

Market-Based Models and
Public-Private Partnership Options for

Non-Sewered Sanitation

in Selected Cities and Towns in Kenya

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Executive Summary

This report is part of a broader piece of analytical work: *Identification and Evaluation of Market-Based Models and Public-Private Partnership (PPP) Options for Non-Sewered Sanitation (NSS) Services in Selected Cities/Towns in Kenya*. The report builds on earlier market intelligence research (unpublished) conducted in Kisumu, Malindi, Nairobi (Eastlands), Naivasha, and Wajir as well as the NSS business model report (unpublished), which identifies and evaluates promising market-based business models for scaling up NSS across the entire NSS service chain: from containment to emptying and transport to treatment and disposal/reuse.

The market intelligence research shows that 80 percent to 100 percent of the population in the five selected cities use NSS.¹ Further, most fecal sludge is not safely emptied and almost none is safely disposed of. The population is growing in all five areas, and a significant fecal sludge treatment deficit is projected for 2030. There is significant market potential for improved NSS services. Realizing that potential toward 2030 will benefit (i) the population, through reduced health impacts of inadequate sanitation and improved service quality; (ii) the environment, through reduced overflowing of pits during rainy season and reduced unsafe disposal of fecal sludge from pits; (iii) private operators, through business expansion; and (iv) society, through reduced health costs and increased employment.

The NSS business model assessment outlines the key challenges and market failures across the NSS value chain (affordability of service, emptiability of containment units, safe disposal of fecal sludge, financial viability of service provision, and availability of treatment capacity) and identified market-based business models addressing the market failures. The four business models are:

- Construction of affordable, emptiable containment units based on standard designs
- Environmentally safe emptying services through performance-based financing
- Delegated operations and maintenance (O&M) of publicly owned fecal sludge treatment plants (FSTPs) (with an additional option of design-build-finance and O&M of FSTPs)
- Integrated services across market segments

The cost of containment, emptying, and transport is likely to lower as the market expands, but any business model addressing these market segments (partial or integrated) will need a temporary performance-based subsidy to facilitate market creation. The initial investment cost in treatment capacity will have to be funded separately by government, donors, or impact investors due to the large up-front costs and affordability constraints. However, the most successful value-generating FSTPs could become viable on an operating cost coverage basis in the medium term.

Against this background, this PPP options report develops the following options based on promising business models for the different parts of the NSS service chain²:

- **Containment PPPs** for improved on-site sanitation (OSS) based on standard designs with predefined fixed household payment, targeting low-income households.
- **Emptying and transport PPPs** for affordable, environmentally safe emptying services through performance-based financing, targeting vacuum tank operators (VTOs) and manual emptying operators.
- **Treatment and reuse PPPs** for third-party O&M for government-owned FSTPs. Although O&M for publicly financed FSTPs is given priority based on the appetite indicated by the public sector during our assessments, private sector players in the market also indicated an appetite for a design-build-operate model.

This report discusses the market structure, proposed PPP options, subsidy determination approach, payment mechanism, performance indicators, subsidy need, contract structure, and funds flow for each of the PPPs. Indicative draft term sheets are developed for each of the PPPs. In subsequent investment operations, these should be detailed in close cooperation with the individual counties and water service providers (WSPs).

The proposed **containment PPP** is based on a subsidy and incentive program for toilet construction and installation and operation of improved on-site systems at household level based on standard designs. The program includes a predefined fixed payment by the households and a top-up payment by the WSP to ensure financial viability. The top-up payment will be fixed in the bidding documents (in K Sh, per standard unit). The intended target group is owner-occupied housing units and rental units.

The average cost of new toilet facilities is assessed at US\$550 per unit, and the average cost of upgrading a facility is assessed at US\$200 per unit. The performance-based contract will include two outputs against which payments will be made: (i) demand creation evidenced by household contribution paid to a designated account; and (ii) delivery of standardized, predesigned OSS units. An independent verification agent will verify the outputs as the basis for the contractual payment. It is proposed that the tender be based on standard designs for emptiable OSS containment units (substructures and superstructures). Government- approved standard designs will have to be developed.

The proposed **emptying and transport PPP** assumes that the municipality will be zoned in several areas with a limited number of three- to five-year concessions in each area to be tendered among formal pit emptying service. The tender could be technology neutral (equal terms for labor-intensive and vacuum tanker service), or separate contracts could be tendered for labor-intensive and vacuum tanker service if there were concern that one group would have difficulties competing. For accessible NSS facilities, a regulated payment per cubic meter per ton per barrel with a predefined annual reduction will be determined competitively in the tender. Safe disposal will be ensured through a contractually designated disposal facility. For the less-accessible NSS facilities, tenderers shall be encouraged to engage with informal pit emptying service to provide extension to customers who are more difficult to reach.

The operator payment will consist of a fixed household payment (increasing over contract period, initially around 50 percent of cost of service, reflecting a willingness to pay [WTP] of US\$30

to US\$40) and a performance-based subsidy (declining over contract period, initially 50 percent of current cost of service) to incentivize efficiency improvements by private operators. Gradual efficiency improvements driven by improved operation and management practices, increasing return to scale, and gradual increases in WTP as the service is recognized in the market may bridge the viability gap over time. The release of the performance-based subsidy to the contractor shall be contingent on assessment of the key performance indicators (KPIs) in the contractual performance scorecard, based on self-reporting and subject to independent verification. We propose that the service-level specifications for the tender include a set of standard operating procedures (SOPs) for emptying and transport of fecal sludge. Such SOPs are not available in the Kenyan market and will have to be developed.

The proposed **treatment and reuse PPP** is based on construction of publicly owned FSTPs with subsequent delegated O&M contracted to private operator under a management contract. The contract should incentivize use of fecal sludge-based reuse products for commercial businesses. The private operator will be responsible for the operation of the FSTP plant and subsequent upscaling of the dried solids for briquetting, compost, or other uses. The length of the contract should be at least two years, preferably three years, with an option of extension by two years to allow operators to build operation experience, hire and train qualified staff, and establish a sustainable market for reuse products.

We propose that remuneration for the O&M services consist of a performance-based management fee linked to the amount of fecal sludge received and treated and a set of measurable and verifiable KPIs. An additional revenue is expected from selling fecal sludge-based reuse products. The operation of the most successful value-generating FSTPs could become viable in the longer term. We propose that the county or its WSP develop and adopt a set of SOP for O&M of the FSTP before tendering O&M services. Such SOPs are not available in the Kenyan market and will have to be developed.

Because of affordability constraints at household level, construction of containment facilities and environmentally safe pit latrine emptying and transport services are not financially viable for private operators without a subsidy. The contracts will include performance-based subsidies for pro-poor access to safe sanitation. The payment of the subsidy will be directly linked to the output (establishment of access to sanitation for eligible households) rather than the input (e.g., person-hours spent, tons of cement used). This shifts the performance risks to the service provider, whose payment will be based on verified outputs. Further, operators will be required to take a risk on development of the NSS market. The targeting mechanism proposed in the containment and emptying and transport PPPs combines geographical targeting (implementation in low-income peri-urban areas) and self-selection-based targeting (construction and subsequent emptying of pit latrines).

The proposed PPP structures are well tested in other countries and sectors. This should facilitate an efficient process when finalizing term sheets for the contracts and preparing draft bidding packages, based on World Bank standard bidding documents and relevant Government of Kenya (GoK) procurement regulations.

Based on a preliminary review of the 2021 PPP Act, the operation and management of an existing government-owned FSTP appears to fall under the Act (schedule 2); therefore, it will have to be

procured in accordance with the Act. In contrast, the micro PPPs proposed for containment and for emptying and transport appear not to fall under the Act. Confirmation of this will require a legal opinion.

A significant change to the framework of PPPs under the 2021 Act is the entering into PPP agreements between county governments and private entities and providing more provisions for the implementation of PPPs by county governments (part VI). County governments are required to obtain approval of the county assembly before embarking on a PPP project. They must also obtain written approval to undertake the project from the PPP Committee and cabinet secretary in charge of finance if the project requires a government support measure or exceeds the fiscal ability of the county. We propose that the county governments or their WSPs be the contracting entity.

A capacity assessment of the county government and WSPs shows that overall they have a good understanding of the NSS situation in their area but have little or no experience with PPPs in NSS. Capacity building of county government and WSP staff in the areas where PPPs will be implemented will ensure that there is sufficient internal capacity for competently procuring and monitoring the PPPs.

A preliminary capacity assessment of the potential private operators indicates significant differences in technical, managerial, and financial capacity between a few large organizations with access to foreign funding and the many micro and small operators. To ensure a level playing field and facilitate competition for the PPP contracts, capacity development for potential private bidders is likely needed to ensure good understanding of the differences between the PPP contracts and traditional contracts in the sector.

Successful implementation of the PPPs in the NSS sector requires a conducive enabling environment. This in turn requires:

- Engagement with PPP Directorate on which of the identified PPPs are included under the 2021 PPP Act.
- Identification of the sources of funds for viability gap funding.
- Capacity building for the contracting authorities and bidders for small and medium enterprises (SMEs).
- Engagement with the Kenyan financial sector on the NSS market opportunity and SMEs' access to finance.
- Independent verification and escrow accounts to alleviate SMEs' reluctance to trust public sector counterparts.
- Development of standards supporting service-level specifications for operators.

NOTES

1. NSS use is 80 percent to 100 percent, but unsafely managed wastewater and fecal sludge is 60 percent to 80 percent, reflecting that some fecal sludge is safely managed.

2. The NSS business model report identifies possibilities for further expansion of existing full-service business models for container-based sanitation in, for example, Nairobi. Such service expansion will be very dependent on the incumbent operator and will therefore be difficult to expand through competitive procurement of a PPP (although it could possibly be based on direct procurement under art. 38 of the 2021 PPP Act). Services in other areas of cities with existing container-based sanitation could still be procured competitively.

Abbreviations

| | |
|---------|--|
| ATP | ability to pay |
| CBE | community-based enterprise |
| CBO | community-based organization |
| CWIS | Citywide Inclusive Sanitation |
| EMCA | Environmental Management and Coordination Act |
| FSM | fecal sludge management |
| FSTP | fecal sludge treatment plant |
| GHG | greenhouse gas |
| GoK | Government of Kenya |
| GWSP | Global Water Security and Sanitation Partnership |
| JMP | Joint Monitoring Programme |
| KPI | key performance indicator |
| M&E | monitoring and evaluation |
| MSMEs | micro, small, and medium enterprises |
| NAWASIP | National Water and Sanitation Investment Program framework |
| NEMA | National Environmental Management Authority |
| NGO | nongovernmental government organization |
| NSS | non-sewered sanitation |
| O&M | Operations and maintenance |
| OHS | occupational health and safety |
| OSS | on-site sanitation |
| PPE | personal protective equipment |
| PPP | public-private partnership |
| SMEs | small and medium enterprises |
| SOP | standard operating procedure |
| UNICEF | United Nations Children's Fund |

| | |
|-----|-----------------------------|
| VTO | vacuum tank operator |
| WHO | World Health Organization |
| WSP | water service provider |
| WSS | water supply and sanitation |
| WTP | willingness to pay |

1. Introduction

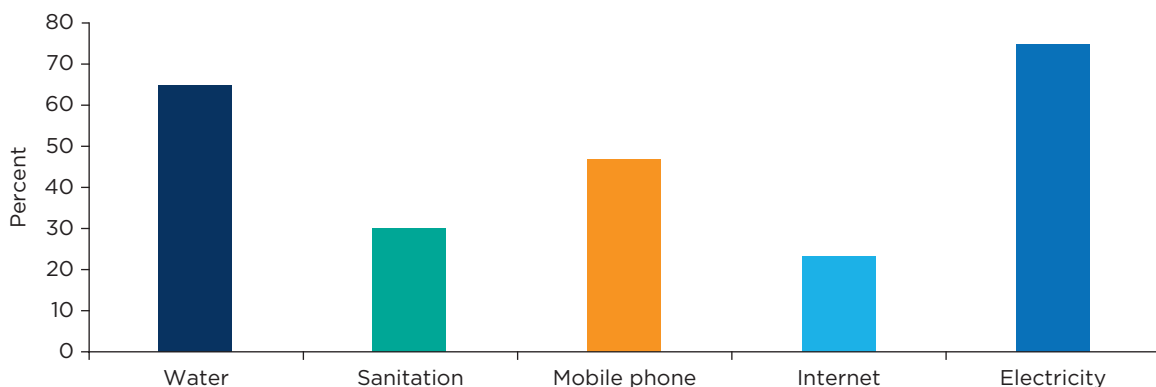
1.1 Challenge in Expanding Access to WSS Services

Although Kenya has made some progress in expanding access to water supply and sanitation (WSS) services over the last decade, a huge service gap remains. Access to WSS is lagging other services nationally, and the country is lagging among its peers in the region. The 2019 census data show that twice more Kenyans have access to electricity than basic sanitation (figure 1.1), at least 23 percent of the country's population lack access to an improved water source, and 25 percent have no access to an improved sanitation service. These figures on the access gap are significantly lower than those reported by the United Nation's Children's Fund (UNICEF) and World Health Organization (WHO) Joint Monitoring Programme (JMP) because the census access data include shared improved WSS services while JMP data do not. According to the JMP, Kenya's WSS indicators are among the lowest in Sub-Saharan Africa (figure 1.2).

There are huge disparities in access to WSS services between rural and urban areas and between high- and low-income households. While 91 percent of the urban population have access to improved water services,¹ only 63 percent of the rural population have access (figure 1.3). Access to piped water services is also significantly higher in urban areas (58 percent) compared to rural areas (19 percent).

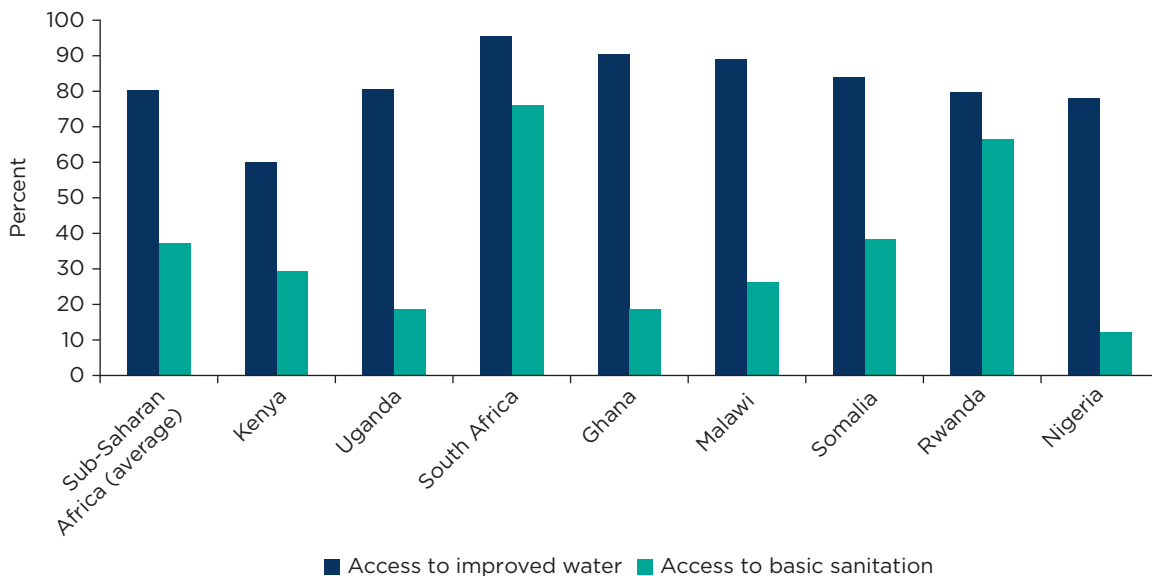
The inequalities are similar for sanitation services, with 93 percent of urban households having access to improved sanitation services compared to 75 percent in rural areas. Similar disparities exist across counties. Nairobi County has near universal access to improved WSS, while 10 counties (21 percent of counties) have less than 50 percent of households with access to improved water.

