bank	2018	An Introduction to a Countywide Approach to Sanitation	Report
5	Garn	2014	Factors Associated With Pupil Toilet Use in Kenyan Primary Schools	Research
6	Garn et al	2016	The impact of sanitation interventions on latrine coverage and latrine use	Research
7	GFA Consulting Grp	2018	Kakuma SFD Report	SFD
8	GFA Consulting Grp	2018	Mavoko SFD Report	SFD
9	Gudda	2018	Pit latrine faecal sludge accumulation: assessment of trends and determinants in low-income settlements, Nakuru	Research
10	Hugo et al	2021	Patterns and Drivers of Household Sanitation Access and sustainability in Kwale county	Case Study
11	Institute for Economic Affairs	2007	Rapid Assessment of Kenya Sewerage and Wastewater Treatment	Research
12	IPA	2014	Demand for Sanitation in Kenyan Urban Slums	Case Study
13	IRC	2017	Monitoring Systems Change: A Rapid Landscaping	Report
14	John Njuguna	2019	Progress in sanitation among poor households in Kenya	Research
15	Kioko Kithuki	2021	WASH characteristics of Kitui county, Kenya	Research
16	KNBS	2019	2019 Kenya Population and Housing Census	Other
17	KNCHR	2017	Framework for Monitoring Realization of the Rights to Water and Sanitation Kenya	Policy
18	Mason et al	2018	Reforming urban sanitation under decentralization - Crosscountry learning for Kenya and beyond	Research
19	Ministry of Health	2016	Kenya Environmental Sanitation and Hygiene Strategic Framework (KESSF)	Policy
20	Ministry of health	2020	National ODF Kenya 2020 Campaign Framework	Report
21	MoH	2016	Kenya Environmental Sanitation and Hygiene Strategic Framework (KESSF)	Policy

22	Muhoro Ndungu	2009	Kenya Water and Sanitation Programme and the Water Sector Reform Programme	Report
23	Nakagiri	2016	Are pit latrines in urban areas of Sub-Saharan Africa performing?	Case Study
24	Nanyonjo et al.	2020	Landscape analysis of faecal waste management policy gaps in Eastern Africa	Research
25	Peletz, et al	2020	Expanding safe fecal sludge management in Kisumu, Kenya: an experimental comparison of latrine pit-emptying services	Research
26	PJ Busienei et al	2019	Latrine Structure Design and Conditions and the Practice of open defecation	Research
27	PMA2020	2017	PMA2020 Kenya R5 WASH Brief	Report
28	Rachel peletz et al	2020	Expanding safe fecal sludge management in Kisumu,an experimental comparison of latrine pit emptying services	Research
29	Sanivation	2019	Naivasha Sub-County SFD Report	SFD
30	Sheillah Simiyu	2017	Preference for and characteristics of an appropriate sanitation technology for the slums of Kisumu Kenya	Research
31	Sheillah Simiyu	2014	Determinants of usage of communal sanitation facilities in informal settlements of Kisumu, Kenya	Research
32	SHF	2020	Safely Managed Sanitation Services in the Global Sanitation Fund	Research
33	SHF	2020	Safely managed sanitation services in rural areas	Research
34	SNV	2013	Rural Kenya Market Research on Sustainable Sanitation Products and Solutions for Low Income Households	Research
35	SNV	2020	Treatment technologies in practice	Research
36	Toilet Board Coalition	2020	Sanitation Economy Markets Kenya	Report
37	Ulrich	2016	Assessing the Costs of on-Site sanitation	Report
38	UNICEF	2020	What do safely managed sanitation services mean for UNICEF programmes?	Conference Paper
39	UNICEF	2020	Nairobi SMART survey Final	Report
40	Unknown	2019	Kenya sanitation policy and planning framework	Policy
41	USAID	2018	WASH-FIN Kenya Project Brief	Report
42	USAID	2017	How Kenya Monitors Health Information System Performance	Case Study
43	USAID	2014	WASHplus in Kenya Baseline Findings	Report
44	Wasonga et al	2014	Improving Households Knowledge and Attitude on Water, Sanitation, and Hygiene Practices through School Health Programme	Research
45	WASREB	2020	WASREB Impact Report 2019/2020 (No. 13)	Report
46	WASREB	2019	List of WSPs in Kenya regulated by WASREB	Other

47	WEDC et al	2018	Nairobi SFD Report	SFD
48	WEDC et al	2015	Nakuru SFD Report	SFD
49	WEDC et al	2016	Kisumu SFD Report	SFD
50	WHO	2019	National Systems to Support Drinking-water, Sanitation and Hygiene	Report
51	Winter et al	2019	A mixed-methods study of women's sanitation utilization in informal settlements in Kenya	Research
52	WorldBank	2016	Scaling Up Blended Financing of Water and Sanitation Investments in Kenya	Report
53	WSP	2005	Understanding Small Scale Providers of Sanitation Services: A Case Study of Kibera	Case Study
54	WSP	2005	A Review of the EcoSan Experience in Eastern and Southern Africa	Research
55	WSP/ IFC / MoH	2013	Kenya on-site sanitation market intelligence	Case Study
56	WSP/ IFC / MoH	2013	Kenya Demand Generation Strategies	Case Study
57	WSP/ IFC / MoH	2013	Kenya on-site-sanitation product and business model design	Case Study
58	WSUP	2017	Situation analysis of the urban sanitation sector in Kenya	Case Study
59	WSUP Africa	2004	Better Water and Sanitation for the Urban Poor	Research

B. List of Stakeholders Interviewed

Acronym / Name	Full Name / Implementer	Interview / Workshop
AfDB	African Development Bank	Interview
APHRC	African Population and Health Research Center	Both
KEWASNET	Kenya Water and Sanitation Civil Society Network	Workshop
KIWASCO	Kisumu Water & Sanitation Co. Ltd.	Both
KIWASH	USAID Kenya Integrated WASH	Both
KNBS	Kenya National Bureau of Statistics	Both
KWAHO	Kenya Water for Health Organization	Workshop
MoWSI	Kenya Ministry of Water & Sanitation & Irrigation	Both
NCWSC	Nairobi City Water & Sewerage Company Ltd	Workshop
NEMA	National Environment Management Authority	Both
Sanergy	Sanergy	Both
Emptiers' Association	Septage Emptiers' Association of Kenya	Both
SHOFCO	Shining Hope for Communities	Interview
UNICEF	UNICEF Kenya	Both
USAID	United States Agency for International Development	Both
WASREB	Water Services Regulatory Board	Both
World Bank	World Bank Group	Workshop
WSTF	Kenya Water Sector Trust Fund	Both
WSUP	Water & Sanitation for the Urban Poor	Both

C. First Workshop Participants List

No.	Organization	Name	Email
1	APHRC	Edna Riechi	eriechi@adhrc.org
2	Emptiers' Association	Peter Khamisi	hamisipeter@yahoo.com
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25	UNICEF	Julie Abriot	jaubriot@unicef.org
26	UNICEF	Talia Meeuwissen	tmeeuwissen@unicef.org
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28	WASREB	Francis Maluki	fmaluki@wasreb.go.ke
29	World Bank	James Origa	jotieno2@worldbank.org
30	WSTF	Stella Warue	stella.warue@waterfund.go.ke
31	WSUP	Emmanuel Owako	eowako@wsup.com

D. First Stakeholder Workshop Agenda

Held Thursday, July 15th 2021 at the Crowne Plaza in Nairobi

Time	Session
8:00	*Arrivals, Sign in*
8:30	Opening Plenary: Remarks by MOH, MoWSI, UNICEF Kenya & Ruthie Rosenberg (Consultant)
	Activity & Presentation(s): The vision for SMOSS and why it's important
	Activity: Aligning on the immediate challenges
11:00	*Tea/ coffee break*
	Activity: Feedback on the proposed SMOSS indicators
13:00	*Lunch*
	Activity: Feedback on the data collection plan
15:15	*Tea/ coffee break*
	Activity: Reframing challenges and brainstorming activities
	Discussion: Who's at the table? Developing a roadmap
	Activity: Sustaining momentum: next steps and commitments
	Closing Plenary: Next steps, acknowledgements
17:30	*End of day*

E. Final Workshop Participants List

No.	Organization	Name	Email
1	Emptiers' Association	Peter Khamisi	hamisipeter@yahoo.com
2	PASA	Eva Muhia	varetproducts@yahoo.com
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17	Sanivation	Syrus Motua	syrus@sanivation.com
18	Sanivation	Sylvia Kengere	sylvia.kengere@sanivation.com
19	Sanivation	Naomi Korir	Naomi@sanivation.com

F. Final Stakeholder Workshop Agenda

Held on Tuesday, 31st May, 2022 at Windsor Hotel in Nairobi

Time	Session
7:45–8:00am	*Arrivals, Sign-in*
8:00–8:45am	**1.1 Opening Remarks:** Remarks by MoH and MoWSI
8:45–9:00am	**1.2 Warm-Up Activity**
9:00-9:10am	**1.3 Introduction:** Agenda & Objectives
9:10–9:25am	**2.1 SMOSS Vision Recap :** The Vision for SMOSS and Its Importance
9:25–9:45 am	**2.2 Phase 1 Recap:** Recap of Phase 1 Activities
9:45-10:10am	**3.1 Phase 2:** Data Collection
10:10–10:25am	*Tea/Coffee Break*
10:25-11:45am	**3.2 Phase 3:** Data Analysis
11:45-12:15pm	**3.3 Phase 3:** Feedback: Questions, Discussion & Sharing
12:15-12:35pm	**4.1 Initial Reactions**
12:35–1:00pm	**4.2 Initial Group Sharing**
1:00–2:00pm	*Lunch*
2:00–2:15pm	**Group Energizer:** Pop quiz on data presented
2:15–3:00pm	**5.1 Indicator Feedback:** Global and Local Indicator Deep Dive
3:00-3:15pm	*Tea/Coffee Break*
3:15–3:45pm	**5.2 Lessons Learned**
3:45–4:15pm	**5.3 Preparing for Scale:** Plenary brainstorm: opportunities and challenges for stakeholders to scale, focus on specifics
4:15–4:35pm	**6.1 Closing Activity:** Commitments
4:35–5:00pm	**6.2 Closing Plenary:** Acknowledgements and Next Steps
From 5:00pm	*End of day, Departures*

G. Facility Types

On-site containment types
Flush/pour flush toilets connected to: Piped sewer system Flush/pour flush toilets connected to: Septic tank Flush/pour flush toilets connected to: Pit Latrine Flush/pour flush toilets connected to: Elsewhere Flush/pour flush toilets connected to: Unknown / Not sure / Do not know Ventilated improved pit latrine Pit latrine with slab Pit latrine without slab / open pit Urine-diverting dry toilet to: Composting toilet Urine-diverting dry toilet to: Cartridge or container based system Urine-diverting dry toilet to: Other Composting toilet Bucket Hanging toilet /Hanging latrine No facility / bush / field Other No response

Emptying types
Manual: bucket Manual: other Mechanized: hand pump Mechanized: vacuum Mechanized: other: specify _____ Other: specify _____

Transport types
Used protected removal pipe and motorized machine so that fecal effluents does not spread in the surrounding environment e.g. vacuum tanker Motorized vehicle without pumping system Manually-operated vehicle without pumping system Manually carried Other: specify: _____ No applicable No response

Treatment types
Chemical Bio-degradation Burying Lagoon Anaerobic reactors Decentralized system Other: specify: _____ No applicable No response

Annex 5: SMOSS Kenya Data Collection Report

This report was prepared by Sanivation, the SMOSS Kenya data collection partner, and details the results from analysis conducted using the pilot data as well as the key learnings and recommendations from the data collection exercise itself.

Data Collection for the Pilot Monitoring of Safe Management of Onsite Sanitation Systems (SMOSS) in Kenya

Final Report
2022

Acknowledgments

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Introduction

The Sustainable Development Goal (SDG) targets 6.2 aims at achieving access to adequate and equitable sanitation and hygiene for all and to end open defecation by the year 2030. Currently in the world, an estimated 2.4 billion people still lack access to the least basic sanitation service. In Kenya, sanitation remains a significant challenge[1]. Almost 10% of the population still practices open defecation and only 29% has access to a basic sanitation service[3]. So far, the country has no available estimates for safely managed sanitation services mainly due to lack of data collection methods, clear indicators, and availability of national monitoring system.

Onsite sanitation systems are the most common sanitation systems used in Kenya, with only about 15% having access to sewerage services[2]. There are about 43 sewerage systems in Kenya and wastewater treatment plants in 15 towns (serving a total population of 900,000 inhabitants). The operational capacity of these wastewater treatment plants is estimated at around 16% of design capacity, due to inadequate operation and maintenance, as well as low connection rates to sewerage systems[2]. These are often neglected and characterised by blockages owing to intermittent water supply[3]. On-site sanitation services and access to transport and treatment services for onsite sanitation is equally poor.