Figure 1.1. Share of Access to WSS in Kenya Compared to Other Services, 2019



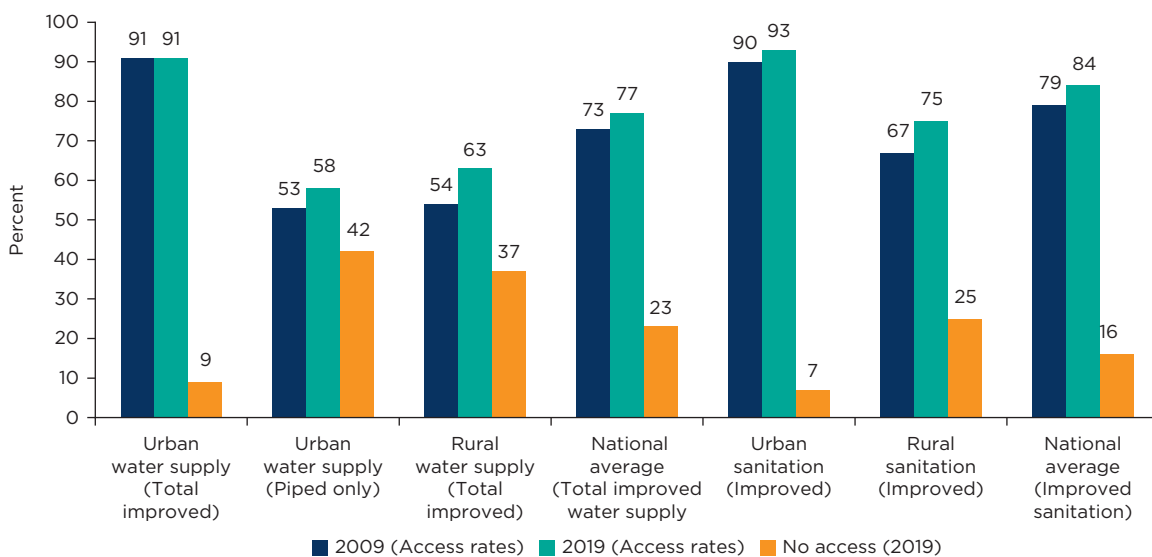
Source: Kenya Population and Housing Census 2019.

Figure 1.2. Share of Access to WSS Services in Kenya Compared to Other Countries and Sub-Saharan Africa, 2021



Source: Progress on household drinking water, sanitation and hygiene 2000-2020: Five years into the SDGs. Geneva: World Health Organization (WHO) and the United Nations Children’s Fund (UNICEF), 2021.

Figure 1.3. Share of Urban-Rural Disparities in Access to WSS Services in Kenya, 2009 and 2019



Source: adapted from Kenya Population and Housing Census 2019.

Almost 79 percent of open defecation occurs in 13 counties, mainly in the northern and eastern regions (Kenya Population and Housing Census 2019).

Safe sanitation is critical for health and well-being; and girls are especially affected. Without adequate sanitation facilities, they are more likely to drop out of school or are vulnerable to assaults while seeking privacy. Lack of safe sanitation is also damaging to economic growth due to premature

deaths, healthcare, and pollution, as well as leading to lost time and productivity seeking treatment and finding access to sanitation facilities.

Ensuring access to sanitation for all by 2030 is one of the top priorities of the UN Sustainable Development Goals and is reflected in the Kenya Vision 2030 national development plan, which seeks to make basic sanitation available to all by 2030. The GoK aims for universal access to safe and affordable sanitation services (including 80 percent sewerage coverage) in urban areas by 2030 in its National Water Master Plan 2030. In 2021, the Ministry of Water, Sanitation, and Irrigation and the county governments adopted the National Water and Sanitation Investment Program (NAWASIP) framework, which maintains the universal coverage target by 2030 but revises the sewerage coverage target from 80 percent to 40 percent. Given the difficulty of meeting sanitation targets through sewer systems, both public and private players recognize the potential for non-sewered options to supply sanitation services on a large scale. As a result, the remaining 60 percent of the sanitation access coverage would have to be covered by safely managed NSS facilities. In Kenya's cities and secondary towns, the NSS market is made up of those who rely on unimproved or shared sanitation facilities and would be the intended beneficiaries of programs aimed at moving people up the sanitation ladder (to reach a basic or safely managed service).

Kenya is home to a fledgling but growing private sector presence in the sanitation market. Numerous micro, small, and medium enterprises (MSMEs)—including hundreds of pit emptying firms, VTOs, and constructors of improved OSS solutions—operate in this industry, but on a small, fragmented scale and with limited access to financial resources to grow their service delivery. In this context, PPPs and results-based approaches may provide governments and utilities with a mechanism for improving access to improved sanitation in the many urban areas that are likely to remain non-sewered for the foreseeable future.

A well-structured partnership between public and private actors may mobilize financial, technical, and management resources and engage local communities in accelerating access to basic infrastructure services, including improved sanitation. Since 2005 the Global Partnership for Results Based Approaches has tested results-based financing instruments, including output-based aid in the WSS sector, to improve service delivery for low-income communities through pro-poor subsidies linked to actual results achieved. Several models have been tested, including performance-based subsidies to public and private service providers based on verification of preagreed project targets (e.g., reflected in KPIs for volume of improved access and quality of the improvement) and holding them accountable to deliver results (output-based rather than input-based disbursement of the subsidy).

Under Kenya's devolved government structure, in which responsibility for WSS service delivery is with the individual counties, the need to seek alternatives to public sector loans and grants is pressing. Greater involvement of private operators in the financing and operation of NSS services under market-based business models and PPP models can help counties improve operating performance and achieve access targets, while shifting risk from the public to the private sector. Grant funding or soft loans may still be needed to help unlock additional capital through innovative financing mechanisms, and development partners such as the World Bank can significantly reduce the perceived risk of private lenders and lower the effective cost of borrowing for utilities and private operators to affordable levels through blended financing mechanisms.

1.2 Assignment

The Ministry of Water, Sanitation, and Irrigation sought the support of the World Bank Group to assess market-based models and PPP options for NSS in selected cities and towns in Kenya to provide a comprehensive analysis of drivers, constraints, and opportunities in the NSS market. The goal was to facilitate a good understanding among practitioners and policy makers of the critical enablers of PPPs in this market and inform future sanitation investment programs in Kenya's cities and secondary towns. The immediate objectives were to (i) assess the drivers, constraints, and opportunities in the NSS market in cities and secondary towns; (ii) identify and evaluate scalable, market-based business models across the sanitation chain; and (iii) identify and assess PPP options for scaling up NSS services in Kenya, including the role of public financing in such PPPs to stimulate the NSS market and create jobs. The assignment addresses the need for greater involvement of private operators capable of delivering quality NSS services and possessing the necessary financial, technical, and management resources that can accelerate access to improved sanitation.

Three separate reports were produced. **Market intelligence research** was conducted in Kisumu, Malindi, Nairobi (Eastlands), Naivasha, and Wajir. Based on this, the **NSS business model report** identified and evaluated promising market-based business models for scaling up NSS across the entire NSS service chain: from containment to emptying and transport to treatment and disposal and reuse. The **PPP options report** (the present report) identifies, evaluates, and recommends viable PPP options to operationalize the identified business models.

1.3 PPP Options Report

The main objective of this report is to identify, evaluate, and recommend viable options to operationalize market-based business models for providing NSS services in Kenya. The options address specific market segments across the value chain: containment; emptying and transport; and treatment and disposal and reuse. To allow the reader to appreciate the PPP options report independently of the earlier reports on market intelligence research and NSS business models, comprehensive summaries are provided in the first two sections of this report. The report is structured as follows:

- **Section 2: Market Assessment.** Summarizes the findings of the market intelligence research.
- **Section 3: NSS Business Models.** Introduces the business models identified in the NSS business model report.
- **Section 4: Key Stakeholders in PPPs for NSS.** Outlines the role of the key stakeholders in PPPs in NSS, identifies the key stakeholders in each of the five cities, and provides a preliminary capacity assessment of the key public and private stakeholders.
- **Section 5: Pro-Poor Subsidies and Their Targeting in PPPs.** Presents general background for the output-based aid and performance-based contracting approaches to pro-poor infrastructure access that are used in the containment and the emptying and transport PPPs.
- **Section 6: Containment PPP.** Presents the proposed containment PPP for improved OSS based on standard designs with predefined fixed payment, targeting low-income households in Kisumu and Malindi.

- **Section 7: Emptying and Transport PPP.** Presents the proposed emptying and transport PPP for affordable, environmentally safe emptying services through performance-based financing, targeting VTOs and manual emptying in Kisumu, Malindi, Nairobi, and Naivasha.
- **Section 8: FSTP O&M Contract.** Presents the proposed approach to private sector contracting for O&M contract of new FSTP in Malindi, with possibility for replication to Kisumu and Naivasha, subject to public construction of new or renovation of existing facilities in these towns.
- **Section 9: Enabling Environment for NSS PPPs.** Summarizes requirements for a conducive enabling environment to ensure that PPPs in the NSS sector have a viable and sustainable market.

Indicative draft term sheets for the proposed PPPs and indicative table of contents for FSM SOP are attached in the appendices.

The success of the proposed models for private sector engagement across the different market segments depends on the strength of the institutional framework and enforcement capacity. Subsequent support toward operationalizing the investment proposals will focus on these institutional gaps and building the requisite resilience capacity.

NOTE

1. The Kenyan definition of improved WSS access includes shared services.

2. Market Assessment

2.1 Access to Safe Sanitation

The market intelligence research established key data on current levels of access to safe sanitation in the five cities covered by the assignment. Table 2.1 provides an overview of key access data for each city.

Figure 2.1 shows that 80 percent to 100 percent of the population use NSS across the five cities, most fecal sludge is not safely emptied, and almost none is safely disposed of. At the same time, the population is growing in all five areas, and a significant fecal sludge treatment deficit is projected for 2030 (table 2.2).

The current NSS value chain consists of small formal service providers and facility operators (generally SMEs) and informal local service providers. Containment units (individual and joint) are generally built by local workers with limited formal training and without standard designs, resulting in facilities that may not be possible to empty. Local informal pit emptying services or by formal pit emptying services handle emptying and transport of fecal sludge from pits. They may use labor-intensive emptying approaches or more technology-intensive (vacuum-based) emptying approaches. Disposal and reuse of fecal sludge is constrained by inadequate capacity of FSTPs, some WWTPs operating at capacity, and some emptying operators (especially informal pit emptying services) generally not having an established relation to transport and disposal services and often disposing the sludge unsafely.

Table 2.1. Level of Access to Safe Sanitation in Five Cities in Kenya, 2021

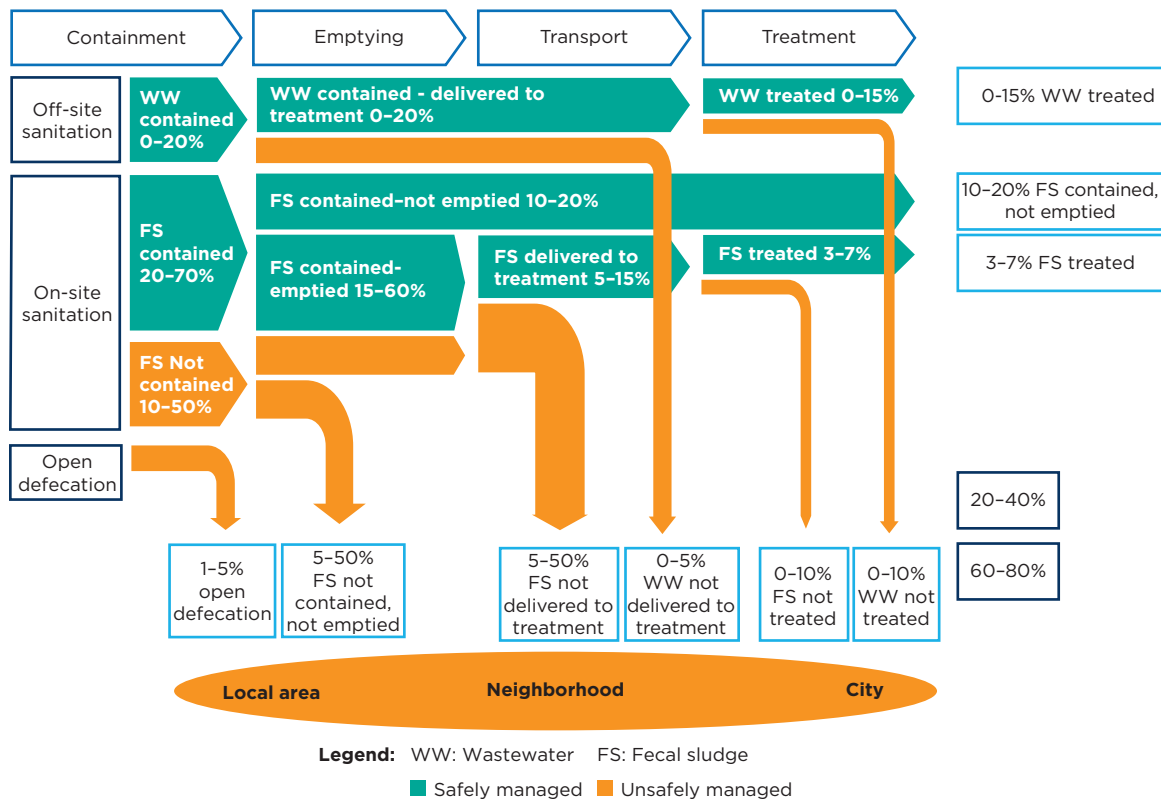
| | UNIT | KISUMU | MALINDI | NAIROBI EASTLANDS ^a | NAIVASHA | WAJIR |
|---|---------------------|----------------------------|----------------------------|--------------------------------|----------|----------------------------|
| NSS use | Persons | 481,121 | 128,149 | 2,007,934 | 210,416 | 121,762 |
| NSS use | % | 80 | 100 | 80 | 85 | 100 |
| Fecal sludge generated by people in service area (2030) | m ³ /day | 1,560 | 519 | 6,741 | 703 | 485 |
| Fecal sludge available for collection (2030) ^b | m ³ /day | 413 | 107 | 789 | 161 | 363 |
| Fecal sludge treatment capacity | m ³ /day | 0 specific to fecal sludge | 0 specific to fecal sludge | 10 | 10 | 0 specific to fecal sludge |

Source: World Bank.

a. Nairobi Eastlands covers the following areas: Mukuru Kwa Njenga, Mukuru Kwa Reuben, Muslim Road, Jericho, Makadara, Mathare, Mukuru Kayaba, and Eastleigh.

b. The calculation of the fecal sludge available for collection is corrected for decomposition, on-site drainage, and share actually emptied.