There is no consolidated or up-to-date data on coverage, availability or quality of transport and treatment services for wastewater and sludge in rural and urban Kenya. For rural areas, solutions provided focus on containment rather than emptying, transport and treatment. The existing real time monitoring platform developed by the Ministry of Health (MoH) and UNICEF which provides information on rural sanitation only looks at containment with no attention to emptying, transport and treatment. As such, safely managed sanitation is not captured in the current national statistics and estimates mainly due to lack of data collection methods, clear indicators and availability of national monitoring systems. Different potential future data sources and data collection methods, including household surveys, technical inspections and service provider data, need to be explored both for rural and urban settings to collate those estimates.

This project led by the UNICEF/WHO JMP aimed at bridging this gap by monitoring how safely waste is contained, emptied, transported, treated and disposed. These tools will subsequently facilitate generation of data that can be used in budgetary allocations aimed at improving sanitation services.

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[1] JMP, 2020
[2] WASREB, 2021
[3] KESHP, 2016.

Project Context and Overview

The SMOSS Kenya project was divided into 3 phases, as follows;

- Phase 1: Inception & Design
- Phase 2: Data Collection
- Phase 3: Data Analysis

The "Inception and Design" phase was implemented by an independent consultant together with the UNICEF Kenya team. This phase included conducting desk reviews, workshops with key stakeholders and designing data collection tools. The goal of this phase, among others, was to;

- Assess the current monitoring systems for household level and institutional sanitation in Kenya and their reliability.
- Assess to what extent the current monitoring systems enable accurate measurement of the proportion of safe management onsite sanitation.
- Understand the current challenges faced that prevent accurate measurement of safe management onsite sanitation.
- Assess the most vital and ideal indicators that need to be measured to enable accurate measurement of safe management onsite sanitation.

Following the successful design of data collection tools, Sanivation was contracted to complete Phase 2: Data Collection. In this report, the Consultant, refers to Sanivation. The deliverables for this phase are shown in **Error! Reference source not found.** below;

Table 1: Phases, deliverables, and timelines of the SMOSS Data Collection project

Phases	1. Inception Phase	2. Training and Pilot of Data Collection	3. Data Collection and Data Entry	4. Data Analysis & Workshop	5. Final Report
Phase overview	Kickoff meetings, rapid review of context documents, modification of plans	Training of survey leads and enumerators. Pilot test of data collection in each county (3)	Households, schools and healthcare facility surveys, Key informant interviews, and focus group discussions in each county (3)	Data analysis, Compiling learnings, creating scaling plan, creating summery slide report. Workshop to share findings	Compiling all data, data analysis, feedback, learnings, scaling plan in a final report
Deliverable	Inception Report	Data collection preparation summary	Data collection summary report	Summary slides	Final report
Timeline	Weeks 1-4	Weeks 3-9	Weeks 9 & 10	Weeks 11-17	Weeks 17-21

Summary of the reviewed initial client documents

A review of the "Inception and Design" report was completed by Sanivation. Key takeaways from the report included findings that showed that;

a) Data on sanitation service provision (by manual semi-mechanized and mechanized emptiers) is not being monitored.
b) The lack of standard definitions across national and county-level policies and frameworks prevents proper monitoring of on-site sanitation systems.
c) The lack of a national environmental sanitation coordinating body undermines progress towards SMOSS, standard definitions and clarity of roles and responsibilities.

In addition, a review of the data collection tools was completed. These included household, school and healthcare surveys, as well as Key Informant guides for sanitation service providers, county officials and treatment service providers. Through an iterative process with the Client, the Consultant gained a good understanding of the tools.

Summary of target population baseline data

Three counties were selected to pilot the SMOSS tools in Kenya. The criteria for selection were agreed upon by national stakeholders in a stakeholder's workshop held on July 2021. These were;

- Counties progressive in sanitation work
- Previous/ existing relationships for stakeholder buy- in
- Good blend of rural, urban, and peri urban
- Counties with known sanitation work.
- Geographic/ regional diversity
- Presence of informal settlements
- Presence of onsite sanitation
- Availability of sanitation data

Based on these criteria, Nairobi, Kisumu and Nakuru counties were selected. These 3 counties have made impressive progress with improving sanitation, and have key county officials as their sanitation champions. Below is a brief description of the 3 counties.

Nairobi County

Nairobi is one of the 47 counties in Kenya. It hosts the city of Nairobi, which is the capital city of Kenya. Nairobi County is the third smallest, yet the most populous of all the counties in Kenya. The county covers an area of 696 km^2 with a population of 4,397,073 people[4]. It has the highest urbanisation rate at 4% growth per annum. The population is expected to grow as more people continue to move to the city for employment opportunities. Nairobi hosts some of the largest informal settlements in Africa, including Kibera and Mukuru.

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[4] Census, 2019.

Sewerage coverage in Nairobi is at 51% compared to a water coverage of 79%[2]. Onsite sanitation systems are highly used in Nairobi, with open defecation reported mostly in the informal settlements. There are two waste water treatment plants, the Kariobangi Sewerage Treatment Works located in Kariobangi, and Dandora Estate Waste Water Treatment Plant, located in Ruai. There is a heavy presence of vacuum trucks, also known as exhauster truck, which provide fecal sludge emptying and transport services. Also present are manual and semi-mechanized pit emptiers. Some of these have come together to form community-based organisations (CBOs) that are formally recognized.

Nairobi City Water and Sewerage Company (NCWSC) is mandated to provide water and sewerage services to the residents of Nairobi.
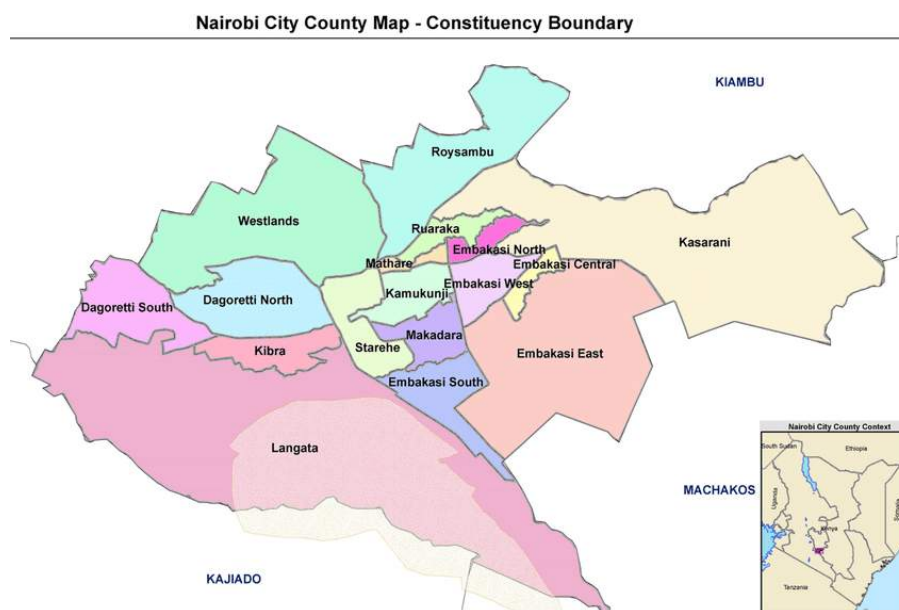

Figure 1: Nairobi County constituency map

Nakuru County

Nairobi is another of the 47 counties in Kenya. It hosts the city of Nakuru, which is the newest city in Kenya. The county covers an area of 7496 km[2] with a population of 2,162,202 people[5]. It has the highest urbanisation rate at 4% growth per annum. Nakuru county is home to 3 Rift Valley Lakes; L. Nakuru, L. Naivasha and L. Elementaita. L. Nakuru is best known for the millions of flamingoes that grace its shores.

Sewerage coverage in Nakuru is at 17% compared to a water coverage of 82%[2]. Onsite sanitation systems are most commonly used in Nakuru. There are 3 waste water treatment plants; Njoro Sewerage Treatment Plant, Old Town Sewerage Treatment Plant, and Naivasha Waste Water Treatment Plant. There are well established fecal sludge exhaustion services in Nakuru, run by private business enterprises and the utility. Also

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[5] Census, 2019.

present are manual and semi-mechanized pit emptiers. Some of these have also come together to form CBOs that are formally recognized.

There are three water service providers mandated to provide water and sanitation services in Nakuru, namely; Nakuru Water and Sanitation Services, Naivasha Water and Sanitation Services and Nakuru Rural Water and Sanitation Services.

Figure 2: Nakuru County Map

Kisumu County

Kisumu County is located in Western Kenya, and hosts the third largest city in Kenya, after Nairobi and Mombasa, and is growing rapidly. It has a population of 1,155,574 people[5]. About 60% of the 549,900 residents of Kisumu town live in informal settlements, areas that are more vulnerable during emergencies. Kisumu has two rainy seasons: the long rains occurring March to June, and the short rains occurring September to November. The county has been experiencing an increased amount of rainfall that results in flooding. The water table in low-lying areas such as Obunga, Manyatta and Nyalenda comes as high 3 meters, making these areas particularly prone to flood emergencies[6]. Flooding causes already precarious sanitation conditions to worsen, with pit latrines overflowing with water, spilling contents into the surrounding environment.

Sewerage coverage in Kisumu is at 20% compared to a water coverage of 85%[2]. There are 2 waste water treatment plants; Nyalenda Treatment Plant and Kisat Treatment plant. There are currently 12 exhausters in Kisumu; 3 owned by the utility and 9 privately

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[6] SFD Kisumu, 2015.

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owned. There are three companies in Kisumu that have been officially licensed to provide safe manual emptying services. Other informal pit emptiers also exist.

The service provider mandated to provide water and sanitation services is Kisumu Water and Sanitation Company.
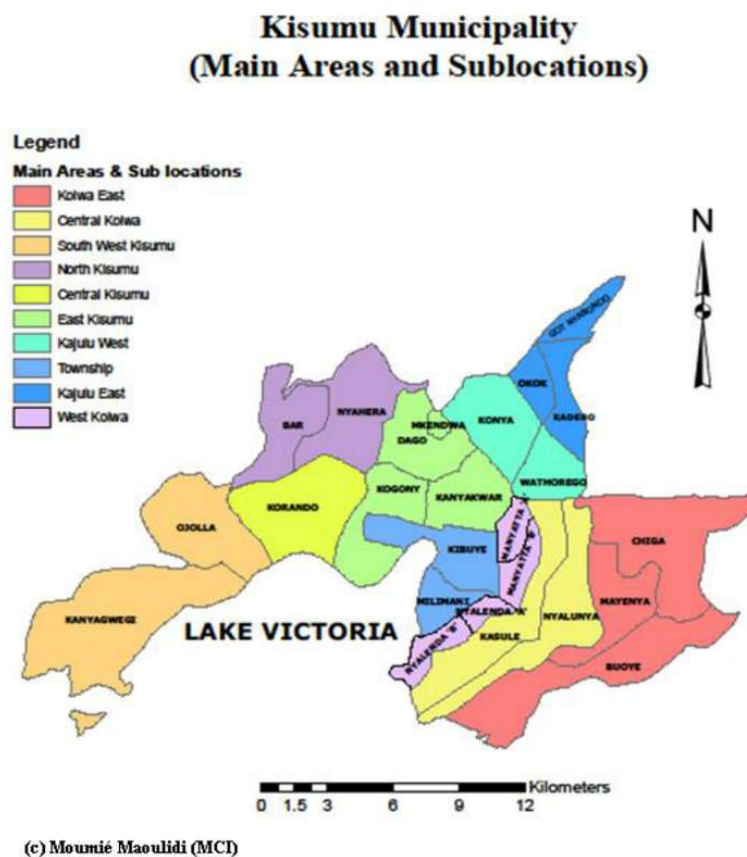

Figure 3: Kisumu municipality map

Project Approach

Research design and sampling methodology

Research Design

The research design for this work was a mixed methods approach. Surveys at households, schools, and healthcare facilities were conducted to provide insights on management of sanitation systems, as well as to observe the status of the sanitation systems. In addition, key informant interviews with sanitation service providers, county officials, and treatment service providers were carried out to assess current practices and costs of those practices.

Study Sites

Study sites within the three counties were purposively selected to suit an urban, peri-urban or rural setting description. This was a requirement to enable an assessment of the applicability of the tools in the 3 different types of settings in Kenya. To avoid delays brought about by community entry, the Consultant selected areas of operations of key stakeholders within the study.