Figure 2.1. Indicative FSM for Five Cities in Kenya, 2021



Source: Original figure based on market research and data for Kisumu and Naivasha, available at sfd.susana.org.
 Note: FSM = fecal sludge management.

Table 2.2. Projected Fecal Sludge Treatment Deficit in Select Cities in Kenya, 2030

| 2030 PROJECTIONS | UNIT | KISUMU | MALINDI | NAIROBI (EASTLANDS) | NAIVASHA | WAJIR |
|--------------------------------|---------------------|--------|---------|---------------------|----------|-------|
| Fecal sludge treatment deficit | m ³ /day | 413 | 107 | 779 | 151 | 363 |

Source: World Bank.

The value chain is characterized by inadequate links between the containment, emptying, transport and treatment, and reuse segments. However, there are integrated services of full service across the value chain from containment to emptying and transport to treatment and reuse (e.g., container-based sanitation provided by Sanergy in Nairobi and by Sanivation in Naivasha).

The core segments of the customer base are (i) owners: live-in owners or landlords with a higher incentive to invest in NSS; (ii) renters (long-term): renters who rely on NSS but depend on their landlord to improve access; and (iii) renters (transient): renters who intermittently live in their accommodation (seasonally, or when work is available) and thus have limited leverage (and at

times, interest) in requesting the landlord to improve their sanitation access. There are no data on the distribution between the market segments of income characteristics, but owners typically higher household incomes than permanent renters, who in turn have higher incomes than transient renters.

The NSS market is significantly underserved across all market segments, providing an opportunity for private sector operators in the NSS market (as well as operators in neighboring markets, such as VTOs focusing on septic tanks and operators in the municipal solid waste management services) to expand their market and business toward 2030.

Across all five cities, on-site containment is close to 100 percent privately funded and owned. While there have been initiatives via Water Sector Trust Fund (WSTF) to support access to containment through a subsidy in Naivasha and Kisumu, this reached fewer than 2 percent of the population. Further, there were significant county and nongovernmental government organization (NGO) initiatives to promote access to containment, but only with limited subsidies or material support.

The emptying and transport market depends on whether the utility has an exhaustor or vacuum tank and the availability of private VTOs. The number of county and private vacuum tanks in each county is as follows: Kisumu (two public, 12 private), Malindi (0 public, two private), Naivasha (one public, 11 private), Nairobi Eastlands (fully served by private businesses), and Wajir (county government provides the bucket latrine service complemented by private companies).

Often, the county VTOs sign contracts with local businesses' premises or industry and do most of their business with them rather than with households. One example is KIWASCO, in which the county VTOs serve mostly hotels and the airport under long-term contracts (much easier than serving individual households).

The VTOs serve mainly the septic tank market. Due to inadequate design, issues of trash and thick content, or risk of collapse, only approximately 25 percent can be mechanically emptied. In Nairobi, this is further exacerbated due to accessibility issues because trucks cannot get into dense settlements. Manual emptying is an informal private service that serves most pit latrines in each location.

2.2 Potential NSS Market Size

Table 2.3 shows the estimated market size, value, and job creation potential up to 2030 in the different market segments in NSS.

Realizing the potential of the NSS market toward 2030 will have major benefits for the population (reduced health impact of inadequate sanitation and improved service quality), the environment (reduced overflowing of pits during rainy season and reduced unsafe disposal of fecal sludge from pits), private operators (business expansion), and society (reduced health costs, increased employment). Realizing this potential will require attention to key challenges across the NSS value chain. PPPs need to be designed around market-based business models for scaling up NSS.

Table 2.3. Projected Market Size of NSS in Kenya, up to 2030

| | UNIT | NEW TOILETS (UP TO 2030) | LATRINE UPGRADES (UP TO 2030) | EMPTYING, VTO (PER YEAR) | EMPTYING, MANUAL (PER YEAR) | TREATMENT AND REUSE (PER YEAR) |
|---------------|----------------------|--------------------------|-------------------------------|--------------------------|-----------------------------|--------------------------------|
| Market size | Number | 140,000 units | 32,000 upgrades | 44,000 emptying | 57,000 emptying | 650,000 m ³ |
| Market value | US\$/year | 16,500,000 | 1,100,000 | 2,600,000 | 3,900,000 | 3,345,000 |
| Job potential | Full-time job equiv. | 1,000 | 60 | 150 | 850 | 190 |

Source: World Bank.

Note: The potential jobs generated include skilled labor (drivers, foremen, engineers); unskilled labor (manual construction workers, emptiers); and administration (accounting, customer relations, management). NSS = non-sewered sanitation; VTO = vacuum tank operator.

2.3 Challenges and Market Failures in the NSS Market

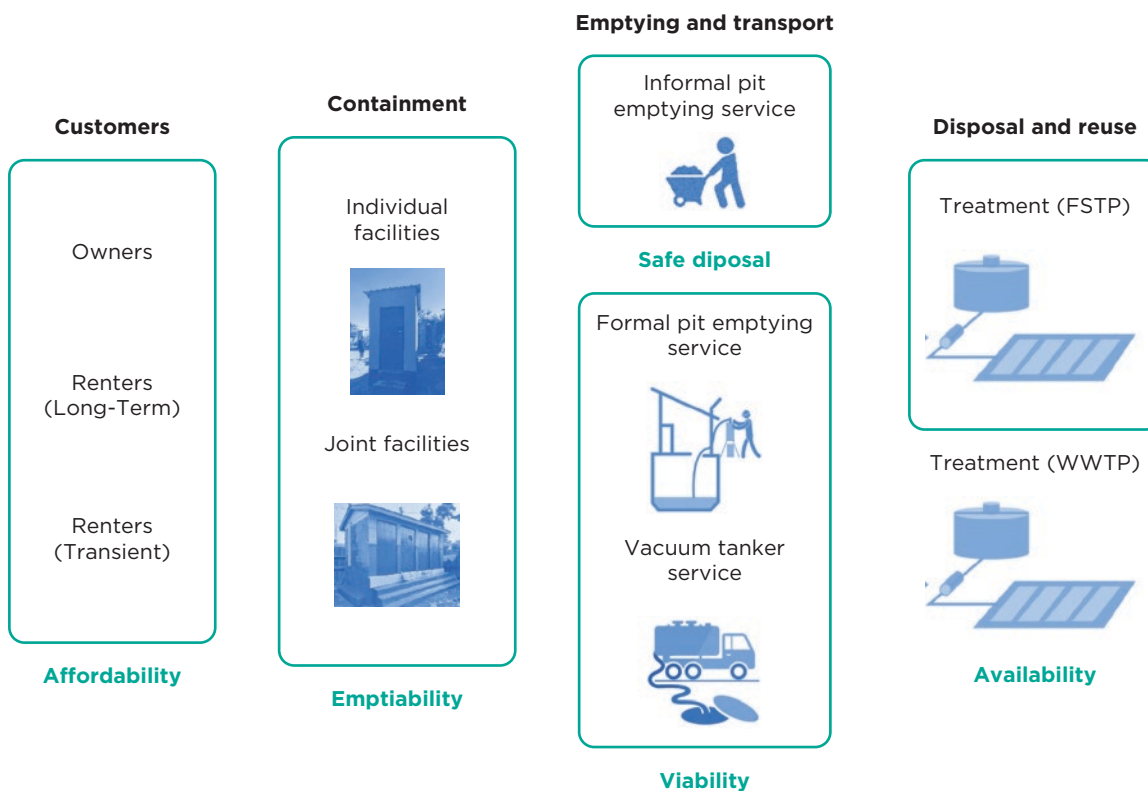
The key challenges and market failures across the NSS value chain concern (figure 2.2):

- Affordability constraints at household level, which result in limited WTP / ability to pay (ATP) for new containment facilities (whether owned, leased, or paid per use) for professional emptying and transport companies (which deliver the collected sludge to an acceptable final disposal option), and the cost of safe disposal (to the extent that the cost for disposal is partly transferred to the households through the value chain).
- Inadequate design requirements for containment facilities that do not ensure emptiability of the units (leading to overflow during rains and, ultimately, abandonment and new construction nearby with gradually increasing risk of infiltration with drinking water resource).
- Difficulty of ensuring safe disposal of fecal sludge collected by informal emptying services without access to transport to disposal sites.
- Limited viability of operation of formal emptying services (both labor intensive and vacuum tanker-based), in which cost of service is around double of the WTP, leading to low priority given to expanding services in poorer areas.
- Limited availability of safe treatment facilities for fecal sludge.

The government must address these issues in the design of PPPs around market-based business models for scaling up NSS for the following reasons:

- If affordability constraints are not addressed there will be limited uptake of new or improved services across the value chain. Affordability will have to be ensured through (i) temporary, results-based subsidies as the market builds; (ii) clear incentives to bring down costs as the market expands; and (iii) gradually increasing WTP as the service is recognized.
- If future facilities are not all designed to be emptied and accessible at a cost in line with WTP and ATP, new households will experience lock-in to unsafe NSS solutions. Therefore, design requirements for emptiability should be established and enforced.
- If informal emptying services continue without access to transport to disposal sites, the problem of unsafe disposal of fecal sludge will continue. Informal operators depend on their

Figure 2.2. Market Failures in the Current NSS Market in Kenya



Source: World Bank.

Note: FSTP = fecal sludge treatment plant; WWTP = wastewater treatment plant.

income from the service, and models for replacing the unsafe service with safe service should seek to integrate them (e.g., to provide the last-distance extension when formalized operators have difficulties accessing with mechanized services).

- If the viability of the formalized emptying services is not ensured, there will be no basis for these companies to buy additional vehicles and equipment and hire staff to expand their business.
- Finally, and possibly most challenging, if adequate treatment capacity is not established and made available at terms affordable for emptying and transport operators, any improvement in service at the earlier stages of the value chain will lead to increased disposal problems.

3. NSS Business Models

The following business models addressing the identified market failures were assessed:

- **Containment segment.** Improved OSS based on standard designs with predefined fixed payment (relevant in all five cities, but with alternative designs in Wajir).
- **Containment segment.** Pro-poor access to improved NSS services in unserved public areas (relevant in Kisumu, Malindi, and Nairobi).
- **Emptying and transport segment.** Affordable, environmentally safe emptying services through performance-based financing (relevant for VTO-based operators in Kisumu, Malindi, and Naivasha, relevant for more labor-intensive services in Nairobi due to difficult access, and requiring a solution based on existing containment units in Wajir).
- **Treatment and reuse.** FSTPs based on public construction with delegated O&M and full private sector-driven design-build-finance-operate model (relevant in all towns but should be aligned with activities in place).
- **Integrated services across market segments.** Full service, including provision of containment units, emptying and transport, and dedicated treatment capacity (relevant for container-based sanitation service expansion in Kisumu and Nairobi, highly relevant in Wajir if built around existing containment approach, and could be relevant in Malindi).

Any partial intervention in the containment or emptying and transport market segments requires adequate treatment to be available or be established in parallel. If this were not the case, there is a significant risk that environmental and health benefits from safe disposal cannot be realized. However, integrated business models that include the full value chain provide an assurance for the availability of the necessary treatment capacity.

Irrespective of the choice of partial or integrated business models, the initial investment cost in the treatment capacity will likely have to be funded separately by government, donors, or impact investors for the foreseeable future due to the large up-front cost and affordability constraints. However, the most successful, value-generating FSTPs could become viable on an operating cost coverage basis. The cost of containment, emptying, and transport is likely to be reduced as the market expands, but any business model addressing these market segments (partial or integrated) will need a temporary performance-based subsidy to facilitate market creation.

3.1 Business Models for Containment Market

Two business models were assessed for the containment market. The first, “improved OSS based on standard designs with predefined fixed payment,” is based on a subsidy/incentive program for toilet construction and installation and operation of improved on-site systems at household level based

on standard designs with a predefined fixed payment in installments¹ by the households and the top-up payment by the utility being a bid parameter. The intended target group is owner-occupied housing units and possibly rental units subject to regulation of rent adjustment, and access fee charged if the installation received a public subsidy. The second, “pro-poor access to improved NSS services in unserved public areas,” is based on ensuring an affordable price on a subscription basis or pay per visit. The intended target group is people on the move in city centers and transport depots. This could possibly include people with limited access to facilities at their place of work or stay, but this should not be used by landlords to avoid their obligation to provide sanitary facilities to renters.

3.2 Business Models for Emptying and Transport Market

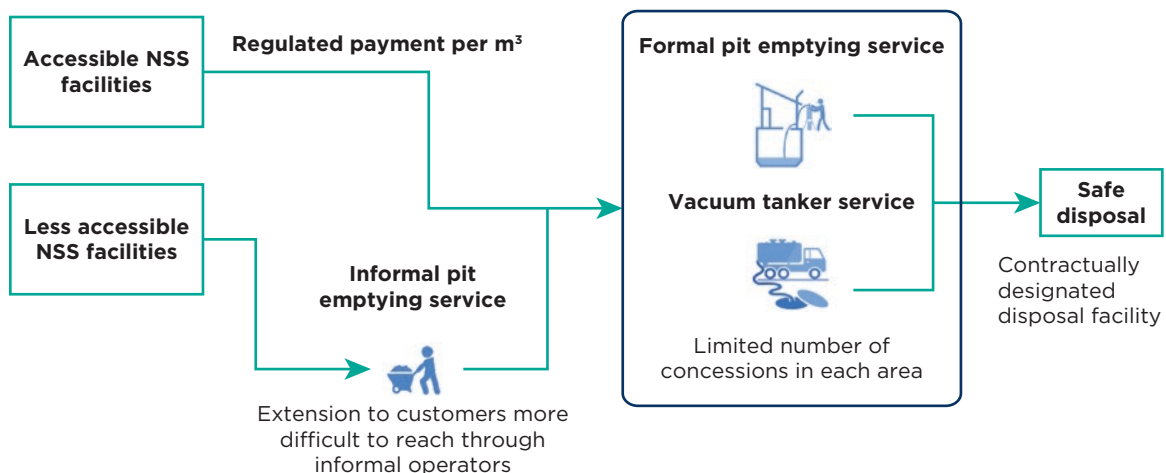
The emptying and transport business model, “affordable, environmentally safe emptying services through performance-based financing,” is based on support for expansion of the VTO market through performance-based financing for FSM to provide affordable pit latrine emptying services. This business model is illustrated in figure 3.1.

3.3 Business Model for Disposal and Reuse Market

The treatment and reuse business model, “FSTPs based on public construction with delegated O&M,” is based on construction of the FSTP under public procurement, with subsequent delegated O&M contracted to private operator under a management contract. The contract should incentivize use of fecal sludge-based reuse products for commercial businesses.

Figure 3.1. Business Models for Emptying and Transport Market in Kenya

Emptying and transport: affordable, environmentally safe emptying services through performance-based financing



Source: World Bank.

Note: NSS = non-sewered sanitation.

3.4 Business Model Based on Integrated Services across Market Segments

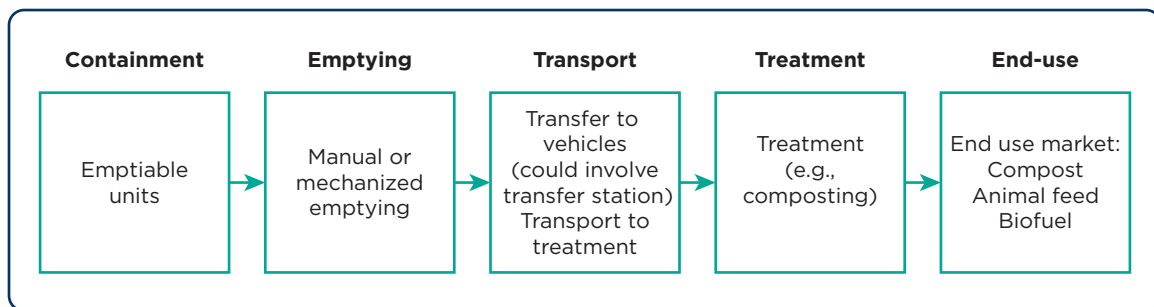
The business model based on integrated services across market segments could take several forms. It could be a full-service approach, such as the container-based sanitation solution successfully piloted in Nairobi by Sanergy, which integrates all NSS market segments in one joint value proposition. Under such a full-service model, customers will, on a purchase, lease, or subscription basis, access improved sanitation units with professional O&M of the containment unit, emptying and transport to a dedicated treatment facility, and sale of reuse products (animal feed, fertilizer, briquettes) in the market. It could be a more partial model as considered by Sanivation for Wajir, in which bucket toilets are complemented with a business model combining emptying and transport with treatment capacity (figure 3.2).

3.5 Recommended Business Models and Their Applicability

The **NSS business model report** recommends the following market-based business models as promising opportunities for scaling up NSS across the entire NSS service chain (table 3.1).

Figure 3.2. Business Model Based on Integrated Services across Market Segments

Integrated services across market segments



Source: World Bank.

Table 3.1. Priority Options for Further NSS Development in Selected Cities in Kenya

| | RECOMMENDED BUSINESS MODELS | APPLICABILITY |
|--------|---|---|
| Kisumu | Combination of interventions in three separate market segments: <ul style="list-style-type: none"> • Containment (improved OSS based on standard designs with predefined fixed payment) • Emptying and transport (affordable, environmentally safe emptying services through performance-based financing, targeting VTO and manual emptying) • FSTP availability (FSTPs based on public construction with delegated O&M) | Low-income households All pit latrines All fecal sludge collected |

(Continued)

Table 3.1. (Continued)

| | RECOMMENDED BUSINESS MODELS | APPLICABILITY |
|----------|--|--|
| Malindi | Combination of interventions in two separate market segments: <ul style="list-style-type: none"> • Containment (improved OSS based on standard designs with predefined fixed payment) • Emptying and transport (affordable, environmentally safe emptying services through performance-based financing, targeting VTO and manual emptying) | Low-income households All pit latrines |
| Nairobi | Parallel business models: <ul style="list-style-type: none"> • Emptying and transport (manual) and sewerage discharge • Container-based sanitation expansion | Dense, low-income areas Subject to identification of public partner |
| Naivasha | Combination of interventions in two separate market segments: <ul style="list-style-type: none"> • Emptying and transport (affordable, environmentally safe emptying services through performance-based financing, targeting VTO and manual emptying) • FSTP availability (FSTPs based on public construction and renovation with delegated O&M) | Low-income households All pit latrines |
| Wajir | Integrated business model based on bucket latrines Integrated business model based on Ecosan | Low-income areas Higher-income areas |

Source: World Bank.

Note: FSTP = fecal sludge treatment plant; OSS = on-site sanitation; O&M = operations and maintenance; VTO = vacuum tank operator.

NOTE

1. An option for payment in installments is likely to increase uptake. Opportunities for enabling this will be considered during transaction preparation; however, setting up a dedicated revolving fund for the specific project may not be cost efficient, and other options, such as micro finance by financial institutions, may be more appropriate.

4. Key Stakeholders in PPPs for NSS

Collaboration from civil society, and the public and private sector at large, are necessary for the recommended PPP options to be a success. For this market review, we consulted public and private stakeholders in each of the five cities under analysis. This consultation was approached as open-ended research with regard to NSS PPPs, and it is recommended that a more in-depth consultation be conducted with these same stakeholders before the design or implementation of any PPPs. This consultation should be held with both public and private sector actors, as well as citizens, to ensure key stakeholder support for the PPPs.

The research was also guided by a national taskforce committee that engaged in decision-making and reported reviews at each phase of the project. We recommend that these consultations be extended at the national level to a wider consultation group, convened, and regularly consulted to ensure that the structures developed are relevant beyond the five cities under analysis.

4.1 Stakeholders and Their Roles in NSS PPPs

The key stakeholders and their roles in relation to the PPPs for NSS are described in the following sections and abbreviated as follows. The three PPPs covered are outlined later in the report for segments of the value chain:

- **OSS:** Output-based contracts for marketing (demand creation) and construction of emptyable OSS units.
- **FSM:** Performance-based franchise contracts for improved emptying and transportation of fecal sludge (fecal sludge management [FSM] services).
- **FSTP:** O&M contract for FSTP.

The roles of stakeholders are described generically across the three PPP options whenever possible, indicated as *all*. For roles specific to individual PPPs, they are indicated by the abbreviations *OSS*, *FSM*, or *FSTP*.

PPP Directorate at the National Treasury

The PPP Directorate is the technical arm of the PPP Committee and is mandated to facilitate implementation of the PPP program and projects in Kenya. Under part VI (art. 64–66) of the 2021 PPP Act, a county government may enter into a PPP agreement with a private party and shall be responsible for the administration of the project development cycle. A county government

intending to undertake a PPP project shall subject the project to a detailed feasibility study and liaise with the PPP directorate during each phase of the project (including submitting feasibility studies prepared).

County governments must obtain approval of the county assembly before embarking on a PPP project. They also must obtain written approval to undertake the project from the PPP Committee and cabinet secretary in charge of finance if the project requires a government support measure or exceeds the fiscal ability of the county.

Whereas the O&M of an existing government-owned FSTP appears to fall under the Act (PPP arrangements 1 or 2, schedule 2) and has to be procured in accordance with the Act, the micro PPPs proposed for containment and for emptying and transport do not appear to fall under the Act. Confirmation requires a dialogue with the PPP Directorate and possibly a legal opinion.

4.1.1 County Government

The county government is responsible for the administration of the project development cycle and must liaise with the PPP Directorate during each phase of the project. We propose that the county WSP is the contracting authority on behalf of the county government. Depending on the individual case, the county government may be the contracting authority, in which case the role of the WSP described below would fully or partly be transferred to the county.

The county shall provide an oversight role during liaisons with the PPP Directorate, monitoring and evaluation (M&E), and other matters in their mandate. The county public health department (which works closely with WSP to improve sanitation) shall have a key role in M&E and for creating public awareness.

4.1.2 County Water Service Providers

The WSPs will invite bids from qualified eligible bidders for the PPPs for NSS. After bid evaluation and award, WSPs monitor the service delivery of the private service providers (contractors). The role of WSP is to:

- Liaise with the county government during each phase of the project.
- Plan and conduct tendering of contracts for the contractors (all).
- Plan and conduct tendering of contract for verification agent, providing independent validation of delivered outputs as basis for payment (all).
- Liaise with potential contractors and their organizations in prebid meetings (all).
- Delegate to successful contractors for the duration of the contract (i) on an exclusive basis, the right to market and construct emptyable pit latrines according to standard designs in the contract specific service area (OSS); (ii) on a nonexclusive basis, the right and responsibility for emptying pit latrines in the contract specific service area (FSM); and (iii) on an exclusive basis, the right and responsibility for O&M of the FSTP (FSTP).
- Liaise with contractors on joint marketing efforts (OSS and FSM) and provide information on NSS facilities in the service areas (all).

- Structuring community responsiveness and enforcement mechanisms with all the county public health department.
- Ensure availability of FSTPs or other designated treatment plants with a functioning weighbridge or other system for registration of volume upon entrance (FSM).
- Control implementation of the contract using the general performance standards for services and the performance indicators (all).
- Pay the contractors in a timely manner based on invoices verified by the verification agent (all).
- If the contractor does not fulfill contractual duties, demand the contractor fulfill them; in case of continued nonfulfillment, terminate the contract before expiry date (all).
- Maintain an NSS database and update it regularly with data provided by contractors (all) in a template provided by WSP.

4.1.3 NSS Service Providers (Contractors)

NSS service providers will carry out NSS services in the contractual service area following competitively tendered contracts signed with WSPs. The contractor's role is to:

- Provide NSS services in the service area following contractual provisions and the general performance standards for Services (all).
- Liaise directly with potential customers through established points of sale for marketing, community liaison, placing service orders, and addressing service grievances (OSS and FSM).
- Independently arrange to provide services to its customers (OSS and FSM).
- Work with WSP to increase knowledge in the service area of safe NSS services and the availability of the contractor's NSS services (all).
- Construct emptyable pit latrines based on standard designs provided by WSP (OSS).
- Deliver collected pit latrine sludge at the contractually designated treatment facility or an alternative treatment facility identified by WSP (FSM).
- Comply with National Environmental Management Authority (NEMA) and WSP requirements relating to performance of NSS services, including at all times holding these valid licenses: (i) license to operate a business (all); (ii) license to transport waste issued by NEMA (FSM); (iii) hygiene and operational license from the county public health office (all); and (iv) WSP permit for disposal at the designated treatment facility (FSM).
- Invoice customers for the household contribution based on the contractual fixed household payment rate (OSS and FSM).
- Invoice (FSTP) or pay (FSM) the contractual gate fee at the designated FSTP based on weighbridge or similar entry registration records.
- Invoice WSP based on the contractual payment mechanism (all).
- Provide required documentation on service performance with each invoice to WSP with a copy to the verification agent (all).
- Collect and fill customer information into the WSP NSS database in the template provided by WSP (all).
- Pay all O&M expenses and investments in vehicles and own equipment necessary for the service provision (all).

- Ensure that all personnel employed by the contractor hold relevant qualifications and appropriate training and have sufficient relevant experience in the provision of environmentally safe NSS services (all).

4.1.4 Verification Agent

The verification agent is a reputable consultancy firm with monitoring, verification, technical, and auditing expertise contracted by WSP after a tender process. The release of contractual payments from WSP to the contractor is contingent on assessment of the KPIs contained in the contractual performance scorecard. The KPIs will be self-reported by the contractor and verified on a monthly basis against performance targets in the performance scorecard by the verification agent. The role of the verification agent is to:

- Develop a monitoring and verification plan and results framework (including independent periodic surveys on quality and coverage of service and customer satisfaction to validate self-reporting by the contractor).
- Develop the SOPs and processes manual.
- Review operator scorecards (monthly).
- M&E of KPIs (monthly).
- Build capacity of the WSP NSS staff involved in the management of the PPP contract.

4.1.5 Households Receiving FSM Services

Households with pit latrines in the service areas may upon dialogue with a WSP-contracted NSS service provider decide to use their NSS services for pit latrine construction or renovation (OSS) or emptying (FSM) against payment of the fixed household payment rate (to be determined as basis for the contracts and made public by WSP). Household demand is signaled through filling a simple form for expression of interest. The role of the households is to:

- Engage with NSS service providers contracted by WSP using a simple expression of interest form if they need pit latrine improvement or emptying services.
- Pay the regulated fixed household payment for pit latrine construction or renovation directly to the WSP after entering into a brief written agreement with the OSS service provider (OSS).
- Pay the regulated fixed household payment for pit latrine emptying directly to the emptying and transport service providers after entering into a brief written agreement (FSM).
- Allow NSS service providers access to site for service provision.
- Be available for answering questions on quality-of-service provision experienced if contacted by verification agent as part of the verification process.
- Provide feedback on any grievance related to service provision to the community responsiveness established by WSP or the county.

4.2 Private Sector Actors

We have mapped the national and local private sector actors as potential participants in PPPs for delivery of NSS services (table 4.1). There are two large private sector actors (Sanivation and Sanergy) and a significant number of small to medium actors.

Sanivation implements treatment plants in partnership with local governments. The plants treat fecal sludge from pit latrines and septic tanks. The plants then transform the fecal sludge into biomass fuels that serve as a substitute for firewood. The revenue from sales covers operational costs.

Sanergy franchise sanitation units have created a Fresh Life network across Nairobi’s urban slums, offering an affordable alternative to sewers. The sludge is removed from the community by handcarts and trucks. The handcarts ensure that toilets can be installed deep in urban slums where there are only narrow, unpaved roads as access points. The sludge is converted at a centralized facility into valuable end-products such as organic fertilizer and insect-based animal feed. Sanergy plans to expand its operation with government partners in Nairobi, Kisumu, and other cities to increase sanitation coverage significantly.

The capacity of the private sector varies significantly in relation to its experience with PPPs and capacity to access financing and take financial risk. Even relatively simple PPPs such as the ones proposed for the NSS sector require private operators to take on more risk than under traditional procurement.

Table 4.1. NSS Barriers and Possible Mitigation Measures in Kenya

| BARRIER | TYPE OF ACTOR (INFORMAL, SMES, LARGE) | PROPOSED MITIGATION MEASURE |
|--|--|--|
| Limited technical capacity on NSS | Informal, SMES | Targeted capacity development on NSS (e.g., for SMES from adjacent market segments) |
| Limited managerial capacity | Informal, SMES | Incubation/capacity development for NSS start-ups and SMES |
| Lack of PPP experience | Informal, SMES | Targeted capacity building on PPP Prebid meeting to explain transaction |
| Access to finance | Informal, SMES | Engagement with financial sector on NSS market opportunity, Corporate Social Responsibility (CSR) aspects, and possibility of using asset financing with the financed vehicle as security Consider partial credit guarantees to participating financial institutions to cover potential defaults on loans to SMES |
| Legal ability to be a contract counterpart | Informal | Incentivize formal actors to include informal ones in supply chain |
| Lack of trust of public sector counterpart | SMES, large | Independent verification and escrow account |

Source: World Bank.