An urban area in this study was defined broadly by the presence of administrative structures such as government offices and courts and a relative concentration of services such as hospitals and financial institutions such as banks. Peri-urban areas were those located on the outskirts of cities or large urban areas but retain some rural characteristics such as agricultural production. Rural areas had little to no presence of administrative structures and government services and other infrastructure. Livelihood activities were predominantly centered on agricultural production.

The following areas were sampled and included in the study in the 3 counties;

Table 2: Selected study sites in Nakuru, Nairobi and Kisumu counties

	Nakuru county	**Nairobi county**	**Kisumu county**
Urban	Naivasha CBD	Makadara	Manyatta
Peri Urban	Kamere	Embakasi South	Nyalunya
Rural	Mai Mahiu / Longonot	Dagoretti South	Lower Seme

Sampling Methodology

At the last stage of household sampling, stratified random sampling technique was applied to select households. The strata used was sewered and non-sewered areas. This enabled getting feedback for most of the questions on the household survey. The enumerators were required to walk through paths in these strata, selecting the 10th household for a sample. In case of non -response, the procedure was repeated until the whole sample was attained. This method helped avoid the costly and time- consuming alternative of obtaining household registers from authorities or utilities to select samples. It also gave everyone in the sample population an equal chance of being included in the study.

Key Informant Interviewees (KIIs) were purposively sampled, to make sure we included the most relevant samples. The following stakeholders (Table 3) were interviewed;

Table 3: List of Key Informants

Category	Key Informants:
Sanitation service providers	-Chairpersons Exhauster trucks -Chairperson manual emptiers

	-Chairperson semi-mechanized emptiers -Private companies/ Ecosan providers -Community based organizations (CBOs)
County Officials	-Monitoring & Evaluation Officer -WASH Coordinator -Public Health Director -Water and Sanitation Director
Treatment Service Provider	-Technical Managers – water service providers -Low Income Areas Manager (Pro- poor) or Sanitation Manager -Private companies / Ecosan providers

Sample Size Determination

As outlined in the project Terms of Reference, TOR, the proposed sample sizes for the surveys and observations were already provided for the Consultant:

- 600 households, i.e., 200 per county, households distributed across rural, peri-urban, and urban areas for each of the 3 counties

- 27-45 schools, i.e., 3-5 each for rural, peri-urban, and urban areas for each of the 3 counties

- 27-45 health care facilities, i.e., 3-5 each for rural, peri-urban and urban areas for each of the 3 counties

As outlined in the TOR, the proposed sample sizes for the key informant interviews were also already provided for the Consultant:

- Sanitation service providers (e.g., emptiers, masons); 5-10 KIIs per county

- County-level officials responsible for monitoring, inspection and/or enforcement of onsite sanitation standards; 3-5 KIIs per county

- Managers and/or staff of local wastewater treatment facilities; 3-5 KIIs per county

For the purpose of this phase of work, the Consultant just utilized these recommendations from the project TOR. When scaling up for administering this survey at a national level, the sample sizes will need to be recalculated to ensure that the sample is representative at a 95% confidence level. For the three proposed counties, the average percentage of the population with safely managed sanitation is 33%. Assuming a 33% frequency of outcome factor in the population at 95% confidence interval, and a design effect of 1, the proposed 600 households is sufficient for the pilot testing, factoring in non-response households as well.

The schools and healthcare facilities were purposively sampled to give the best representation of public versus private in each of the geographical areas.

Table 4: Sample distribution per county for households, schools, and health care facilities.

	Nairobi County				Kisumu County				Nakuru County			
	Urban	Peri-urban	Rural	Total	Urban	Peri-urban	Rural	Total	Urban	Peri-urban	Rural	Total
Households	75	75	50	200	75	75	50	200	75	75	50	200
Schools	4	4	3	11	4	4	3	11	4	4	3	11
Healthcare Facilities	4	4	3	11	4	4	3	11	4	4	3	11

Quality assurance

To achieve accurate, reliable and valid results, the following data quality assurance procedures were employed.

a)   Sampling

A detailed sampling plan for selection of the study population and the sample was created (Table 4). This plan ensured the correct sample was included in the study with minimal bias. GPS co-ordinates were recorded and analysed to ensure the sampling strategy was implemented as planned. Daily review of GPS coordinates in data relayed was done to ensure sampling was implemented as per the plan.

b)   Training

A detailed training plan for the Survey Leads and the Enumerators was used, and can be found here. Training will be conducted before the data collection process. Survey Leads provided field support and supervision to the enumerators, and performed spot checks and daily debrief meetings to address any issue arising with the data collection process. The same personnel from Sanivation trained the field research staff in all the 3 counties, for uniformity.

c)   Survey implementation

The surveys were uploaded on KoBo Collect mobile-based application, for ease and accuracy in administration. Pre-testing of the mobile based surveys was conducted a day after the training, and all problems arising were addressed before the main data collection exercise. Electronic devices used in the data collection exercise were assessed

for any technical problems prior to this exercise. Overnight charging of the devices by the enumerators was required, to avoid power drainage in the middle of data collection during the day.

d) Data normalization protocols

Definitions of different unique terminologies in the survey was part of the training, to ensure standard understanding across all enumerators. For open ended questions, consistent data formats and measurement standards were used.

Training and Pre-testing

The training included activities and tasks required of the enumerators and survey leads during data collection. Training activities took two days in each county – in Nairobi on the 14th and 15th of February, in Nakuru on the 17th and 18th of February, and in Kisumu on the 24th and 25th of February, 2022.

Training Objectives

The objectives of training the enumerators, survey leads collectors, and the relevant stakeholders were:

- To gain an overall understanding of the scope and purpose of the data collection exercise.

- To gain an overall understanding of the subsystem with which he/she works i.e., the chain of command.

- To gain hands-on experience in the use of the tools that person uses to perform his/her job.

- To inform the team of the sampling plan, the quality assurance plan, and research ethics.

Training Agenda

The training agenda included:

- Training objectives and expectations

- Research methodology

- Sampling strategies

- Review of research survey instruments

- Data collection processes

- Field team structure and responsibilities

- Research professional codes of conduct

- Field logistics

- Questionnaire overview and practices

Training Methodology

The first day of training was conducted in a classroom fashion, where a theoretical introduction to the study and the data collection tools was done. A PowerPoint presentation, linked here, was used to guide the training, as outlined in the agenda above. During this training, an in-depth review of the data collection tools was done. This included training the research staff, using illustrations, on the different sanitation systems and emptying technologies featured in the surveys (Appendix 3 and 4). A role play was done to mimic the actual data collection, which gave the enumerators a further understanding and confidence in using the tools.

Picture 1&2: Day 1 Training in Nairobi

| Picture 1 | Picture 2 |

Picture 3, 4, 5 and 6: Pre- testing data collection from households and a school in Nairobi, Kisumu and Nakuru counties, respectively.

Picture 3

Picture 4

Picture 5

Picture 6

Picture 7, 8. 9 and 10: Toilet observations in Kisumu and Nakuru counties

Picture 7

Picture 8

Picture 9

Picture 10

Each Enumerator and Survey Lead was issued with a tablet and a charger. The KoBo Collect mobile application was downloaded on the tablets, and logged onto the project server. Training was done on how to use the application, including how to collect GPS coordinates. It was required that the GPS coordinate accuracy be maintained below 10 meters. Any issues arising with the KoBo Collect app were addressed and/or recorded for adjustment.

The second day of the training was done in the field. This was a pre-testing activity aimed at:

a) giving the research staff an opportunity to practice survey administration.

b) estimating the time taken to complete one survey to calculate daily quotas.

c) to identify any problems with the data collection tools, the tablets and KoBo Collect app.

In Nairobi, the pre-testing was done in Mukuru kwa Reuben, in Nakuru it was done in Kabati (Naivasha), and in Kisumu, in Nyalenda. Each enumerator interviewed five households under the supervision of the training staff and the survey lead. Together, the enumerators interviewed one school and one healthcare facility. Observations were made to ensure the enumerators administered the questions correctly and politely, as

well as understood the responses and recorded them correctly. Any inconsistencies were addressed in a debriefing session after the pre-test activity.

Training Outcomes and Data Collection

Field Structure and communication channels

The field work was done by a team of three enumerators and one Field Supervisor/Survey Lead. The Field Supervisor was based in the field and oversaw all the data collection activities and conducted the KIIs. The Senior Field Supervisor (Sanivation) oversaw the entire project. To complete interviews in 200 households and 22 institutions, the team conducted surveys for a duration of 12 workdays (completing a minimum of 15 surveys/enumerator/day). Key informant interviews were conducted concurrently with surveys. The reporting line for potential issues and feedback was structured as follows:

Figure 4: Field structure and reporting line
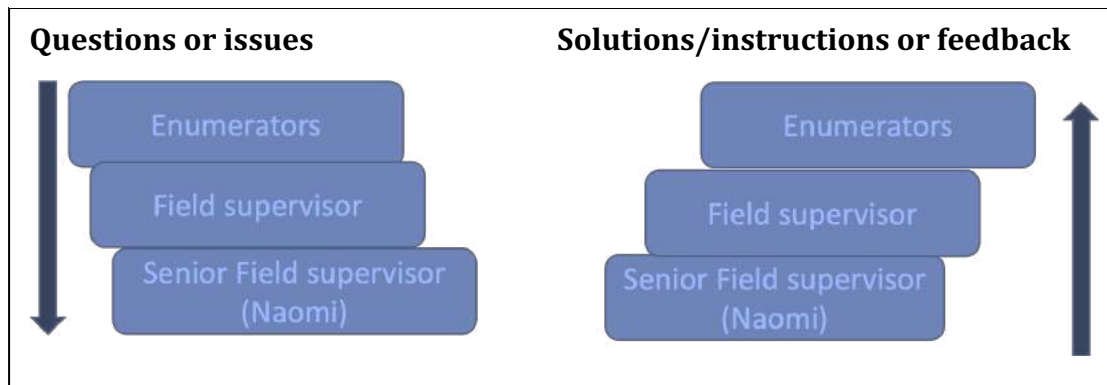
Role definition

Survey Lead

The Survey Leads were in charge of supervising the enumerators, ensuring the data quality assurance protocol was observed and helped with troubleshooting problems/ challenges in the field. Daily debrief sessions with the enumerators were led by the Survey Lead in the morning before dispatching the field teams. These sessions addressed inconsistencies in data and communication of any changes made to the tools. The Survey Lead also conducted KIIs, analyzed the KII data, and wrote reports on the same.

The Survey Leads were issued with a field identification card (ID) with a) UNICEF, Fresh Life, and Sanivation logos (Nairobi County) or b) UNICEF and Sanivation logos (Nakuru and Kisumu counties). They were also issued with a high visibility vest with logos in the same order as in the field IDs for use when needed.

Enumerators

The enumerators were responsible for data collection from households, schools, and HCFs. They were required to follow the sampling methodology as trained and maintain

the highest level of professionalism and ethics. In Nairobi and Nakuru counties, the enumerators were attached to Community Health Volunteers (CHVs), who are knowledgeable of the selected areas, and recognized by those communities. In Kisumu County, village heads were attached to the enumerators. This structure was adopted to minimize community entry and acceptance challenges.

Each enumerator was issued with a field identification card (ID) with a) UNICEF, Fresh Life, and Sanivation logos (Nairobi County), and b) UNICEF and Sanivation logos (Nakuru and Kisumu counties). All the field personnel (enumerators, CHVs, and village heads) were issued with a high visibility vest with logos in the same order as in the field IDs.

Feedback from household, school and HCF pre-tests

The teams in the three counties reported refusal to be interviewed by some of the households. Some refusals were due to lack of trust (as no IDs were used during the pre-testing), others were busy, and others did not give reasons. Cases of refusals would reduce significantly with the issuance of field IDs for the main exercise.

In Kisumu County, it was said that most studies conducted in the county usually give incentives to participants (like soap). This was checked for during the pre-testing activity, where only 1 out of the 15 households interviewed asked for an incentive. Since this was not factored in the initial budget, it was decided that incentives would not be issued. The enumerators were trained on how to emphasize on the greater benefit of the project, i.e., creation of tools that would highlight the sanitation problems in their communities and provide a basis for improvement.

In overall, the piloted schools and HCFs provided maximum, unconditional support.

Study Results

The Sanitation Ladder

The World Health Organization (WHO) and United Nations Children's Fund (UNICEF), through the Joint Monitoring Programme (JMP) for Water Supply, Sanitation and Hygiene, track progress towards the SDG 6.2 against the "service ladder", which is applicable globally. Safely managed sanitation under SDG 6.2 requires that people use improved sanitation facilities that are not shared with other households, and that the excreta produced should be treated offsite or be treated and disposed of in-situ. The service ladder hierarchy and definitions are shown in Figure 5.

Sanitation ladder

SAFELY MANAGED
Use of improved facilities that are not shared with other households and where excreta are safely disposed of in situ or removed and treated offsite

BASIC
Use of improved facilities which are not shared with other households

LIMITED
Use of improved facilities shared between two or more households

UNIMPROVED
Use of pit latrines without a slab or platform, hanging latrines or bucket latrines

OPEN DEFECATION
Disposal of human faeces in fields, forests, bushes, open bodies of water, beaches and other open spaces or with solid waste

Note: Improved sanitation facilities are those designed to hygienically separate excreta from human contact, and include: flush/pour flush toilets connected to piped sewer systems, septic tanks or pit latrines; pit latrines with slabs (including ventilated pit latrines), and composting toilets

Figure 5: The JMP Sanitation Ladder Source: washdata.org

Sanitation ladders for Kisumu, Nairobi and Nakuru counties and was created using the data collected, as shown in ==Error! Reference source not found.==. These are not fully representative of the counties because the sample sizes used in this study were not representative of the total population in each of the counties. It is recommended to use representative sample sizes for routine monitoring.

For this study, some assumptions were in addition to household, key informant interviews and workshop data, applied to calculate the amount of safely managed sanitation, as detailed in the safely managed onsite sanitation section.
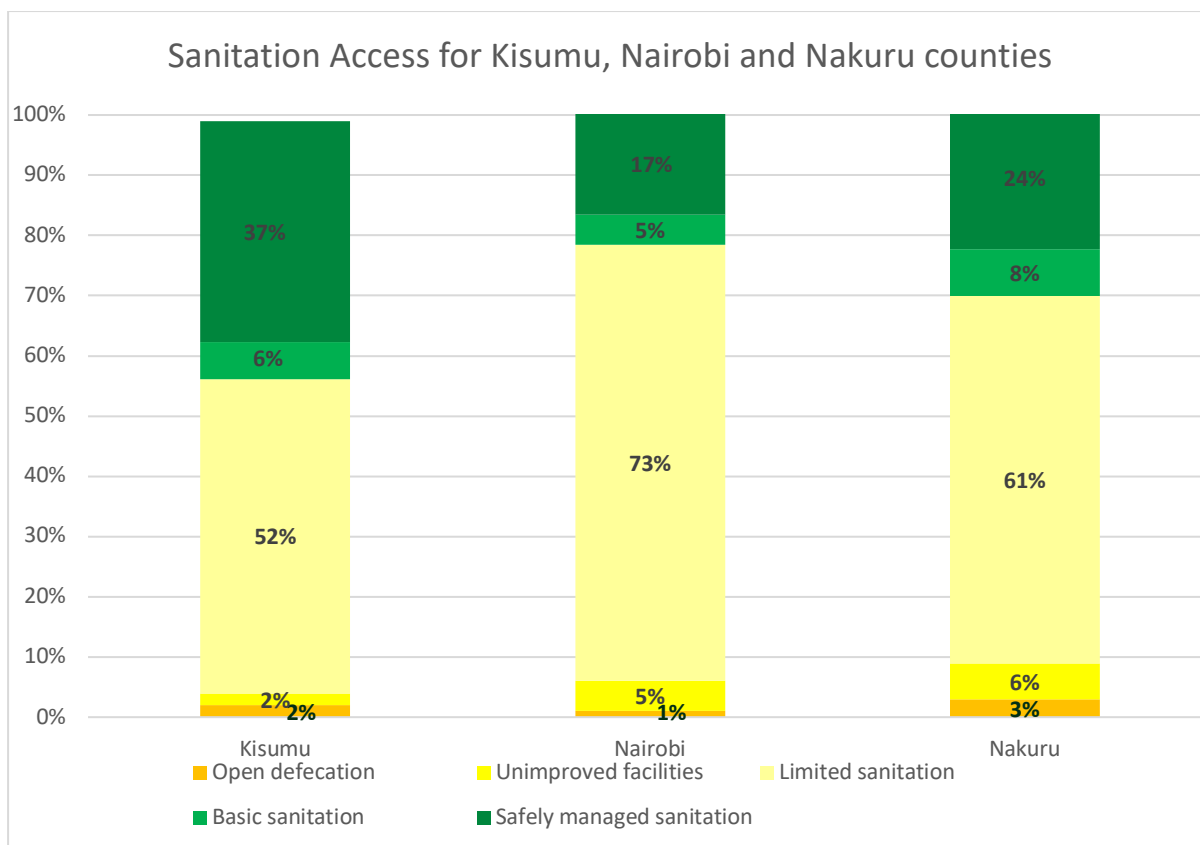
Figure 6: Sanitation ladders for the three study counties

Access to basic sanitation

Toilet facilities in the Kisumu, Nairobi and Nakuru counties' study areas were as shown in Figure 7. These can further be classified per the different settlement areas, i.e, urban, peri-urban and rural settlements as shown in Figure 8.

	Kisumu	Nairobi	Nakuru
Ventilated improved pit latrine	9.41%	0.00%	4.46%
Urine diversion dry toilet	0.00%	5.53%	0.00%
Pit latrine without slab	1.98%	1.01%	4.95%
Pit latrine with slab	76.24%	15.08%	44.55%
Open pit	0.00%	0.00%	0.99%
No facility/bush/field	1.98%	0.00%	0.00%
Hanging toilet/ hanging latrine	0.00%	0.50%	0.00%
Flush	10.40%	77.89%	45.05%
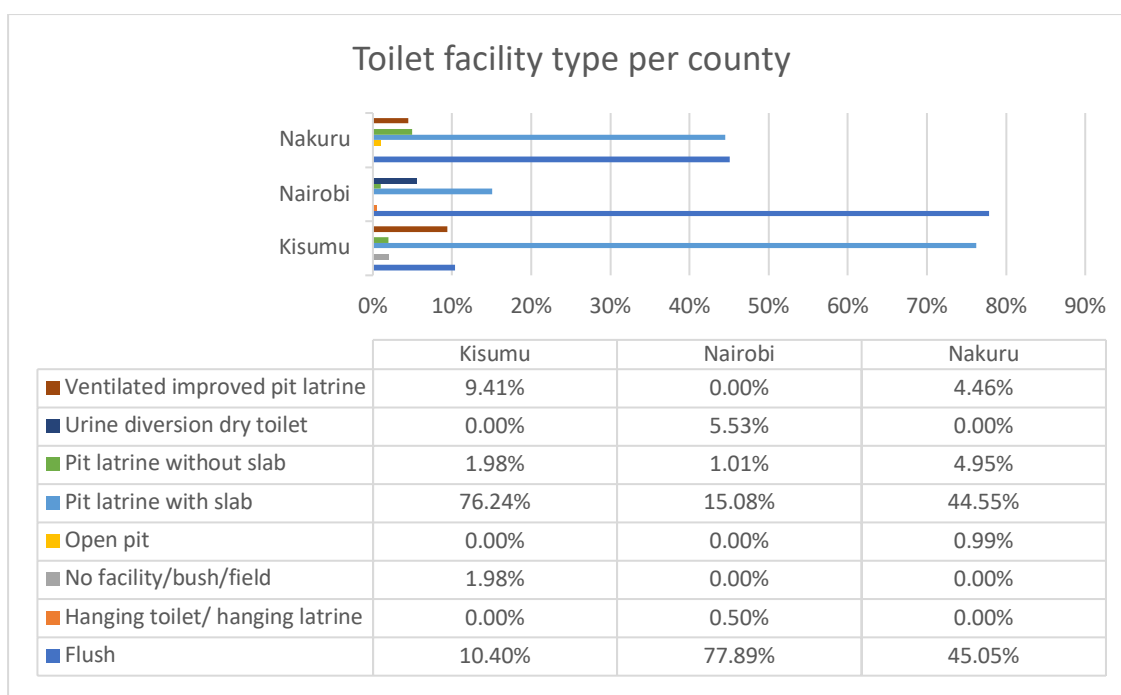
Figure 7: Toilet facility type per county

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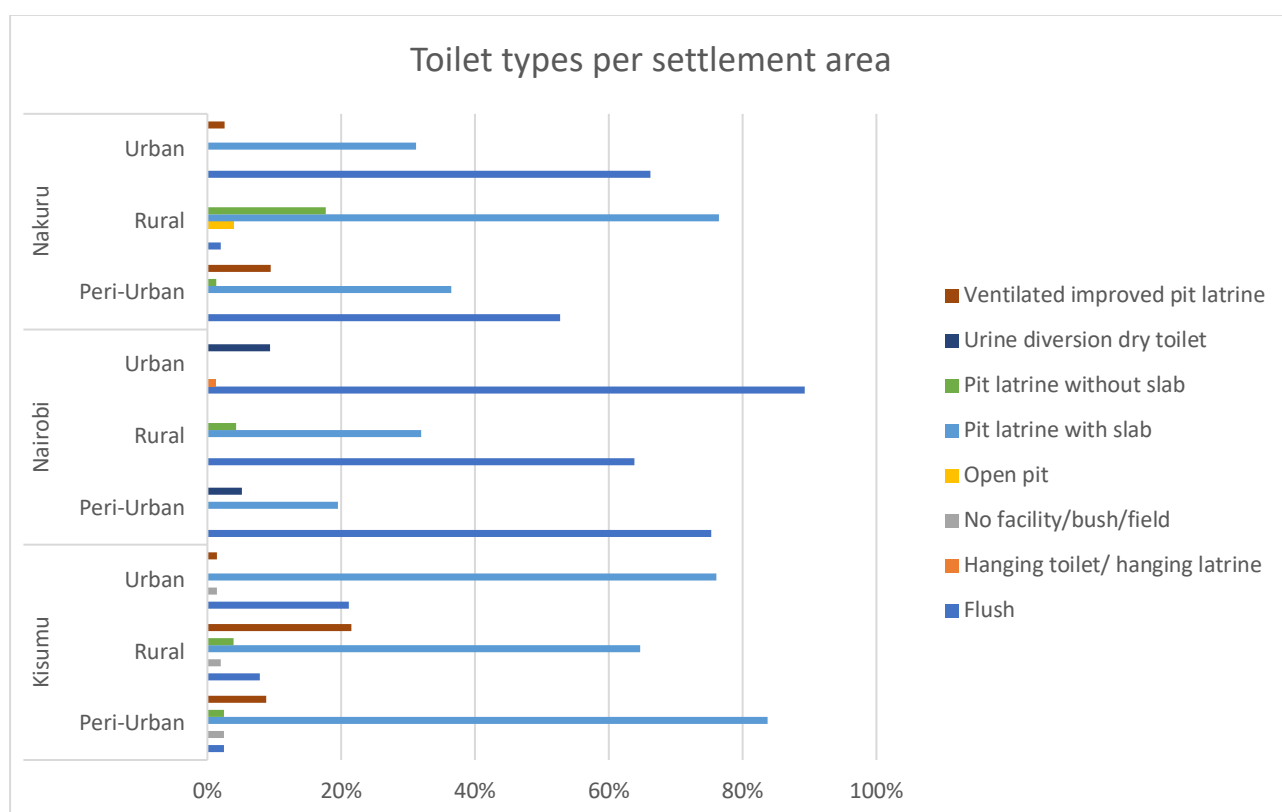
Figure 8: Toilet facility type per settlement area in Kisumu, Nairobi and Nakuru counties.

Improved and Unimproved Sanitation Facilities

The JMP defines improved sanitation facilities as those facilities designed to hygienically separate human excreta from human contact. These include wet sanitation technologies such as flush and pour flush toilets connected to sewers, septic tanks or pit latrines, and dry sanitation technologies such as dry pit latrines with slabs and composting toilets. For this study, overall, improved sanitation facilities formed 96.2% (Table 5). Only 1.5% (9 people) of the 600 respondents did not know where their flush toilets emptied into. All the 9 were renters of the houses they live in. In Kisumu, 193 households had improved facilities (95%), in Nairobi 196 households (98%) and in Nakuru 188 households (93%).

Table 5: Improved sanitation in the study areas

Total Households with Improved Sanitation					
	Kisumu	Nairobi	Nakuru	Grand Total	Improved/ Unimproved Status
Flush to don`t know where	0.0%	0.0%	1.5%	1.5%	Improved
Flush to open drain	0.0%	1.2%	0.0%	1.2%	Unmproved
Flush to piped sewer system	0.8%	21.7%	6.8%	29.3%	Improved
Flush to pit latrine	0.7%	1.8%	4.8%	7.3%	Improved
Flush to septic tank	2.0%	1.2%	2.0%	5.2%	Improved
Hanging toilet/ hanging latrine	0.0%	0.2%	0.0%	0.2%	Unimproved

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No facility/bush/field	0.7%	0.0%	0.0%	0.7%	Unimproved
Open pit	0.0%	0.0%	0.3%	0.3%	Unimproved
Pit latrine with slab	25.5%	5.0%	14.7%	45.2%	Improved
Pit latrine without slab	0.7%	0.3%	1.7%	2.7%	Unimproved
Urine diversion dry toilet	0.0%	1.8%	0.0%	1.8%	Improved
Ventilated improved pit latrine	3.2%	0.0%	1.5%	4.7%	Improved
Total Improved sanitation facilities across the 3 counties				**95%**	
Total unimproved sanitation facilities across the 3 counties				**5%**	

In Kisumu County, pit latrines with slabs comprised 79.27% of all improved facilities in the study area within the county. In Nairobi, the most common improved facilities were flush toilets connected to sewers (66.33%), and in Nakuru, pit latrines with slabs were the most common (46.81%) as shown in Figure 9 below.