Note: NSS = non-sewered sanitation; PPP = public-private partnership; SMES = small and medium enterprises.

This typically includes demand and technical risk but may also include revenue risk on consumers and prefinancing risk (ability to provide some working capital, finance vehicles, and so on).

Sanergy, Sanivation, and other larger organizations with access to foreign funding can take such risks. Smaller private operators, however, cannot absorb much financial risk due to limited access to external financing for working capital and equipment investments. Further, they may be distrustful of the public sector to maintain the ongoing payments.

Given the tendency of delayed funds transfer between the national and county governments, and the ability of this to cripple small enterprises collaborating with the counties, the transaction structure must include financial and contractual mechanisms for timely payment of the private sector actors in the PPP. In the current setup, this is ensured through escrow accounts and independent verification as the basis for the release of contractual payments. Stronger alternatives could be either an independent financial agent (e.g., bank or auditor) appointed as the holder of the escrow account (requires a certain size of project to be cost effective) or other mechanisms, such as a penalty on the public authority for late payment. The subsequent detailed transaction advisory will engage directly with potential bidders to assess their views on alternative risk mitigation mechanisms. Table 4.1 presents a preliminary overview of barriers and possible mitigation measures.

4.3 Legal Framework for PPP

The Public Private Partnership Act, 2021, which came into effect on December 23, 2021, provides for the participation of the private sector in the financing, construction, development, or O&M of infrastructure or development projects through PPPs. The Act focuses on design, construction, rehabilitation, expansion, operation, or management of new or existing infrastructure, assets, or facilities. Such PPPs will normally be large, which is reflected in the potentially time-consuming project preparation, procurement, and approval processes. This is confirmed by the list of PPPs,¹ which in the WSS sector are significantly larger than the envisioned NSS PPPs (often by two orders of magnitude).

The operation and management of an existing FSTP appear to be part of the Act (PPP arrangement 1 or 2 of schedule 2) and will have to be procured in accordance with it. In contrast, the micro PPPs proposed for containment and for emptying and transport do not appear to fall under the Act. Confirmation requires a legal opinion.

A significant change to the framework of PPPs under the 2021 Act is the entering into PPP agreements between county governments and private entities and providing more provisions for the implementation of PPPs by county governments (part VI). County governments need approval from the county assembly before embarking on a PPP project. They also need written approval to undertake the project from the PPP Committee and cabinet secretary in charge of finance if the project requires a government support measure or exceeds the fiscal ability of the county.

This report has identified some critical institutional gaps. However, the next steps include a more detailed assessment covering a regulatory impact assessment, an implementation roadmap, and

a resourcing plan to improve the policy, legal, and regulatory environment for private capital mobilization.

For the proposed contracts, and to ensure complete buy-in, the transaction advisory support on institutional strengthening needs to include a governance and citizen engagement framework that looks beyond the internal contract management to include a publicly accessible citizen engagement and community-level stakeholder framework.

4.4 Sector Policies, Regulations, and Standards

Here is a preliminary list of policies, regulations, and standards governing or affecting the implementation of PPPs in NSS.

- Sector goal:
 - Ensure universal access to improved sanitation and a clean and healthy environment for all by 2030.
- Environmental Sanitation and Hygiene Policy (KESHP) (2016–30):
 - Provides broad guidelines to state and nonstate actors to work toward universal access to improved sanitation and a clean and healthy environment for all by 2030. The policy promotes the adoption of low-cost technologies in peri-urban and slum areas.
- Environmental Sanitation and Hygiene Strategic Framework (KESFF) (2016–30):
 - Medium-term implementation strategy for the KESHP that focuses on declaring Kenya open defecation free by 2030.
- County Environmental Health and Sanitation Bill (2016):
 - Guides county governments on developing county-level legislation that ensures effective delivery and regulation of sanitation services and environmental health standards across all counties.
- Urban Sanitation Guidelines (2019) (draft):
 - Recommends provision of sanitation technologies and services in urban areas. County governments should select technologies and regulate pit emptying services.
- County government:
 - Because of devolution of sanitation to counties, they must develop strategies to improve sanitation services.
- Regulation via regional bodies:
 - NEMA via the regulations under the Environmental Management and Coordination Act (EMCA), 1999, rev. 2015:
 - EMCA (Impact Assessment and Audit Regulations, 2003), providing guidelines, standards, and licensing for proposed developments in line with EMCA.
 - EMCA (Water Quality Regulations, 2006, legal notice 120), providing guidelines and standards for water quality.
 - EMCA (Waste Management Regulations, 2006, legal notice 121), providing guidelines, standards, and licensing for effluent discharge.
 - EMCA (Air Quality Regulations, 2009), providing guidelines, standards, and licensing for waste incineration.
 - EMCA (Wetlands, River Banks, Lakes, and Sea Shore Management Regulations, 2009).

Neither of the following appear to exist, so they will need to be established in relation to PPP tenders in the NSS sector for FSTP containment, emptying and transport, and O&M:

- Standard design for emptiable containment units (pit latrines, septic tanks, substructures, and superstructures)²
- SOP³ for emptying and transport of fecal sludge
- SOPs for the design and operation of FSTPs

4.5 Potential Impacts and Associated Risks of Climate Change

Until recently, there has been limited focus on the climate change impacts of NSS systems, including their contribution to climate mitigation and adaptation (Shaw, Kennedy, and Dorea 2021). OSS technologies such as pit latrines and septic tanks produce greenhouse gases (GHGs), including methane, nitrous oxide, and carbon dioxide from the biological decomposition of fecal sludge. Their off-site counterparts, i.e., wastewater treatment plants (WWTPs) with microbial digestion, also produce emissions associated with the breakdown of organic matter, while many other treatment processes run on significant energy inputs. A recent meta-analysis of GHG emissions from NSS systems (Cheng et al. 2022) indicates that global estimates of emissions from OSS systems are significantly underestimated, and total emissions from sanitation could be as high as 5 percent of anthropogenic emissions.

Further, in a recent case study to estimate direct GHG emissions from the entire sanitation chain in Kampala, Uganda, Johnson et al. (2022) find the aggregate average rate of emissions from all containment systems in the city to be 58.62 kilograms of CO₂e per capita per year and 15.13 kilograms CO₂e per capita per year for CH₄ and NO₂, respectively. The total embedded carbon for the containment systems is expected to be 3.7 kilotons of CO₂ per year, with negligible operational carbon emissions. Fecal sludge transport recorded negligible direct emissions due to the short time in which fecal sludge stays in the VTOs, and the emissions from fecal sludge treatment were 59 kilotons of CO₂e per year, distributed evenly between WWTP and FSTP processes. The total operational emissions at treatment were 2.9 kilotons of CO₂. The study reveals that emissions associated with long periods of storage of fecal waste in sealed anaerobic tanks (49 percent), discharge from tanks and pits direct to open drains (4 percent), illegal dumping of fecal waste (2 percent), leakage from sewers (6 percent), wastewater bypassing treatment (7 percent), and uncollected methane emissions at treatment plants (31 percent) are contributing to high levels of GHG emissions.

Climate change threatens the quality of sanitation systems through escalated changes in natural climatic cycles and events. These changes exacerbate the risks caused by inadequate sanitation by placing considerable strain on sanitation systems, thereby affecting the systems' sustainability through reduction of design life. Unsustainable sanitation systems compound the frustration of global efforts to alleviate access to sanitation services for the 2 billion people lacking it. WHO (2018) recommends that climate change be considered to ensure sanitation technologies and services are designed, operated, and managed to minimize associated impacts on the systems. Additional research is recommended to better understand the correlation between sanitation across the entire chain and climate change. Table 4.2 presents private sector actors and their interest across the NSS value chain.

Table 4.2. Identified Private Sector Actors and Their Current Interest across the NSS Value Chain in Kenya

| | NSS CONTAINMENT | NSS EMPTYING AND TRANSPORT | NSS TREATMENT AND REUSE | RELATED SERVICES (WS, SWM, WTE, ETC.) | EMPLOYEES | CURRENT GEOGRAPHICAL COVERAGE | NOTE |
|--|-----------------|----------------------------|-------------------------|---------------------------------------|------------------------|-------------------------------|--|
| Sanivation | V | V | V | | 17 admin, 17 total | Naivasha, Malindi, Wajir | Container-based sanitation provider. Current partner to utilities with a focus on partnering to expand NSS reach via operational streamlining and construction and operation of waste to value FSTPs. |
| Sanergy | V | V | V | Organic waste collection | 33 admin, 400 total | Nairobi, Kisumu | Container-based sanitation provider. Waste to energy plants producing fertilizer and black soldier fly animal feed. |
| Teams trained by KIWASCO, KUAP, Practical Action | V | | | Construction | Approx. 10 teams | Kisumu | Mass manufacturer of sanitation superstructures. Construction teams that have been well trained on construction of improved sanitation facilities, primarily informal businesses, but offering high-quality construction. |
| Gasia Poa | | V | | Solid waste collection | <10 | Kisumu | Trained pit latrine emptiers offering fecal sludge collection services. |

(Continued)

Table 4.2. (Continued)

| | NSS CONTAINMENT | NSS EMPTYING AND TRANSPORT | NSS TREATMENT AND REUSE | RELATED SERVICES (WS, SWM, WTE, ETC.) | EMPLOYEES | CURRENT GEOGRAPHICAL COVERAGE | NOTE |
|---|--------------------|-------------------------------------|-------------------------------|--|--------------------------|-------------------------------------|---|
| Vuka Sasa, Blue Stars | | V | | | <10 | Kisumu | Informal but trained emptiers of sanitation facilities in Kisumu. |
| KAWAWAMA | | V | | | 30+ companies registered | Kisumu | Association of wastewater managers that services many of Kisumu's exhauster and pit emptying companies. |
| Elphrods Services | V | V | | Loans | <10 | Kisumu | Offer WASH loans for residents of Kisumu to access improved WASH products and services. |
| Kwa Reuben Exhauster and Cleaning Association | | V | | | <10 | Nairobi | Trained team focused on servicing pit latrines in Kwa Reuben. |
| Mobile Alert Toilets | V | V | | | <10 | Nairobi | Construction of improved toilets and improved pit latrine emptying in Nairobi. |
| Brooms Ltd. | | V | | Mobile toilet hire | 10-20 | Nairobi, Thika, Mombasa | Exhauster truck operator in Nairobi; further companies need to be vetted to understand PPP potential. |
| Kimyusi Exhauster Services | | V | | n.a. | <10 | Naivasha | One of approx. 10 exhauster companies in Naivasha. Companies would need to be further vetted to understand PPP potential. |

(Continued)

Table 4.2. (Continued)

| | NSS CONTAINMENT | NSS EMPTYING AND TRANSPORT | NSS TREATMENT AND REUSE | RELATED SERVICES (WS, SWM, WTE, ETC.) | EMPLOYEES | CURRENT GEOGRAPHICAL COVERAGE | NOTE |
|--|--------------------|-------------------------------------|-------------------------------|--|-----------------|-------------------------------------|--|
| Malindi Emptiers Association | | ✓ | | n.a. | Approx. 5 teams | Malindi | Working with Sanivation and MAWASSCO under the Transform program to safely empty and transport waste from pit latrines. |
| Malindi Briquettes | | | ✓ | Briquettes production | <10 | Malindi | Produce carbonized briquettes in Malindi town (from non-fecal sludge sources). |
| Jeremiah Muriuki and construction team | ✓ | | | Construction | <10 | Wajir | Contractor: builds superstructures for bucket latrines in Wajir as well as septic tanks. |
| Kentainers, SilAfrica, TopTank, RotoMoulders | ✓ | | | Plastic manufacture and distribution | >100 | Nationwide | Produce a range of OSS products, e.g., UDDT plates, latrine pans, etc. Potential to collaborate to expand product coverage and access. |
| LIXIL - Sato Products | ✓ | | | One of the largest producers of sanitary hardware in world | >100 | Nationwide, global | Produce and sell SaTopans in Kenyan market: potentially relevant for low-cost, high-quality containment options. |
| Contractors (various) | ✓ | | | | 100+ teams | Nationwide | Abundance of contractors in each location delivering improved sanitation facilities, but no outstanding contractors noted that deliver sanitation infrastructure at scale. |

(Continued)

Table 4.2. (Continued)

| | NSS CONTAINMENT | NSS EMPTYING AND TRANSPORT | NSS TREATMENT AND REUSE | RELATED SERVICES (WS, SWM, WTE, ETC.) | EMPLOYEES | CURRENT GEOGRAPHICAL COVERAGE | NOTE |
|---|-----------------|----------------------------|-------------------------|--|-----------|-------------------------------|---|
| Contractors (SafiSan latrine, FINISH containment facilities) | V | | | Construction | 50+ teams | Nationwide | Many contractors trained by SNV and FINISH to sell improved OSS facilities to specified emptiable designs. |
| Public toilet operators | V | | | | <10 | Nationwide | Numerous small-scale public toilet operators. Companies would need to be further vetted to understand PPP potential. |
| Wajir, Nairobi, Naivasha, Kisumu, Malindi Exhausteur Services | | V | | | <10 | Nationwide | Numerous small-scale exhauster service providers in all cities; none exist at a much larger scale than the other. Companies would need to be further vetted to understand PPP potential. Many are part of Kenya Septage Emptiers Association. |
| Sistema.bio | | | V | Anerobic digestion and biogas products | 100+ | Nationwide | Design and installation of low-cost, easy to operate FSTPs suitable for pit latrine sludge. Installation and maintenance only; do not operate. Functioning site in Madagascar via partnership with WSUP. |

(Continued)

Table 4.2. (Continued)

| | NSS CONTAINMENT | NSS EMPTYING AND TRANSPORT | NSS TREATMENT AND REUSE | RELATED SERVICES (WS, SWM, WTE, ETC.) | EMPLOYEES | CURRENT GEOGRAPHICAL COVERAGE | NOTE |
|---------------------|--------------------|-------------------------------------|-------------------------------|---|-----------|-------------------------------------|--|
| OPERO Services Ltd. | V | V | V | Coaching and formalization services, specifically for Kenyan WASH enterprises | <10 | Nationwide | <p>Work to formalize Kenyan sanitation enterprises via business development training and improved access to technology.</p> <p>Establish a sanitation enterprise and technology hub in Kisumu to demonstrate NSS business and technology options for emptying and transport.</p> <p>Prepare pipeline of businesses available for PPPs.</p> |

Source: World Bank.

Note: FSTP = fecal sludge treatment plant; n.a. = not applicable; NSS = non-sewered sanitation; PPP = public-private partnership; WASH = water supply, sanitation, and hygiene.