Distribution of improved sanitation facilities across the Kisumu's, Nairobi's and Nakuru's urban, peri-urban and rural settlements.

	Peri-Urban	Rural	Urban	Peri-Urban	Rural	Urban	Peri-Urban	Rural	Urban
		Kisumu			Nairobi			Nakuru	
■ Ventilated improved pit latrine	1.23%	1.93%	0.18%	0.00%	0.00%	0.00%	1.23%	0.00%	0.35%
■ Urine diversion dry toilet	0.00%	0.00%	0.00%	0.70%	0.00%	1.23%	0.00%	0.00%	0.00%
■ Pit latrine with slab	11.75%	5.79%	9.30%	2.63%	2.63%	0.00%	4.56%	6.84%	4.04%
■ Flush to septic tank	0.18%	0.70%	1.23%	0.70%	0.53%	0.00%	1.05%	0.00%	1.05%
■ Flush to pit latrine	0.18%	0.00%	0.53%	0.00%	1.93%	0.00%	2.28%	0.18%	2.63%
■ Flush to piped sewer system	0.00%	0.00%	0.88%	8.77%	2.81%	11.23%	2.63%	0.00%	4.56%
■ Flush to don`t know where	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.88%	0.00%	0.70%

Figure 9: Distribution of improved sanitation facilities in different settlement areas

Unimproved sanitation facilities include the use of pit latrines without a slab or platform, hanging latrines or bucket latrines and any toilet facility that drains to open drains. In this

study,30 households interviewed (5%) were found to utilize unimproved facilities. A segregation of these facilities is in the different settlement areas is shown in Figure 10.

	Peri-Urban	Rural	Urban	Rural	Urban	Peri-Urban	Rural
		Kisumu		Nairobi		Nakuru	
■ Pit latrine without slab	8.70%	8.70%	0.00%	8.70%	0.00%	4.35%	39.13%
■ Open pit	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	8.70%
■ No facility/bush/field	8.70%	4.35%	4.35%	0.00%	0.00%	0.00%	0.00%
■ Hanging toilet/ hanging latrine	0.00%	0.00%	0.00%	0.00%	4.35%	0.00%	0.00%
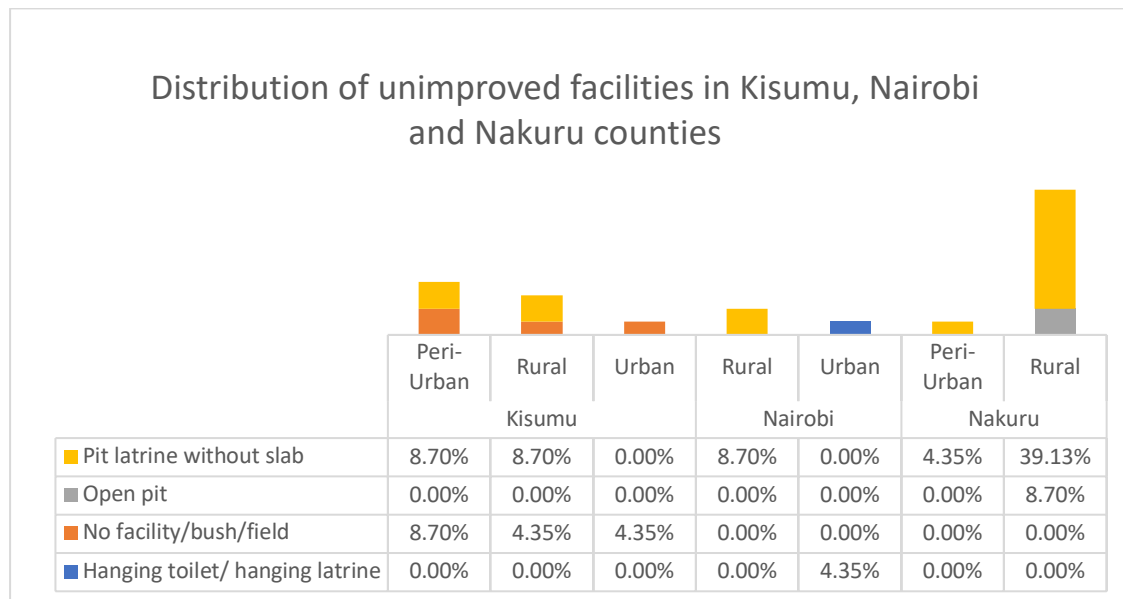
Figure 10: Distribution of unimproved sanitation facilities in different settlements in the study areas

The household survey used had two questions (14a and 14c) that ask about the "primary toilet facility" and "any other toilet facility" that the household utilizes. This question was confusing to the enumerators during training, and can easily be confused to imply that the primary toilet facility should be in the compound. The question on which secondary toilet facility the households use was not found to be useful in the survey for analysis of emptying, transport and treatment of fecal sludge, and its removal from the survey is recommended to avoid confusion during data collection. This core question on toilet facilities is therefore recommended: "What kind of toilet facility do members of your household usually use?"

At least basic onsite and offsite sanitation facilities

Basic sanitation facilities include all improved sanitation facilities that are not shared. These can further be segregated into basic onsite and basic offsite sanitation facilities, depending on where the toilet facilities drain to. Basic onsite sanitation facilities are therefore improved sanitation facilities that are not shared, and where excreta are drained to containments like septic tanks, pit latrines and urine diverting dry toilet containers. Basic offsite sanitation systems drain into sewerage lines. In this study, households with basic sanitation in Kisumu were 43% of all the households surveyed, in Nairobi, 22% and in Nakuru 31%. The proportion of basic onsite and basic offsite sanitation in the three counties is as shown in Figure 11. Of the households surveyed in Kisumu 41% had basic sanitation facilities that drained to onsite containments, and 1% to sewer lines. In Nairobi, 15% of the households had basic sanitation facilities connected to a sewer line, while 7% were on onsite containments. In Nakuru, 23% of the facilities were classified under basic onsite facilities, and 8% under basic offsite facilities.
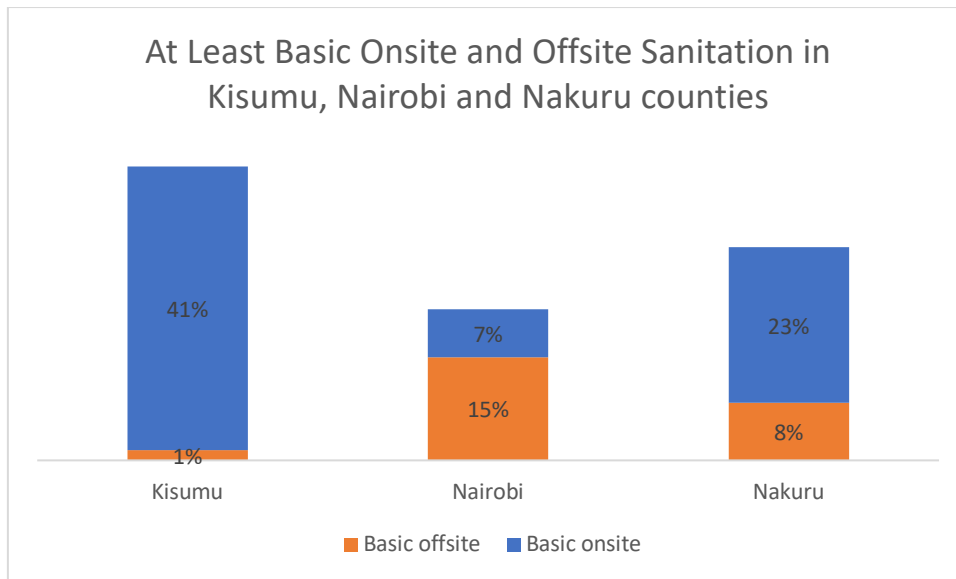
Figure 11: Basic onsite and basic offsite sanitation in the study areas

Limited onsite and offsite sanitation facilities

Limited sanitation refers to the use of improved toilet facilities that are shared with other households. These facilities can further be divided into limited onsite and limited offsite sanitation. Limited onsite facilities are therefore improved facilities that drain to onsite containments (pit latrines and septic tanks) while limited offsite facilities drain to sewer lines. In this study, limited onsite and offsite sanitation facilities were as shown in Figure 12.
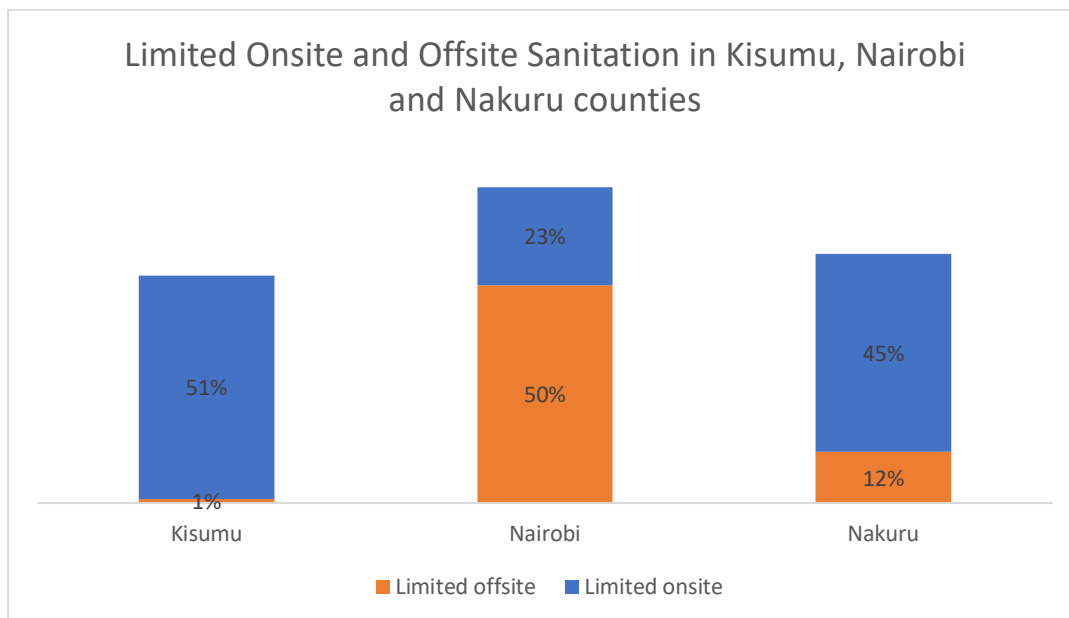
Figure 12: Limited onsite and limited offsite sanitation facilities in the study areas

Containment

Contained and Not Contained Sanitation Facilities

Contained on-site sanitation facilities have containments that do not overflow or discharge excreta directly to the surface environment. Containments are permeable or

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impermeable containers for storing excreta close to the toilet or latrine, and include wet or dry pit latrines, septic tanks, and holding tanks. Many containments discharge liquid to the soil/ground through infiltration from the permeable walls or base of the containment. These are considered as 'contained', as long as the effluent does not contaminate the surface environment. Local indicators to further classify permeable and semi-permeable containments as "contained" or otherwise can be used. This could include evaluation of the risk of groundwater contamination, although this was not tested in the pilot. The Shit Flow Diagram provides an approach to estimate the risk of groundwater contamination using the following criteria[7], which can be adopted for assessment of "contained" facilities at a local level.

1. The vulnerability of the aquifer.
2. The typical lateral spacing between sanitation systems and ground water sources.
3. The degree to which drinking water supplies are provided from groundwater sources inside the city.
4. The type of technology used to produce groundwater including the level of protection that this provides.