NOTES

1. See the Kenya PPP Platform website, <http://portal.pppunit.go.ke>.
2. Could be based on ISO 30500:2018, Non-sewered Sanitation Systems: Prefabricated Integrated Treatment Units. Standard designs for containment units should be different for normal ground conditions with low water table, normal ground conditions with high water table, and ground conditions with rocks.
3. The development of SOPs is recommended before implementing PPP options. Support to the GoK may be provided by the Bill & Melinda Gates Foundation TA Hub for Africa, drawing from experience from different countries or cities, including from Lusaka, Kampala, and Kisumu. While SOPs are important, they need to be backed by regulations enforceable as a standard in the sector irrespective of the existence of a PPP contract. We expect support from the Bill & Melinda Gates Foundation TA Hub for Africa covering SOP development will also include policy, institutional, and regulation reform support.

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5. Pro-Poor Subsidies and Their Targeting in PPPs

Results-based financing and output-based aid are strategies for explicit, performance-based subsidies for delivery of basic services (such as access to sanitation). It is explicitly recognized why the subsidy is provided, who is receiving the subsidy, what is being subsidized, and with how much. It is performance-based because the payment of the subsidy is directly linked to the output (e.g., the establishment of access to sanitation for eligible households) rather than the input (e.g., the person-hours spent, tons of cement used). This shifts the performance risks to the service provider, which is paid based on verified outputs (as with output-based aid) or the implementing agency whose financing is released based on achieved results (as with results-based financing). Output-based aid and results-based financing are characterized by:

- Focus on facilitating pro-poor infrastructure access.
- Results-based contracts that include additional risk transfer compared to traditional contracting.
- Explicit targeting of subsidies (*who* do we subsidize, *what* do we subsidize).
- Determining the size of the subsidies based on competitive bidding or estimated affordability barrier.
- Ensuring that subsidies do not jeopardize long-term sustainability.
- Definition of output-based payment triggers based on technical KPIs.
- Independent verification of achievement of the outputs as basis for payments.
- Transparent, efficient funds flow and subsidy administration modalities.

Results-based financing and output-based aid are often combined with private sector involvement through a PPP, based on performance-based contracts that align the incentives of the private operator with the objectives of the tendering authority. In the sanitation sector, results-based incentives may be used across the sanitation value chain from demand promotion and access, to collection and transport, to treatment, disposal, and reuse. Examples are provided in table 5.1. When subsidies are used to facilitate pro-poor infrastructure access (e.g., for OSS), the targeting may be based on different approaches (table 5.2).

The targeting mechanism proposed in the containment and emptying and transport PPPs that follow combines geographical targeting (project implementation in low-income peri-urban areas) and self-selection targeting (construction and subsequent emptying of pit latrines).

Table 5.1. Output-Based Payment Triggers in Sanitation Sector in Kenya

| VALUE CHAIN | SERVICES | OUTPUT INDICATOR |
|--------------------------------|--|---|
| Demand promotion | Sanitation marketing | Number of households that build/rehabilitate OSS facilities following demand promotion. |
| Access to sanitation | Build/rehabilitate OSS facilities | Number of OSS facilities completed and still operating after a certain number of months. |
| Collection and transport | FSM services | Volume of fecal sludge from OSS transported to and disposed in designated locations. |
| Treatment, disposal, and reuse | Build, operate and maintain decentralized fecal sludge treatment facilities. | Completion of construction of treatment facility Volume of fecal sludge received and treated Volume of agricultural input or biogas generated |

Sources: Trémolet and Evans 2010.

Note: FSM = fecal sludge management; OSS = on-site sanitation.

Table 5.2. Examples of Targeting Mechanisms to Households in Kenya

| POTENTIAL TARGETING METHODS | APPROACH | LIMITATIONS |
|--------------------------------|--|---|
| Proxy means testing | Households fulfilling poverty eligibility criteria verified by proxy means testing for individual households | Only realistic if there is an efficient and reasonably well-targeted centralized system for identification of poor households and targeting of public subsidies |
| Community selection | Using CBOs to identify eligible households | May introduce various biases in the identification |
| Geographical | Targeting project to areas where most of the population are relatively poor | Even in low-income areas some house owners will be relatively wealthy |
| Self-selection-based targeting | Targeting technical options, which are attractive only for households that are relatively poor because richer households would select more expensive options | Limits scope to simpler technical options |

Sources: Trémolet and Evans 2010.

Note: CBO = community-based organization.

REFERENCE

Trémolet, Sophie, and Barbara Evans. 2010. "Output-Based Aid and Sustainable Sanitation." *OB Approaches* 37. World Bank, Washington, DC. <https://openknowledge.worldbank.org/handle/10986/10908>.

6. Containment PPP

The proposed containment PPP is based on a subsidy and incentive program for toilet construction and installation and operation of improved on-site systems at household level. It is based on standard designs with a predefined fixed payment by the households and a top-up payment by the utility to ensure financial viability. The top-up payment will be a bid parameter (in K Sh per standard unit). The intended target group is owner-occupied housing units and possibly rental units subject to regulation of rent adjustment or access fee charged if the installation received a public subsidy. Table 6.1 shows a business model canvas for the first containment business model, “improved OSS based on standard designs with predefined fixed payment.” In the NSS business model report, this containment business model is relevant in all cities.

6.1 PPP Options

6.1.1 Market Structure

The proposed model is based on competition for the market (competitive selection of a single supplier in each area) rather than competition in the market (several operators active in the same geographic area). Competition for the market makes more sense than competition in the market. It will be more efficient to do marketing and construction in one continuous area, and the envisioned transfer of demand risk will be difficult if it were possible for one company to do marketing (not paid before customers sign) and another company subsequently taking up the identified customers at a lower price without doing any marketing (but being compensated upon signing).

6.1.2 Proposed PPP Option

Traditionally, contracts in the Kenyan WSS sector are based on detailed design, pricing of bills of quantities, and contractual price adjustment based on actual input used. Under the OSS project, contractors will be asked to quote fixed unit prices for a limited number of standard designs and be evaluated on a predefined weighting of the individual quoted prices based on the expected distribution of demand between the standard units in the area. During implementation, remuneration will be based on individual quoted prices for the verified implemented OSS units. There will be no price adjustments based on actual inputs but possibly a simple annual price escalation clause to handle inflation risk. The key differences under the OSS tender compared to traditional contracts in the Kenyan WSS sector are:

Table 6.1. Business Model Canvas: Containment

| | | | | |
|--|---|---|--|---|
| <p>Key Partners</p> <ul style="list-style-type: none"> • Companies constructing individual OSS units • Hardware suppliers • Design consultant • Relevant standards body <p>...as well as emptying and transport operators and final disposal facilities</p> | <p>Key Activities</p> <ul style="list-style-type: none"> • Development of standard designs • Determination of fixed HH payment based on WTP/ATP • Public tendering of lots of x,000 units constructed | <p>Value Proposition</p> <ul style="list-style-type: none"> • Emptiable • Well designed • Affordable fixed price • Transparent market (all pay same price) • Possibility for custom options (light, mirror, handwash) | <p>Customer</p> <ul style="list-style-type: none"> • Relationships • Public information campaign to create awareness • Private customer relation to confirm demand and implement | <p>Customer segments</p> <ul style="list-style-type: none"> • Owner occupied housing units • Possibly rental units subject to regulation of rent adjustment / access fee charged |
| <p>Cost Structure</p> <ul style="list-style-type: none"> • Consultant fee for developing standardized design(s) for emptiable OSS units • Cost of per unit subsidy to bridge difference between construction cost and WTP/ATP | <p>Key Resources</p> <ul style="list-style-type: none"> • Use capacity of existing construction and hardware market actors • Build demand for emptying and transport | | <p>Channels</p> <ul style="list-style-type: none"> • Radio, posters, local council, utility website • Offices of OSS construction comp. and hardware suppliers | |
| <p>Revenue Streams</p> <ul style="list-style-type: none"> • Predefined fixed payment per unit by households • Public subsidy per unit determined in competitive bid | | | | |

Source: World Bank.

Note: ATP = ability to pay; HH = household; OSS = on-site sanitation; WTP = willingness to pay.

- Transfer of demand risk to contractors (significantly different from traditional WSP contracts, but risk mitigation will be provided by authority endorsement of contractor and service standards¹).
- The bidding criteria will be fixed standard unit costs for predefined designs rather than bills of quantities and price adjustment (somewhat different from traditional WSP tenders).
- Payments will be output-based, and contractors will have to provide limited prefinancing (not very different from traditional WSP contracts, and the contractor's appetite for this will be verified during transaction preparation).

Contractors could be encouraged but not obliged to engage community-based organizations (CBOs). Similarly, contractors will be encouraged but not obliged to subcontract or hire individuals and community-based enterprises (CBEs) in their contracting area. The tender documents should ask contractors to explain how they will engage with the local communities and resource base and underline that engagement with CBOs, women's organizations, and CBEs are expected to support the marketing effort and facilitate easy implementation. The county should enforce the contractually required standards for services and products vis-a-vis both the contractor and their competitors in the contract area. Households could be given the option of selected standard upgrades (lighting and tiles on floor), which will be fully household paid.

6.1.3 Pro-Poor Targeting

The proposed targeting mechanism combines geographical targeting (project implementation in low-income peri-urban areas) and self-selection targeting (e.g., only pit latrines will receive a subsidy). Traceability mechanisms, including use and application of information and communication technology-based solutions, may be considered.

6.1.4 Subsidy Determination

The household contribution in the financial model is based on indicative data on affordability and WTP, which are based on revealed preferences rather than detailed studies. This should preferably be firmed up prior to tender because the household contribution will be a fixed parameter in the tender. The subsidy for the private operator will be competitively determined in the tender as the required top-up (K Sh per standard unit) to provide the service.

6.2 Risk Transfer

Traditionally, contracts in the WSS sector have been based on a predefined number of units to be constructed at predefined locations. Under the OSS project, contractors will be asked to initially market predefined OSS solutions in a delineated geographic area based on standard designs and fixed household contributions (that vary depending on design). Households that sign up for OSS facilities will have to confirm their demand through deposit of the full household contribution or an agreed partial payment to a dedicated WSP account before construction of their OSS facility. The contractor will then be paid in two installments by WSP for construction of a maximum number of OSS units, subject to demand.

The transfer of demand risk to contractors is significantly different from traditional WSP contracts, and contractors interviewed were initially reluctant to take on this additional obligation. However, upon understanding that they will not have a credit risk on the individual households and that support and training will be provided through the WSP or a sanitation marketing consultant, contractors are expected to accept this as a premise for the tender. Support of this partial risk sharing is proposed to be provided by the county public health department, supporting awareness creation, sanitation marketing, and enforcement of bylaws, as well as by capacity building for contractors.

6.3 Performance Requirements

The contractor must market and build up to a predefined maximum number of containment units based on standard designs provided by the WSP. The containment units shall be built for households that signal demand through payment of the fixed household contribution into an escrow account at the WSP. The contracts will have two outputs that will be independently verified and act as payment triggers upon independent verification:

Output 1: Demand creation

- Contractor will receive training and materials by the WSP or a sanitation marketing consultant.
- Contractor will coordinate with ward development committees, CBOs, and women's groups in promoting the OSS units to create demand.
- Contractor will ask interested customers to sign up on designated standard forms with WSP logo and details of customer, OSS solution, size of household contribution, and how to pay the household contribution.
- Contractor will regularly (e.g., weekly) provide list of signed-up customers to the WSP and the verification agent.
- Signed-up customers will confirm demand by paying a predefined deposit into a designated WSP account.
- WSP will verify reception of customer deposit and (weekly) provide a list of customers, having confirmed demand to the contractor and the verification agent.
- The contractor may initiate construction and issue an invoice to WSP for 30 percent of the fixed price of the unit for each customer, as indicated by verified customer contributions.

Output 2: Construction of OSS Unit

- Based on the list of customers who have confirmed demand (and any contractual requirements for geographic spread, etc.), contractor will initiate construction of the standardized OSS units.
- Once construction of a unit is completed (with geotagging of each facility), the contractor will notify the verification agent, who will verify that the facility has been constructed based on technical specification and provisions of the contract.

- After the verification and confirmation process, the contractor will be paid the remaining 70 percent of the fixed price of the OSS facility, conforming to the payment procedure.
- Depending on the type of contribution made toward construction of the superstructure by the customer, the final payment will be reduced by the cost of materials contributed by the customer.

To ensure that contractors fully appreciate the demand-driven nature of the contract, in which they are responsible for marketing of OSS facilities to households in the contractual area, they receive training and materials from the WSP or sanitation marketing consultant, but that the contractors have final responsibility for interaction with communities, they must present a plan for demand creation as part of their tender.

This plan for demand creation shall describe how contractors will work with the communities, including ward development committees, CBOs, and women's groups, to create demand for the OSS units and encourage them to facilitate demand creation and ensure cost-effective and smooth implementation. The contractor shall describe the use of CBEs as subcontractors and, subject to demand, ensure a reasonable spread of the number of OSS units per service block in the project area. Contractors may propose innovative approaches, such as building demo versions of the standard toilets in their contractual areas to support the marketing effort. The contractual outputs (i) demand creation evidenced by household contribution paid to the project account and (ii) delivery of standardized, predesigned OSS units to be verified by the verification agent need to be clearly defined and relatively easy to verify.

6.4 Payment Mechanism

Under the performance-based contract, the contract price is based on fixed unit prices of the different standard units, determined by the tender and a variable number and distribution of units, subject to demand. The contract price for each unit constructed shall cover the cost for demand creation, superstructure, and substructure of the individual units. The results-based payment mechanism includes two installments. Together, they constitute the full and final payment for demand creation and construction:

- First payment: 30 percent of the fixed unit price for a given unit to be paid upfront by WSP upon verification of payment by customer.
- Second payment: 70 percent of the fixed unit price for a given unit to be paid by WSP upon verified completion of construction of the unit, according to prespecified quality standards.

The contractor may invoice monthly based on developments in verified customer signup (first payment) and verified completion of units (second payment).

The verification agent, on behalf of the WSP, will verify the first payment request. This verification will confirm that all units listed under the request for the first payment correspond to customers who have signed commitments to install OSS units and confirmed demand by depositing the

household contribution for the unit in the designated project account (to be confirmed by the WSP-designated accounting officer).

The verification agent, on behalf of the WSP, will provide technical verification for the second payment request on site. The verification will document that the installed units listed under the second payment correspond to units for which the verification agent has issued a technical completion certificate and for which a verified first payment has been made (to be confirmed by the WSP-designated accounting officer).

An optional 10 percent advance could be available upon contract signature against bank guarantee. This amount will be deducted against the second payment, with a similar reduction of the outstanding advance.

The contractor will be remunerated based on performance. Increased transfer of demand risk and price variation risk are the most significant differences from the traditional contracts in the sector. The transfer of demand risk gives the contractors a significant incentive to adopt a proactive approach toward the communities and engage with ward development committees, CBOs, and women's groups to create demand for the OSS units. Nevertheless, these activities are new for the contractor and the training, marketing material, and guidance to be provided by the WSP or sanitation marketing consultant will be important for the contractor's success.

Other service objectives, such as engagement of CBEs as subcontractors and achievement of a balanced number of OSS units per service block in the project area could be encouraged in the tender docs. However, such additional objectives are not recommended to be a firm requirement with payment implications. Contractors are likely to consider such approaches out of self-interest to facilitate easy operation in the contract area. However, when it is not possible to achieve these objectives (e.g., due to lack of suitable CBO or unbalanced geographic demand patterns), a firm requirement with payment implications will jeopardize implementation or demand creation and may reduce competition for the contracts.

To ensure that contractors appreciate the results-based nature of the contract and the related payment model, the tender will explain in detail the contractual payment model in which contractors will be paid in two installments with 30 percent upon verified signup of individual households and 70 percent upon verified completion of units, and that the contractors can invoice monthly against the verified payment triggers. Further, bidders must present a plan for prefinancing of construction works as part of their tender. This plan should outline how the individual bidder normally handles prefinancing of construction work, e.g., through existing working capital, supplier credits, or bank credit facilities and provide comfort that the volume of work tendered for under the present tender is realistic given their available sources of prefinancing.

6.5 Funds Flow

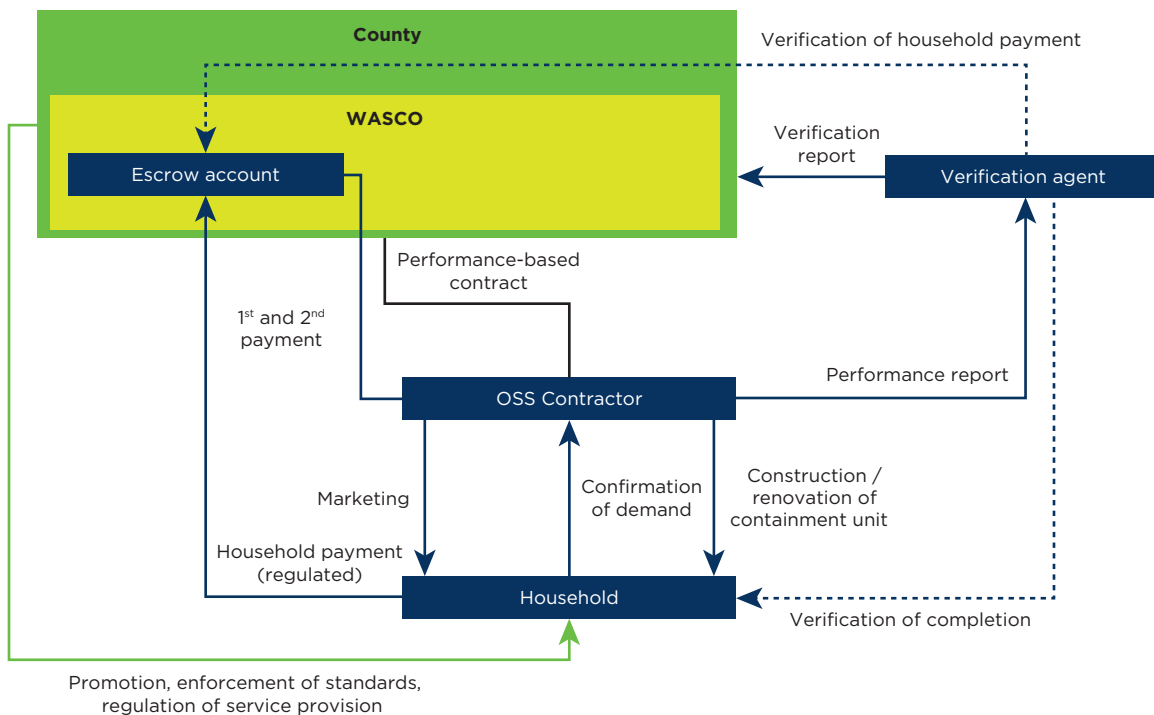
The sources of funds for payment of contractors will combine public funds (whether from government budget or donors) channelled through the WSP (the subsidy) and the household

contributions. However, the WSP is expected to pay the contractor directly and hence no funds should flow directly between the contractor and households. This limits the risk of customers misunderstanding the contractors' incentives and removes any contractor exposure to credit risk on the individual households.

The WSP must establish a designated account for household contributions to facilitate easy identification of contributions and ensuring ring fencing vis-a-vis other WSP expenditures. There should be a simple information technology system to register households that have indicated demand, track who has paid contributions, and track which contributions have been paid to contractors as part of the 30 percent prefinancing (same information technology system will support verification). Finally, there should be a part-time accounting officer supporting this.

Because of affordability challenges in the recipient areas, we encourage that a credit institution is found that can provide short-term funding for the household contribution for OSS construction and renovation in parallel, but this should not delay the preparation for project start. The proposed contract structure and funds flow for the PPP is illustrated in figure 6.1.

Figure 6.1. Contract Structure and Funds Flow for Containment PPP in Kenya



Source: World Bank.

Note: OSS = on-site sanitation; WASCO = Water and Sewage Company.

6.6 Assessment of Subsidy Need

For Kisumu and Malindi, the WTP is assessed to be 50 percent of the total cost for both a new and improved unit. These levels need further validation in both Kisumu and Malindi, including in relation to conditions (high water table, etc.), which may require additional investments. The average cost of new toilet facilities is assessed at US\$550 per unit (average cost of a toilet facility in Kisumu) against a WTP of US\$225 per unit; the average cost of upgrading a facility is assessed at US\$200 per unit against a WTP of US\$75 per unit.

6.6.1 Kisumu

The subsidy need in Kisumu is assessed based on an assumption of 2,000 new toilets per year and improvement of 100 existing units per year over 10 years. The viability gap funding in Kisumu is US\$1,537,500 over five years, assuming that the current unit costs fall by 10 percent and that the WTP levels increase by 5 percent per year. Figure 6.2 shows sample containment data from Kisumu. Figure 6.3, panels a and b, shows cost of new and improved units compared to WTP with subsidy in Kisumu, 2021–30.

6.6.2 Malindi

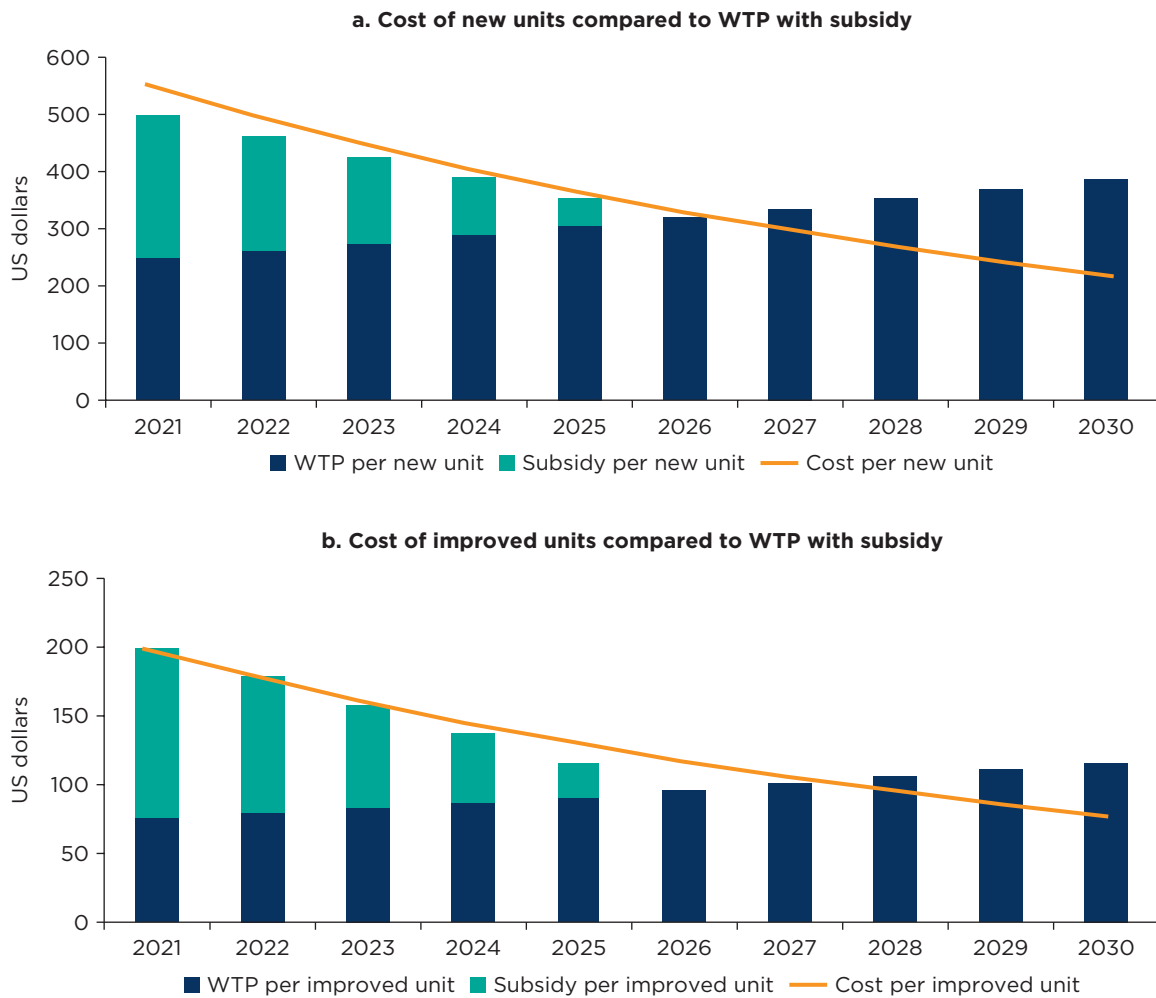
The subsidy need in Malindi is assessed based on an assumption of 1,500 new toilets per year and improvement of 200 existing units per year over 10 years. The viability gap funding in Malindi is US\$1,200,000 over five years, assuming that the current unit costs fall by 10 percent and that the WTP levels increase by 5 percent per year. WTP is assumed to be 50 percent of the total cost for both a new and improved unit. Figure 6.4 shows sample containment data from Malindi. Figure 6.5, panels a and b, shows cost of new and improved units compared to WTP with subsidy in Malindi, 2021–30.

Figure 6.2. Screenshot of Sample Containment Data, Kisumu

| CONTAINMENT | | | |
|---|-----------|------------|--|
| Select city | Drop-down | Kisumu | |
| Subsidy | | | |
| Subsidy, new unit | USD/unit | 250,0 | |
| Subsidy, improved unit | USD/unit | 125,0 | |
| Subsidy scheme | Drop-down | phase-out | |
| Subsidy phase out period | years | 5 | |
| Subsidy phase out rate | %/year | 20% | |
| Improved construction efficiency | %/year | 10% | |
| Increased WTP | %/year | 5% | |
| City | | Kisumu | |
| Without subsidy | | | |
| IRR | % | -10% | |
| NPV | USD | -1.204.540 | |
| With subsidy | | | |
| IRR | % | 20% | |
| NPV | USD | 127.884 | |
| Total viability gap funding needed | USD | 1.537.500 | |

Source: World Bank.

Figure 6.3. Cost of New and Improved Units Compared to WTP with Subsidy in Kisumu, 2021-30



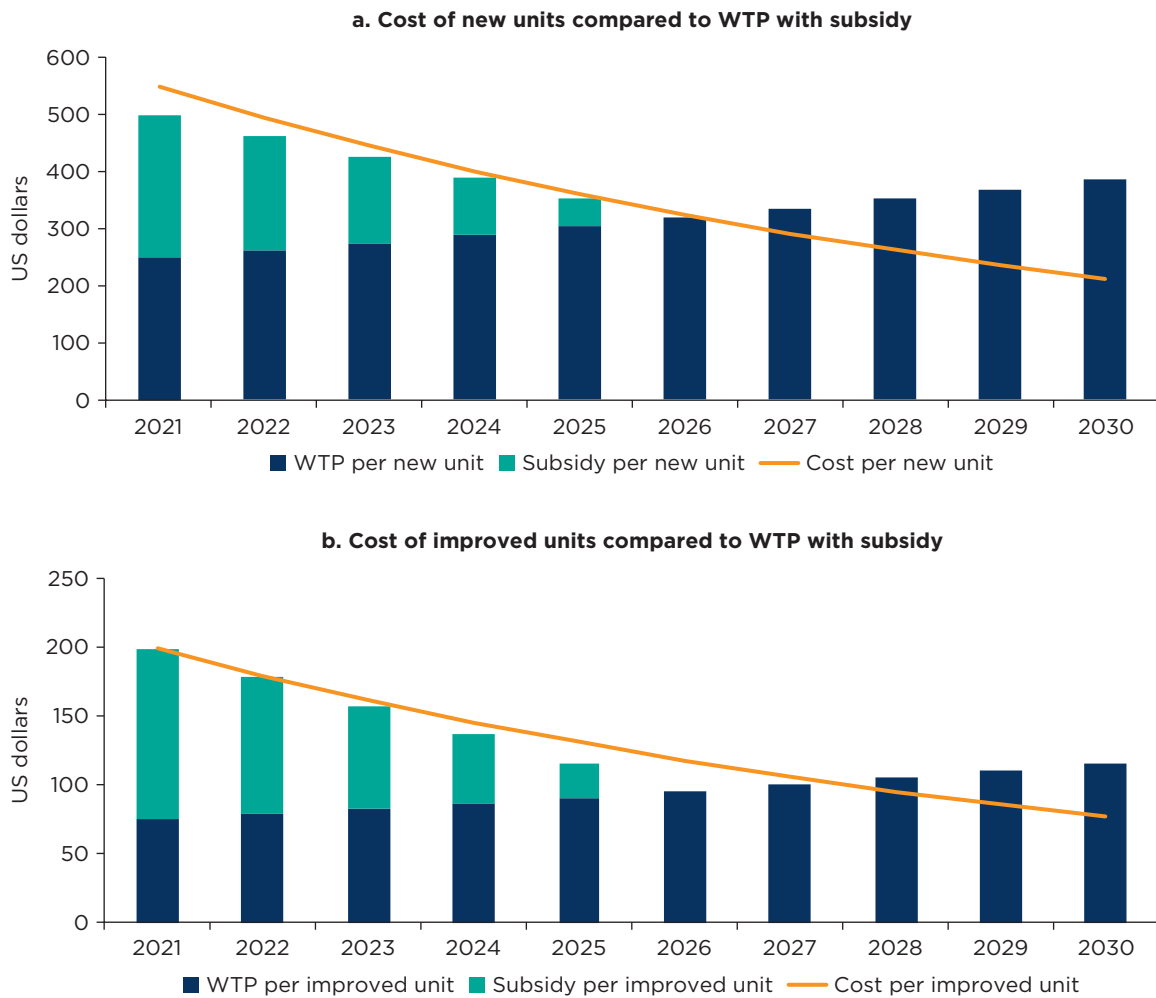
Source: World Bank.
 Note: WTP = willingness to pay.