Onsite sanitation facilities made up 68% and offsite sanitation facilities 29% of the study population (Table 6). In Kisumu, 97.5% of the study population were on onsite sanitation, 31.1% in Nairobi, and 75% in Nakuru (Figure 13). These values are not representative of the whole population because of the small sample sizes that were used. For example, in Kisumu, the urban area selected for this study was primarily a semi-formal to informal settlement, where sewer connection is low. However, onsite sanitation is more predominantly used in Nakuru and Kisumu counties as seen in the Shit Flow Diagrams for the two areas. The Naivasha SFD, where this study was done, indicates 84% of the population utilizes onsite sanitation, 15% are connected to the sewer, and 1% practice open defecation (OD). The Kisumu SFD indicates that 75% of the population uses onsite sanitation systems, 20% are on sewers and 5% practice OD. The Nairobi SFD indicates that only 46% of the population relies on onsite sanitation, and 50% are connected to the sewer, and 4% practice OD.

Table 6: Onsite and Offsite sanitation facilities in the study areas

Type of sanitation facility (Onsite / Offsite)

	Kisumu	Nairobi	Nakuru	Grand Total	% Population
Flush to sewer (Offsite)	5	130	41	176	29%
Onsite sanitation (Onsite)	196	62	150	408	68%
Flush to **don't know** where	0	0	9	9	2%
Flush to open drain	0	7	0	7	1%
Onsite sanitation	**97.51%**	**31.16%**	**75.00%**	**68.00%**	
Offsite sanitation	**2.49%**	**65.33%**	**20.50%**	**29.33%**	

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[7] SFD assessment of risk of groundwater contamination
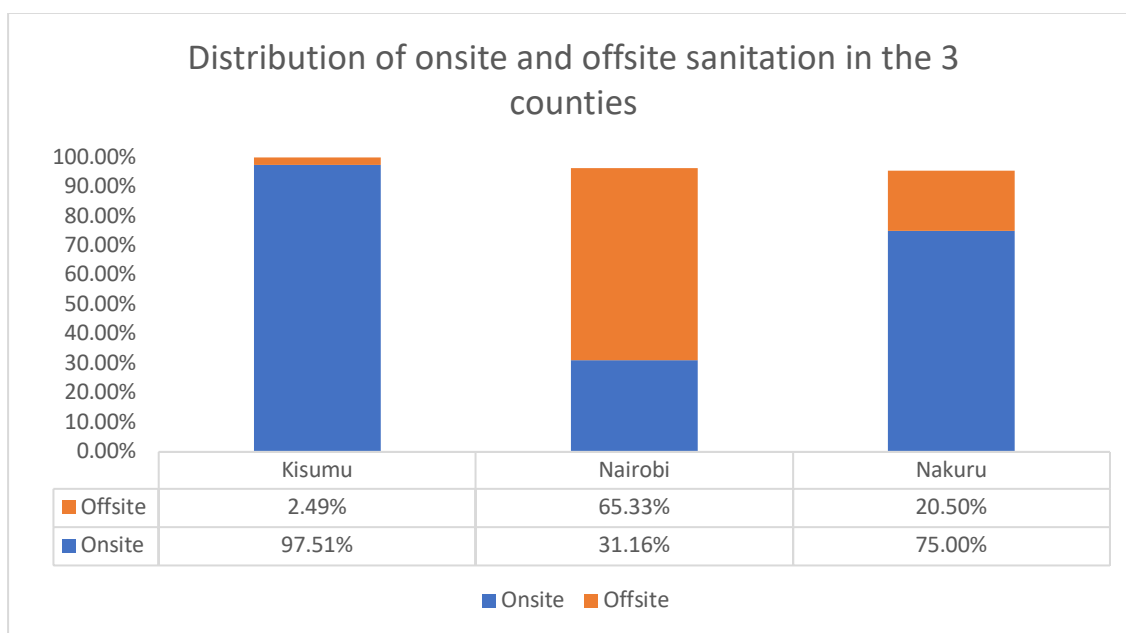
Figure 13: Distribution of onsite and onsite sanitation in the 3 counties

Of the 408 respondents on onsite sanitation, 401 households' containments were contained. These included households whose toilets were connected to pit latrines with slabs, ventilated improved pit latrines, septic tanks and urine diverting dry toilets. Further analysis of where the liquid effluent drained to showed that 2 households' containments were draining to the environment. This reduced the number of "contained" containments to 399. Nine households, all rented, that didn't know where the toilets were connected to were classified under offsite sanitation facilities. It is expected that the number of households with "contained" containments would reduce if the risk for groundwater contamination would be evaluated, especially in peri-urban and rural areas where shallow wells supply households with drinking water. Containment is primarily analysed using Q16a and 16b, whose recommended edit has been addressed in the contained/ not contained section above.

Of the 408 respondents on onsite sanitation, 330 households reported their containments to not having an overflow (question 16a). These resulted to blank responses for question 16b that sought to know where the containment drains into due to a skip logic. Thirty-four (34) households (8%) did not know whether their containment systems had an overflow or not (Table 7). Of these, 30 were "renters" and 4 "home owners". The owners were however not the head of those households. To reduce the "don't know" responses for this question, it is recommended that the survey be administered to more knowledgeable persons in rented households, like the caretakers or owners of the rental units. Twenty-six households (6%) reported containments that have overflow lines, with 10 households (2.5%) draining into sewer lines, 8 households (2%) draining into leach pits, 2 households (0.5%) being pit latrines that drain into septic tanks and another 2 households (2%) draining into the environment. Four households (1%) knew that their containments drained, but didn't know where they drained to (Table 8). Again, these

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were found to be renters, pointing back to the need of interviewing a more knowledgeable person in rented units.

Table 7: "I don't know" responses for containment overflow lines

Count of households reporting "don't know where containments drain into".				
Row Labels	**Kisumu**	**Nairobi**	**Nakuru**	**Grand Total**
Flush to pit latrine		4	1	5
(blank)		4	1	5
Flush to septic tank		2	1	3
(blank)		2	1	3
Pit latrine with slab	8	12	4	24
(blank)	8	12	4	24
Ventilated improved pit latrine			2	2
(blank)			2	2
Grand Total	8	18	8	34

Table 8: Households with containment overflow lines, and where the effluent drains to

Count of households with containments with overflow line for liquids				
Row Labels	**Kisumu**	**Nairobi**	**Nakuru**	**Grand Total**
Flush to pit latrine			4	4
Conventional sewer			3	3
Soak pit/leach field			1	1
Flush to septic tank	3	3	4	10
Conventional sewer		1		1
Don`t know	1		3	4
<mark>Open drain/surface environment</mark> (Not contained)	1			1
Soak pit/leach field	1	2	1	4
Pit latrine with slab	2	1	6	9
Conventional sewer	1		4	5
<mark>Open drain/surface environment</mark> (Not contained)		1		1
Soak pit/leach field	1		2	3
Ventilated improved pit latrine	2		1	3
Conventional sewer			1	1
Other – Septic tank	2			2
Grand Total	7	4	15	26

Some households in this study reported that their containments drained to the environment, but it is suspected that this could just be a small proportion as most did not prefer to disclose. It is thus recommended that enumerators couple this survey question with observations to ascertain that no waste is being discharged to the environment.

Emptying And Transport

Most onsite containments are designed to be emptied once full. These include pit latrines, holding tanks, and septic tanks. Depending on the soil structure, some unlined pit latrines have been reported to collapse during emptying, especially when using mechanical emptying methods. Emptying services are classified as manual, semi-mechanized or mechanized. The JMP global indicators recognize all emptying done through the three methods above. This report recommends a local indicator for emptying, that takes into account the service providers and the emptying technologies / equipment they use. This indicator is then referred to as "safely managed emptying". The rationale for recommending a focus on service providers and the emptying technology / equipment is because manual emptying has been found to not only be unhygienic, but life-threatening to the emptiers. They often descend into containments and use buckets on ropes to empty them. The focus in these contexts is therefore to not only empty the containments, but to also ensure the safety of the emptiers. In Kenya, unsafe manual emptying practices are still being practiced nationally, and there is currently no policy regulating emptying practices. On the county level, Kisumu County are the first to develop Standard Operating Procedures (SOPs) for emptying of onsite sanitation systems. These SOPs are currently at the county assembly for discussions to be passed into law. The manual emptiers trained and certified to use the SOPs would then receive authorization and recognition by the county, just like the mechanized and semi-mechanized emptiers.

Core indicator - ever emptied

Of the 408 households on onsite sanitation, 264 household's containments had never been emptied before (65%), 110 containments had been emptied (27%), while 16 households didn't know whether or not they were emptied (4%). Improved onsite sanitation facilities that had been emptied before were 107. The emptied methods used varied from manual to mechanized, as shown in Table 9 below.

Table 9: Emptying methods used across the study areas

Emptying methods used to empty improved onsite sanitation facilities across the study areas			
	Kisumu	**Nairobi**	**Nakuru**	**Grand Total**
Don`t know	0.94%	0.00%	0.00%	0.94%
Emptied manually using bucket and/or barrel	33.02%	11.32%	0.00%	44.34%
Emptied using a mechanical exhauster	16.98%	12.26%	16.98%	46.23%
Emptied using a pump	0.00%	0.94%	0.00%	0.94%
Not emptied- we dig another latrine	6.60%	0.00%	0.00%	6.60%
Not emptied-it is abandoned	0.94%	0.00%	0.00%	0.94%

Grand Total		**58.49%**	**24.53%**	**16.98%**	**100.00%**

After emptying, the waste was deposited in various locations, as shown in Table 10.

Table 10: Disposal practices in study areas

Disposal practices in study areas				
	Kisumu	**Nairobi**	**Nakuru**	**Grand Total**
Don`t know	**6.67%**	**0.67%**	**27.33%**	**34.67%**
I don`t know	6.67%	0.67%	27.33%	34.67%
Emptied manually using bucket and/or barrel	**23.33%**	**8.00%**	**0.67%**	**32.00%**
Buried in a covered pit	14.00%	0.00%	0.67%	14.67%
Disposed off in situ	0.67%	0.00%	0.00%	0.67%
I don`t know	0.67%	3.33%	0.00%	4.00%
Placed in an uncovered pit, open ground, water body or elsewhere	0.67%	0.00%	0.00%	0.67%
Removed and disposed of offsite	7.33%	4.67%	0.00%	12.00%
Emptied using a mechanical exhauster	**12.00%**	**8.67%**	**12.00%**	**32.67%**
I don`t know	4.00%	6.00%	12.00%	22.00%
Other	0.00%	0.67%	0.00%	0.67%
Removed and disposed of offsite	8.00%	2.00%	0.00%	10.00%
Emptied using a pump	**0.00%**	**0.67%**	**0.00%**	**0.67%**
Other	0.00%	0.67%	0.00%	0.67%
Grand Total	**42.00%**	**18.00%**	**40.00%**	**100.00%**

Local indicator – locally defined safely emptied

Question 18 of the household survey used asks who provided the emptying service, and offers the options as shown on (Table 11: Emptying service provider knowledge by renters and home owners. It is recommended that these responses be refined to include all the emptying options in the area of study. For example, in Kenya, the response could include: a) Who emptied b) How the emptying was done (bucket, gulper, mechanized - pump to lorry or exhauster truck, c) Use of PPE This would enable local classification of emptying into safely managed and unsafely managed emptying. It is also recommended that surveys be administered to the most knowledgeable person in the household on sanitation matters regarding the household or address to reduce the likelihood of "I don't know" responses.

A proposed local indicator for emptying is the % of waste safely emptied. This would estimate the percent of waste that is low risk to the environment, and to the emptiers. The indicator would be calculated as the percent of waste emptied by authorized personnel using manual, semi-mechanized or mechanized equipment that do not leak during emptying, with emptiers who use personal protective equipment (Appendix 2).

Table 11: Emptying service provider knowledge by renters and home owners

Emptying service providers in study areas			
	Own this house	**Rent this house**	**Total**
Household members/Neighbours	**6.36%**	**13.64%**	**20.00%**
Flush to pit latrine	0.91%	0.00%	0.91%
Flush to septic tank	0.91%	0.00%	0.91%
Pit latrine with slab	3.64%	13.64%	17.27%
Ventilated improved pit latrine	0.91%	0.00%	0.91%
I don`t know	**6.36%**	**6.36%**	**12.73%**
Flush to pit latrine	0.00%	1.82%	1.82%
Flush to septic tank	0.00%	2.73%	2.73%
Pit latrine with slab	6.36%	1.82%	8.18%
Municipality	**0.91%**	**2.73%**	**3.64%**
Flush to pit latrine	0.00%	0.91%	0.91%
Flush to septic tank	0.00%	1.82%	1.82%
Pit latrine with slab	0.91%	0.00%	0.91%
Others	**0.00%**	**2.73%**	**2.73%**
Flush to pit latrine	0.00%	0.91%	0.91%
Pit latrine with slab	0.00%	0.91%	0.91%
Pit latrine without slab	0.00%	0.91%	0.91%
Private service provider	**20.00%**	**40.00%**	**60.00%**
Flush to pit latrine	2.73%	1.82%	4.55%
Flush to septic tank	5.45%	2.73%	8.18%
Pit latrine with slab	10.00%	33.64%	43.64%
Pit latrine without slab	0.91%	0.91%	1.82%
Ventilated improved pit latrine	0.91%	0.91%	1.82%
(blank)	**0.91%**	**0.00%**	**0.91%**
Pit latrine with slab	0.91%	0.00%	0.91%
Grand Total	**34.55%**	**65.45%**	**100.00%**

The household survey has additional expanded questions on the cost of emptying and frequency of emptying and amount of sludge emptied. These questions are useful when designing waste collection, treatment and reuse interventions for local cities. Skip logics for this emptying section are recommended for facilities connected to the conventional sewers. An example is question 17C that asks what happened the last time the containment was full. This question generated a lot of "other - specify" responses for respondents who were on sewers. The emptying practices in the three counties are shown in Figure 14: Emptying practices in the study areas.

Figure 14: Emptying practices in the study areas

	Don`t know	Emptied manually using bucket and/or barrel	Emptied using a mechanical exhauster	Emptied using a pump	Not emptied- we dig another latrine	Not emptied-it is abandoned
Kisumu	0.86%	31.03%	16.38%	0.00%	6.03%	0.86%
Nairobi	0.00%	10.34%	12.93%	0.86%	0.86%	0.00%
Nakuru	0.00%	0.86%	18.10%	0.00%	0.86%	0.00%
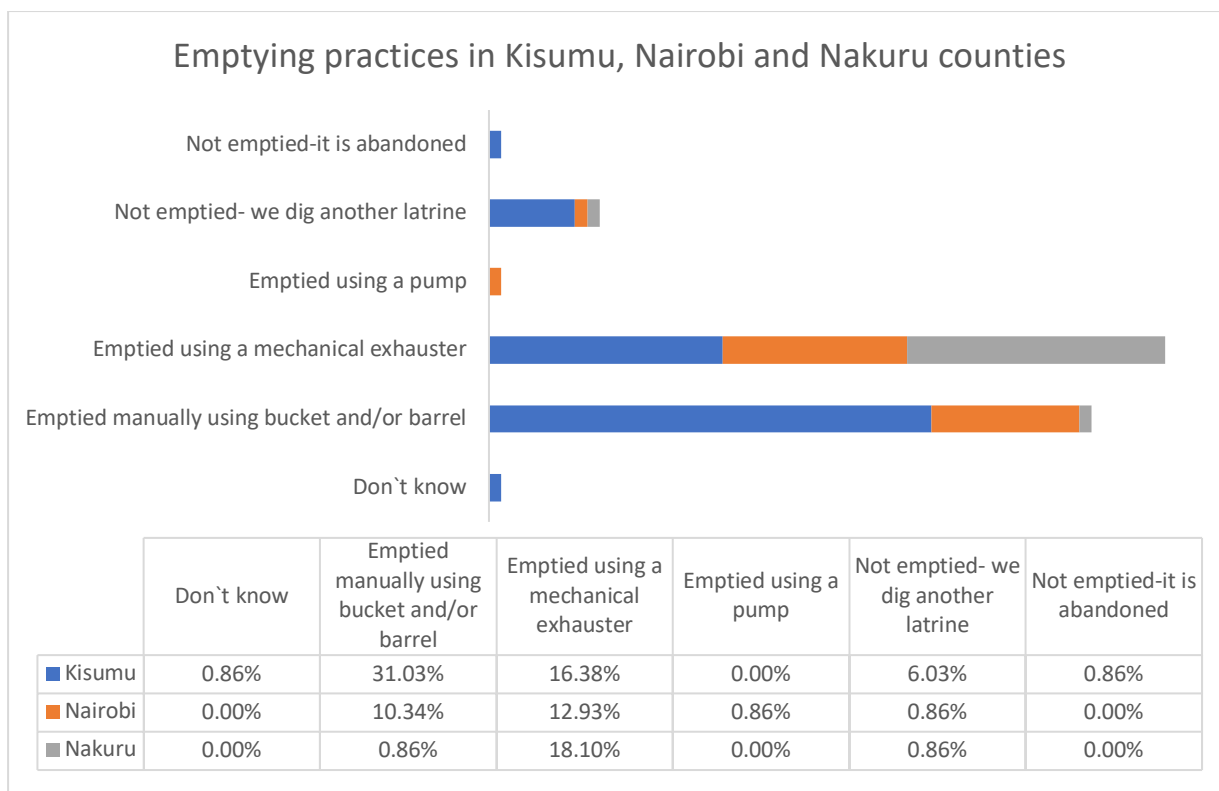
The survey used has no specific question on the transport method used after emptying. It is recommended that a follow up question after question 18, on who provided the emptying service be added to follow up on which transport method was used. This can include handcarts, pick-ups, lorries, donkey carts and exhauster trucks. The local indicator for transport is "safely transported". This excludes all transport methods that leak waste to the environment, as this poses a public health risk to the communities nearby.

Transport and Disposal

According to the JMP guidelines, any improved facility that has never been emptied is considered safely deposited in-situ. Safely treated waste is all waste that has both the solid and liquid fractions treated. Solids fractions are regarded safely treated if treated through conventional methods like drying beds, or re-use methods like co-composting, briquetting, and the like. Liquid fractions are considered safely treated only after going through secondary treatment.

Local indicators for Kenya are recommended to further establish the capacity of the treatment plants, because most were designed years back to serve a smaller population than they actually do. Disposal of waste in situ and off site for local indicators in Kenya should also consider the risk of drinking groundwater sources contamination, before being classified as safe disposal.

For this study, out of 110 respondents who said their containment had been emptied before, fifty-three did not know where the waste was taken after emptying. The rest

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reported as shown in **Error! Reference source not found.**, with only one respondent reporting disposal in the environment. Disposed of in situ in this survey referred to burying waste in a hole dug adjacent to the original containments, while disposed of offsite referred to when the waste would be disposed in a location away from the original pit latrine, like in a designated dumping site.

The responses by the households on where the waste was taken after emptying were not reliable, as most of them reported lack of knowledge on where the waste is taken after emptying. It is assumed that all exhauster trucks semi-mechanized emptiers deposit in treatment plants, but there is a possibility of disposal in water bodies or thickets, which was not substantiated in this study. Manual emptiers on the other hand are known to deposit the waste in the environment or a hole dug next to the original containment, and never to the treatment plants. A local indicator to estimate the amount of faecal sludge safely transported considers the percent of waste that is low risk to the environment during transportation. This would be calculated as the percent of waste emptied by authorized personnel using manual, semi-mechanized or mechanized equipment, while using personal protective equipment, and technologies including sewers, barrels, buckets, improvised tanks or vacuum truck that do not leak during transportation (Appendix 2).

For this study, it was not possible to get interviews with the manual emptiers. All mechanized and semi-mechanized emptiers interviewed reported disposing the waste they collected in treatment plants nearby.

Treatment

The interviews with the technical team in Kisumu confirmed that the treatment plant was operating under the design capacity, confirming that all waste going to the site was safely treated (100%). In Nakuru county, the Naivasha treatment plant's aeration ponds ware broken with only the secondary and tertiary maturation ponds in operation. It was therefore assumed that 50% of the waste was safely treated. It was not possible to get an interview with the technical teams in Nairobi, and could not ascertain the proportion of waste safely treated. For this study, we adjusted and assumed that 90% of the waste was treated, giving room for possible breakages in the system.

Safely managed on-site sanitation

To be considered safely managed sanitation under SDG 6.2, it is required that people use improved sanitation facilities that are not shared with other households (equivalent to the basic service level), and that the excreta produced should be managed through one of these three pathways:

a)   Excreta is treated and disposed of in situ
b)   Excreta is emptied and disposed of in situ
c)   Wastewater and excreta is treated offsite in a treatment plant

For this study, the following criteria and assumptions were used to calculate the amount of safely managed sanitation:

  i.   All containments never emptied are safely managed.
 ii.   All excreta buried in containments that were abandoned is safely managed.
iii.   All excreta emptied and buried in a hole next to the original containment is safely managed
 iv.   Adjustments for waste deposited in the environment during emptying and transport, and amount of waste not treated, were calculated using the assumptions in the table below. Manual emptiers and technical managers of the water service providers were not available to interview in this study, and figures from published Shit Flow Diagrams for the three counties were referenced.

Table 12: Assumption applied in calculating safely managed sanitation

County	Category	Assumption	Adjustment (%)	Source
Nairobi	Emptying and transport; sewerage conveyance	20% of waste conveyed in sewers is deposited in the environment due to bursts and leaks	80%	Nairobi SFD 2018
	Emptying and transport; disposal into the environment after emptying	30% of all waste emptied is deposited in the environment	70%	Nairobi SFD 2018
	Treatment	12% of waste delivered to the treatment plants is not treated.	88%	Nairobi SFD 2018
Nakuru (Naivasha)	Emptying and transport; sewerage conveyance	15% of waste conveyed in sewers is deposited in the environment due to bursts and leaks	75%	Naivasha SFD 2019
	Emptying and transport; disposal into the environment after emptying	Exhauster trucks in Naivasha are not known to leak or dispose waste in the environment	--	Naivasha SFD 2018
	Treatment	85% of waste delivered to the treatment plant is not treated.	25%	Naivasha SFD 2018
Kisumu	Emptying and transport; sewerage conveyance	20% of waste conveyed in sewers is deposited in the environment due to bursts and leaks	80%	Kisumu SFD 2015

	Emptying and transport; disposal into the environment after emptying	50% of waste emptied manually is deposited in the environment	50% for manual empties	Kisumu SFD 2015
	Treatment	5% of waste delivered to the treatment plant is not treated.	95%	Kisumu SFD 2015

After applying these assumptions, the amount of safely managed sanitation across the 3 counties was calculated as shown in Table 13.Table 13: Count of households with safely managed sanitation

Total safely managed sanitation	Kisumu	Nairobi	Nakuru
All improved sanitation containments never emptied	64	9	45
Excreta emptied, buried in situ	6		
Excreta emptied and treated off-site	3	2	
Wastewater delivered to treatment plant	2	22	6
Total	76	32	51

Lessons Learned from the Training and Pre-testing Exercise

The training and pre-testing exercises were a success. Some challenges encountered included:

1. Flow of questions – it was noted that the skip logic on the household and institutions surveys on the KoBo Collect App did not exclude redundant subsequent questions. This resulted to asking irrelevant questions which would contribute to respondent fatigue. To correct this, skip logics were added to the tools, as well as on the surveys uploaded on KoBo.

2. Translation of household surveys – in Kisumu County, the research staff requested for the household survey to be translated into the local language (Dholuo). This is specifically important for the rural areas, where locals are anticipated to only understand the local language. The survey was also translated into Swahili for use in the three counties. Enumerators were required to have a hard copy in hand during the data collection exercise, for referencing whenever needed. It is therefore recommended for countries adopting the SMOSS tools to consider translating them to their local language before use, especially in rural set-ups.

3. Ethical Review Process – ethical review/ clearance was sought form Strathmore University's Institutional Review Committee. This activity took 2 months and was flagged as a potential to timeline delays. Being a vital step before research, it is recommended that enough planning time be allocated by research teams for this step, especially if countries have a history of delays with the ethical clearance process.

4. Community entry and acceptance – the importance of engaging local WASH coordinators and the local administrative leaders is emphasized, for successful data collection from communities. WASH focal persons, CHVs and village elders were included into the field teams and accompanied enumerators during data collection. The County Public Health Officers and WASH Coordinators in all the three counties have also been sensitized on the upcoming research study, and permission to proceed has been granted.

5. Research Staff IDS – for avoidance of fraud suspicion by the community/ institutions, all research personnel will be given field IDs and high visibility vests, clearly labelled with the respective project stakeholders logos for each county (as detailed in the role definition section above).

Key Findings from the Data Collection Exercise

After data collection, metrics were developed to track progress achieved towards SDG 6.2. These were divided into global and local indicators. Global indicators are more generalized, and can be applicable to all countries in the world. Local indicators that would be more specific to Kenya were developed to help address challenges along the sanitation service chain. These focus on the service delivery as well as infrastructure.

Kenya indicators will use definitions from local policies, like from the KESH policy and SFD guidelines, to be more comprehensive and specific to context. They will also highlight areas in need of interventions.

The global and local indicators, are listed in Table 14 below; The definitions and calculation methods are shown in Appendix 1 and 2.

Table 14: Global and Local Indicators

Household SMOSS Indicators (Source: JMP reviews; **JMP Households definitions**)			
	Indicator	**Global Indicators**	**Local Indicators**
Basic sanitation	% Improved sanitation facilities	✔	
	% Basic sanitation facilities	✔	
	% Basic on-site sanitation facilities	✔	
Containment	% Waste safely contained (where the risk of groundwater contamination is low)		✔
	% Waste contained	✔	
	% Limited sanitation facilities	✔	
	% Unimproved sanitation facilities	✔	
	% Open defecation	✔	
Emptying	% Waste contained, emptied	✔	
	% Waste contained, emptied and deposited in situ	✔	
	% Waste emptied and treated off-site	✔	
	% Waste safely emptied (of HH that emptied)		✔
Transport	% Waste transported	✔	
	% Waste safely transported (takes into account leakages during transportation)		✔
Disposal / Treatment	% Waste disposed in-situ	✔	
	% Waste emptied and disposed in-situ	✔	
	% Waste emptied, disposed off-site and treated	✔	
	% Waste safely treated		

Appendix

1.1 Households

#	Indicator	JMP Definition
OVERALL INDICATOR		
1.	% Safely managed sanitation	Improved not shared on-site facilities that are; a) disposed in situ (contained but not emptied) b) emptied and disposed in-situ c) emptied, disposed and treated off-site
BASIC SANITATION		
2.	% Improved sanitation facilities	Use of sanitation facilities that are deemed improved, including flush/pour flush toilets connected to piped sewer systems, septic tanks or pit latrines; pit latrines with slabs (including ventilated pit latrines), and composting toilets.
3.	% Improved onsite sanitation	Improved on-site containment refers to the improved sanitation facilities that are on-site, which are all other than those discharging to sewer and those that don't know where they discharge to.
4.	% Basic sanitation facilities	Use of improved sanitation facilities that are not shared by other households.
5.	% Basic on-site sanitation facilities	Improved facilities that are on-site / # improved facilities × % not shared.
CONTAINMENT		
6.	% Waste contained	Households with contained on-site storage (pits/tanks) refers to the proportion of households using basic on-site sanitation facilities which prevent excreta and effluent from being discharged to the surface environment.
7.	% Limited sanitation facilities	Use of improved facilities shared between two or more households.
8.	% Unimproved sanitation facilities	Use of pit latrines without a slab or platform, hanging latrines, bucket latrines or toilets disposing to open drains.
9.	% Open defecation	Disposal of human feces in fields, forests, bushes, open bodies of water, beaches, and other open spaces or with solid waste.
EMPTYING		
10.	% Waste emptied	All basic contained on-site systems that have ever been emptied. It does not include by who, how or how frequently it was emptied.
TRANSPORT		

#		JMP Definition
11.	% Waste transported offsite	All contained emptied facilities that are delivered off-site to a treatment site or a sanitary landfill.
TREATMENT / DISPOSAL		
12.	% Waste disposed in-situ	All contained facilities that not emptied (i.e., considered disposed of in-situ).
13.	% Waste emptied and disposed in-situ	All contained facilities that emptied and disposed of in-situ (i.e., buried in a covered pit locally.)
14.	% Waste emptied, disposed off-site and treated	All contained emptied facilities that are delivered off-site to a treatment site and both the liquid and solid fraction are treated.

1.2 School Global Indicators

#	Indicator	JMP Definition
1.	% Advanced sanitation facilities	Defined at national level. Elements might include students per toilet ratios, appropriate facilities for menstrual hygiene management, or toilet accessibility for all users (to be defined at national level).
2.	% Basic sanitation facilities	Improved facilities, which are single-sex and usable at the school.
3.	% Limited sanitation facilities	There are improved facilities (flush/pour-flush toilets, pit latrine with slab, composting toilet), but not single-sex or not usable at time of survey.
4.	% No service	No toilets or latrines, or unimproved facilities (pit latrines without a slab or platform, hanging latrines, bucket latrines).

1.3 Healthcare Facilities Global Indicators

#	Indicator	JMP Definition
1.	% Advanced sanitation facilities	Defined at national level. Defined at national level. Elements might include toilet cleanliness, toilet lighting, or patients per toilet ratios.
2.	% Basic sanitation facilities	Improved sanitation facilities are usable with at least one toilet dedicated for staff, at least one sex-separated toilet with menstrual hygiene facilities, and at least one toilet accessible for people with limited mobility.
3.	% Limited sanitation facilities	At least one improved sanitation facility, but not all requirements for basic service are met.
4.	% No service	Toilet facilities are unimproved (pit latrines without a slab or platform, hanging latrines and bucket latrines), or there are no toilets or latrines at the facility.

Appendix 2: Local Indicators

#	Indicator	Definition
1.	Overall % safely managed onsite sanitation	% of waste that is safely managed throughout the entire sanitation value chain (containment, emptied, transported, treated)
2.	% Waste safely **contained**	% of waste that has a low risk to the environment in its containment stage. Calculated as % fully lined pit latrines, septic tanks or unlined pit latrines and septic tanks where the risk of groundwater contamination is low. Includes composting toilets and container-based sanitation (CBS).
3.	% Waste safely **emptied**	% of waste that is low risk to the environment during emptying. Calculated as % of waste emptied by authorized personnel using manual, semi-mechanized or mechanized equipment, with PPE and does not pose a risk to the surrounding environment during emptying
4.	% Waste safely **transported**	% of waste that is low risk to the environment during transport. Calculated as waste transported using sewers, barrels, buckets, tanks or vacuum trucks that DO NOT leak during transportation.
5.	% Waste safely **treated**	% of waste that is properly treated before being released into the environment. Calculated as a percent of the difference between the actual capacity (m^3/day) of the treatment plant and the treated flow (m^3 of wastewater and fecal sludge / day)

*HH = Household   **OSS= Onsite Sanitation Systems

Appendix 3: Type of settlements in study areas

Name of County	Area Category			Frequency	Percent	Valid Percent	Cumulative Percent
Kisumu	Peri-Urban	Valid	Formal	6	7.5	7.5	7.5
			Informal	48	60.0	60.0	67.5
			Semi-formal	26	32.5	32.5	100.0
			Total	80	100.0	100.0	
	Rural	Valid	Formal	6	11.8	11.8	11.8
			Informal	10	19.6	19.6	31.4
			Semi-formal	35	68.6	68.6	100.0
			Total	51	100.0	100.0	
	Urban	Valid	Formal	6	8.5	8.5	8.5
			Informal	40	56.3	56.3	64.8
			Semi-formal	25	35.2	35.2	100.0
			Total	71	100.0	100.0	
Nairobi	Peri-Urban	Valid	Informal	24	31.2	31.2	31.2
			Semi-formal	53	68.8	68.8	100.0
			Total	77	100.0	100.0	
	Rural	Valid	Formal	1	2.1	2.1	2.1
			Informal	23	48.9	48.9	51.1
			Semi-formal	23	48.9	48.9	100.0
			Total	47	100.0	100.0	
	Urban	Valid	Formal	26	34.7	34.7	34.7
			Informal	25	33.3	33.3	68.0
			Semi-formal	24	32.0	32.0	100.0
			Total	75	100.0	100.0	
Nakuru	Peri-Urban	Valid	Semi-formal	1	1.4	1.4	1.4
			Formal	3	4.1	4.1	5.4
			Informal	27	36.5	36.5	41.9
			Semi-formal	43	58.1	58.1	100.0
			Total	74	100.0	100.0	
	Rural	Valid	Informal	38	74.5	74.5	74.5
			Semi-formal	13	25.5	25.5	100.0
			Total	51	100.0	100.0	
	Urban	Valid	Formal	14	18.2	18.2	18.2

	Frequency	Percent	Valid Percent	Cumulative Percent
Informal	25	32.5	32.5	50.6
Semi-formal	38	49.4	49.4	100.0
Total	77	100.0	100.0	

Appendix 4: Respondent gender

Name of County	Area Category			Frequency	Percent	Valid Percent	Cumulative Percent
Kisumu	Peri-Urban	Valid	Male	61	76.3	76.3	76.3
			Female	19	23.8	23.8	100.0
			Total	80	100.0	100.0	
	Rural	Valid	Male	38	74.5	74.5	74.5
			Female	13	25.5	25.5	100.0
			Total	51	100.0	100.0	
	Urban	Valid	Male	49	69.0	69.0	69.0
			Female	22	31.0	31.0	100.0
			Total	71	100.0	100.0	
Nairobi	Peri-Urban	Valid	Male	62	80.5	80.5	80.5
			Female	15	19.5	19.5	100.0
			Total	77	100.0	100.0	
	Rural	Valid	Male	31	66.0	66.0	66.0
			Female	16	34.0	34.0	100.0
			Total	47	100.0	100.0	
	Urban	Valid	Male	53	70.7	70.7	70.7
			Female	22	29.3	29.3	100.0
			Total	75	100.0	100.0	
Nakuru	Peri-Urban	Valid	Male	49	66.2	66.2	66.2
			Female	25	33.8	33.8	100.0
			Total	74	100.0	100.0	
	Rural	Valid	Male	35	68.6	68.6	68.6
			Female	16	31.4	31.4	100.0
			Total	51	100.0	100.0	
	Urban	Valid	Female	1	1.3	1.3	1.3
			Male	55	71.4	71.4	72.7

				Frequency	Percent	Valid Percent	Cumulative Percent
			Female	21	27.3	27.3	100.0
			Total	77	100.0	100.0	

Appendix 5: Respondent age

Name of County	Area Category			Frequency	Percent	Valid Percent	Cumulative Percent
Kisumu	Peri-Urban	Valid	15-17	1	1.3	1.3	1.3
			18-25	11	13.8	13.8	15.0
			26-60	53	66.3	66.3	81.3
			More than 60	15	18.8	18.8	100.0
			Total	80	100.0	100.0	
	Rural	Valid	15-17	1	2.0	2.0	2.0
			18-25	9	17.6	17.6	19.6
			26-60	38	74.5	74.5	94.1
			More than 60	3	5.9	5.9	100.0
			Total	51	100.0	100.0	
	Urban	Valid	15-17	1	1.4	1.4	1.4
			18-25	6	8.5	8.5	9.9
			26-60	59	83.1	83.1	93.0
			More than 60	5	7.0	7.0	100.0
			Total	71	100.0	100.0	
Nairobi	Peri-Urban	Valid	15-17	1	1.3	1.3	1.3
			18-25	13	16.9	16.9	18.2
			26-60	61	79.2	79.2	97.4
			More than 60	2	2.6	2.6	100.0
			Total	77	100.0	100.0	
	Rural	Valid	18-25	4	8.5	8.5	8.5
			26-60	39	83.0	83.0	91.5
			More than 60	4	8.5	8.5	100.0
			Total	47	100.0	100.0	
	Urban	Valid	15-17	1	1.3	1.3	1.3
			18-25	7	9.3	9.3	10.7
			26-60	61	81.3	81.3	92.0
			More than 60	6	8.0	8.0	100.0
			Total	75	100.0	100.0	

				Frequency	Percent	Valid Percent	Cumulative Percent
Nakuru	Peri-Urban	Valid	15-17	7	9.5	9.5	9.5
			18-25	24	32.4	32.4	41.9
			26-60	42	56.8	56.8	98.6
			More than 60	1	1.4	1.4	100.0
			Total	74	100.0	100.0	
	Rural	Valid	15-17	6	11.8	11.8	11.8
			18-25	9	17.6	17.6	29.4
			26-60	30	58.8	58.8	88.2
			More than 60	6	11.8	11.8	100.0
			Total	51	100.0	100.0	
	Urban	Valid	15-17	5	6.5	6.5	6.5
			18-25	18	23.4	23.4	29.9
			26-60	50	64.9	64.9	94.8
			More than 60	4	5.2	5.2	100.0
			Total	77	100.0	100.0	

Appendix 6: Participants Religion

Name of County	Area Category			Frequency	Percent	Valid Percent	Cumulative Percent
Kisumu	Peri-Urban	Valid	Christian	80	100.0	100.0	100.0
	Rural	Valid	Christian	51	100.0	100.0	100.0
	Urban	Valid	Christian	66	93.0	93.0	93.0
			Other	5	7.0	7.0	100.0
			Total	71	100.0	100.0	
Nairobi	Peri-Urban	Valid	Christian	75	97.4	97.4	97.4
			Other	2	2.6	2.6	100.0
			Total	77	100.0	100.0	
	Rural	Valid	Christian	46	97.9	97.9	97.9
			Other	1	2.1	2.1	100.0
			Total	47	100.0	100.0	
	Urban	Valid	Christian	73	97.3	97.3	97.3
			Other	2	2.7	2.7	100.0
			Total	75	100.0	100.0	
Nakuru	Peri-Urban	Valid	Muslim	1	1.4	1.4	1.4
			Christian	73	98.6	98.6	100.0

			74	100.0	100.0	
		Total	74	100.0	100.0	
Rural	Valid	Christian	51	100.0	100.0	100.0
Urban	Valid	Christian	77	100.0	100.0	100.0