Figure 6.4. Screenshot of Sample Containment Data, Malindi

| CONTAINMENT | | | |
|------------------------------------|-----------|-----------|--|
| Select city | Drop-down | Malindi | |
| Subsidy | | | |
| Subsidy, new unit | USD/unit | 250,0 | |
| Subsidy, improved unit | USD/unit | 125,0 | |
| Subsidy scheme | Drop-down | phase-out | |
| Subsidy phase out period | years | 5 | |
| Subsidy phase out rate | %/year | 20% | |
| Improved construction efficiency | %/year | 10% | |
| Increased WTP | %/year | 5% | |
| City | | Malindi | |
| Without subsidy | | | |
| IRR | % | -10% | |
| NPV | USD | -934.000 | |
| With subsidy | | | |
| IRR | % | 21% | |
| NPV | USD | 105.941 | |
| Total viability gap funding needed | USD | 1.200.000 | |

Source: World Bank.

Figure 6.5. Cost of new and improved units compared to WTP with subsidy in Malindi, 2021-30



Source: World Bank.
 Note: WTP = willingness to pay.

NOTE

1. Having the enterprises in charge of uptake and community mobilization, which might not be their core skill set, involves separate risks. We suggest that the contractor’s appetite for this will be tested during transaction preparation to identify whether targeted capacity building or support by the utility in the area are necessary.

7. Emptying and Transport PPP

The emptying and transport business model, “affordable environmentally safe emptying services through performance-based financing,” is based on support for expansion of the VTO market through performance-based financing for FSM to provide affordable pit latrine emptying services. This could be a transitional operational subsidy that will incentivize licensed private operators and NGOs and CBEs to participate in the development of an emptying market in defined concession areas, with the objective of emptying service being viable without subsidy after end of contract.

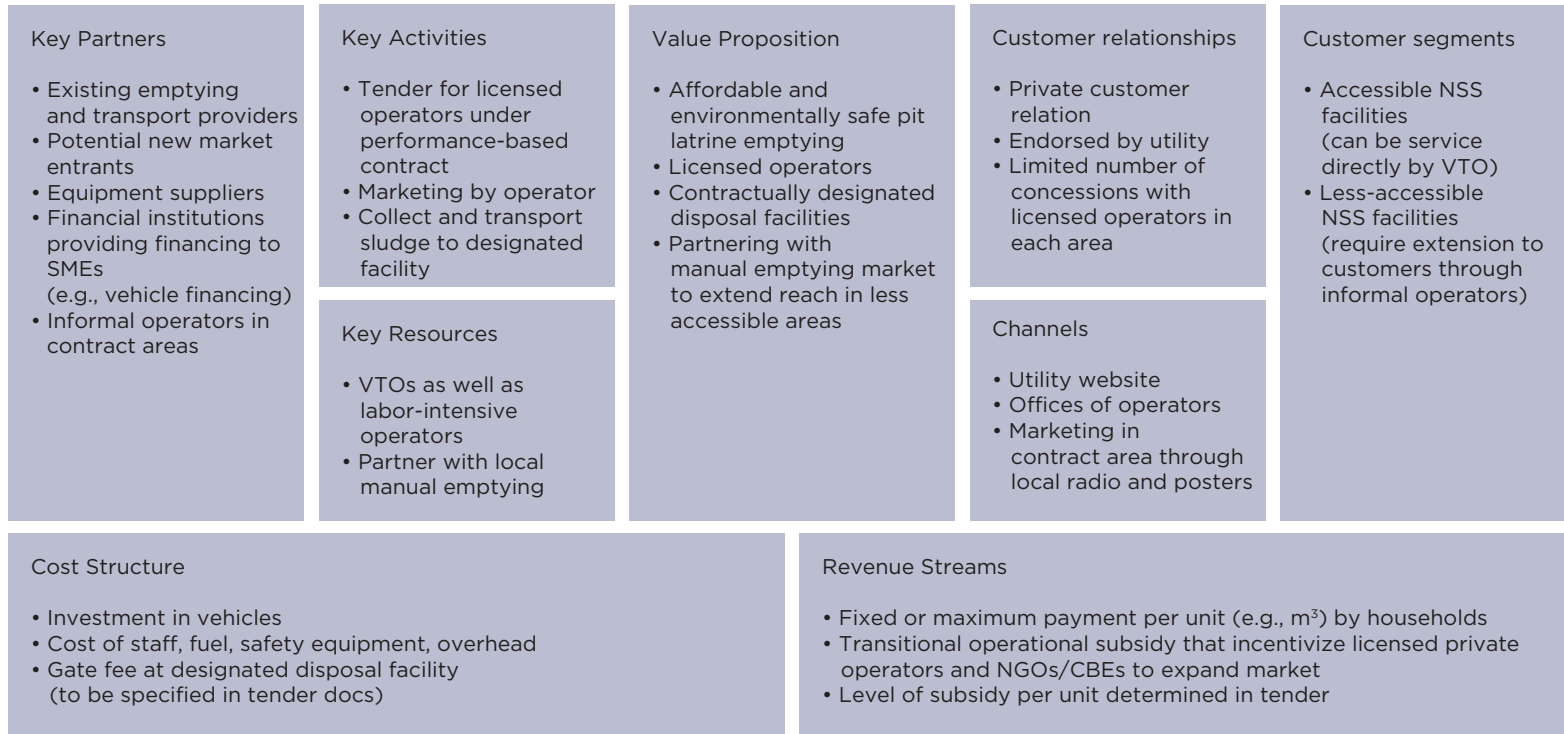
The municipality would be zoned in a number of areas with a limited number of concessions in each area to be tendered among formal pit emptying service. The tender could be technology neutral (equal terms for labor-intensive and vacuum tanker service), or separate contracts could be tendered for labor-intensive and vacuum tanker service if there were concern that one group would have difficulties competing.

A prevalent challenge facing the emptying and transportation market is access to the households by vacuum trucks, thereby necessitating labor-intensive emptying in some areas (particularly in dense areas of Nairobi). However, technology neutral tenders can ensure value for money. They allow the private party in the PPP to assess the appropriate mix of labor and vacuum tankers, based on what makes sense for a particular area, and to submit proposals, based on the best mix, that are responsive to the performance standards. Efforts are ongoing in the market to introduce modern mechanized technologies that can access hard-to-reach areas while ensuring occupational health and safety (OHS) standards for the sanitation workers. It will have to be decided in the individual tenders whether a technology neutral approach is feasible or whether separate contracts for labor-intensive and vacuum tanker services are necessary. The latter is expected to be most relevant in Nairobi.

For accessible NSS facilities, a regulated payment per cubic meter per ton per barrel with a predefined annual reduction could be determined competitively in the tender. Safe disposal will be ensured through a contractually designated disposal facility. For the less-accessible NSS facilities, tenderers should be encouraged to engage with existing informal pit emptying service to provide extension to customers who are more difficult to reach. Figure 7.1 shows a business model canvas for the emptying and transport business model, “affordable, environmentally safe emptying services through performance-based financing.”

In the NSS business model report, “affordable, environmentally safe emptying services through performance-based financing” business model, targeting VTO and manual emptying, is relevant in Kisumu, Malindi, Nairobi, and Naivasha.

Figure 7.1. Business Model Canvas: Emptying and Transport



Source: World Bank.

Note: CBE = community-based enterprise; NGO = nongovernment organization; NSS = non-sewered sanitation; SMEs = small and medium enterprises VTO = vacuum tanker operator.

7.1 PPP Options

7.1.1 Market Structure

The FSM market consists of several market segments with differences in service models, capital equipment, and cost structure. The vacuum tanker service market, which provides emptying of septic tanks, is the most mature market segment. It is the most mechanized market segment due to easier road access to customers and ease of using mechanical suction for emptying septic tanks) and has the lowest unit operating costs. It is the market segment with the highest income, ATP, and WTP for service among customers. Finally, this market has the lowest price of safe disposal of the collected sludge, which can be taken to the normal WWTP.

The formal pit latrine emptying market, which services pit latrines, is more fragmented. It is a more manual service and lacks adequate capital equipment, has higher unit operating costs and higher cost of safe environmentally safe disposal at dedicated FSTPs, has lower-income customers, and has competition from informal local service using environmentally unsafe disposal approaches. Finally, the informal pit latrine emptying market (informal pit emptiers), which competes with the formal pit emptiers for the same customers, are small, local labor-intensive operators without automated equipment and motorized vehicles.

In practice there are blurred boundaries between the market segments, with several VTOs active in the pit emptying market. They provide emptying services using their vacuum tankers, but with more manual labor and higher cost of service than in the septic tank market.

7.1.2 Proposed PPP Option: Performance-Based Subsidy for Franchise

A performance-based subsidy for franchises could incentivize operators in FSM market to increase coverage and quality of services, which will in turn increase WTP and enable WSP to gradually increase operating cost recovery through emptying fees. A transitional operational subsidy could incentivize licensed private operators to participate in the development of the pit emptying market, with the objective of this service being viable without subsidy after end of contract.

The operator payment will consist of a fixed household payment (increasing over contract period, initially around 50 percent of cost of service) and a performance-based subsidy (declining over contract period, initially 50 percent of current cost of service) to incentivize efficiency improvements by private operators. The efficiency improvements will be driven by the ability and incentives of operators to improve operation and management practices and opportunities to expand their business when they are ensured a multiyear concession with limited competition in the market at regulated prices that are profitable at the start of the contract.

An independent verification agent will verify the delivered volume to designated FSTPs, delivery of emptying service to eligible households, and fulfillment of other service-level KPIs. Disbursements of the performance-based subsidy to the private operators will be made upon completion of service against FSTP entrance records; household payment documentation; operator self-reporting; sample of households interviewed; and on-site spot checks. The household co-payment risk is a

normal commercial risk and will have to be accepted by the operators. An escrow account will be established for the performance-based subsidy to mitigate WSP payment risk.

For a market that is not initially commercially viable and may need to be supported, it makes more sense to have competition for the area than in the area. If operators have a service obligation, there is a risk of competition in a zone, leading to adverse competitive behaviour (cherry picking). However, a limited degree of competition (two, max three suppliers in each zone) could be considered.

The faith of incumbent suppliers (informal private sector, NGOs, CBEs) is always a concern when formalizing tenders and contracts in an existing market. We recommend letting more formalized incumbent suppliers bid on equal terms and encourage any bidder to actively engage with and associate with existing smaller suppliers in the zone. However, if there are strategic reasons to give individual incumbent providers special protection, it may be better to keep their service areas outside the new market structure than to design the market around their specific situation. A deliberate effort to support existing players to form a consortium or similar procurable business entity can be a longer-term option, but will require change management, capacity development, and consensus building.

Operator contracts should designate disposal points, which may include a temporary disposal facility, until the long-term facility is operational. The administrative and commercial access terms should be clear, including dumping fee, basis for calculation of dumping fee, and opening hours. Further, procedure for allocation of secondary disposal points in case of temporary unavailability of the designated disposal facility should be clear.

7.1.3 Pro-Poor Targeting

The targeting mechanism proposed for improved FSM combines geographical targeting (project implementation in low-income peri-urban areas of Kenya) and self-selection targeting (only FSM for pit latrines will receive a subsidy).

7.1.4 Subsidy Determination

The septic tank emptying market has a relatively higher ATP and WTP for service than the pit latrine market and lower costs of collection and disposal. There is therefore limited argument for subsidizing the septic tank emptying market. However, the pit emptying market is viewed by the more formalized operators as a challenging market segment, and some potential service providers have decided not to be in the market. It is therefore likely that a well-structured incentive could facilitate market development and attract new market participants.

In the financial model, the household contribution is based on ATP/WTP, which in turn is based on revealed preferences (what people are paying in the market) rather than detailed studies. This should preferably be firmed up prior to tender because the household contribution will be a fixed parameter in the tender.

The subsidy level should be sufficient to allow operators in the pit latrine market to recover the cost of service, including investments in vehicles and equipment. We propose to determine the final level of the subsidy through competitive bidding with the unit price (subsidy plus household contribution) in the first contract year as the key bid parameter. We also propose to gradually scale down the subsidy over the life of the contract by 20 percent per year. As illustrated in the financial model, this requires operators to improve efficiency in service provision (reduce their unit costs) by around 8 percent per year over a five-year contract period.¹ This will combine improved operation and management practices and increasing return to scale when operators expand their market. Because the subsidy will be uniform for all customers in a contract area, it makes sense to target a specific service area or zone with relatively homogeneous market baseline conditions (e.g., socioeconomics, settlement pattern, pit and sludge characteristics, access routes, and distance to the FSTP).

7.1.5 Contract Length

We propose to tender contracts with two to three private operators in each zone. We propose that the first-year unit price (subsidy plus household contribution) in K Sh per cubic meter is the bid criteria. The contract length should be at least three and ideally five years to allow operators to have a reasonable depreciation period for their equipment and, in particular, vehicles. A shorter contract duration does not allow operators to depreciate vehicles sufficiently and makes the unit subsidy needed higher. Contractual requirements for gradual expansion of capacity could be included. However, as long as service provision is profitable, the capacity should expand to service the market without a contractual requirement.

7.1.6 Performance Requirements

We propose that a set of SOPs for emptying and transport of fecal sludge in the county is developed and adopted by the individual counties prior to tendering FSM services. The SOP should cover (i) overall operation, (ii) emptying, (iii) transport, (iv) disposal, (v) customer relations, (vi) public health risk management, (vii) OHS management for sanitation workers, and (viii) monitoring. An indicative table of contents for SOPs for FSM is in appendix D.

Under the emptying and transport PPP, performance requirements for overall operation, specific equipment, and procedures on operation, emptying, transport, and disposal will be specified in the SOP, emptying and transport fecal sludge in the county.

These general performance requirements should apply:

- The contractor must manage labor and equipment to be available adequately at times needed for the performance of the services.
- Equipment shall be maintained in a clean and orderly manner and all truck loads covered during transport to not create any nuisance of leakage, odor, air emission, noise, or litter. All vehicular equipment shall be signed in a unique way for this contractor to enable easy monitoring of equipment movement by the WSP and county residents. All vehicles shall

have a logbook of time and movement activities, including arrival at customers and arrival at designated disposal facility.

- The contractor must provide all equipment as well as tractors and trailers, slurry trucks, or vacuum tankers as needed to perform the above services and have a backup to handle expected downtime. The contractor shall provide annual proof of vehicle registration and insurance, as well as proof of corporate registration, insurance, tax payment, and permits as required for conducting FSM work in the county. Equipment provided by the contractor shall be the contractor's property at the end of the contract period. Equipment made available to the contractor by the WSP (if any) shall be the property of the WSP at the end of the contract period.
- The contractor must train all personnel on health and safety issues and maintaining health and safety records of any incidents. WSP will provide initial training for all the staff of the successful bidder; however, the contractor must ensure that subsequent trainings are provided. The contractor must provide all personnel with uniforms, identification badges, and protective equipment according to the SOPs, emptying and transport fecal sludge in WSP. The contractor must instruct supervisors, drivers, and labor to perform the services in an orderly, polite, and productive manner.
- The contractor shall properly discharge fecal sludge wastes only to officially designated FSTPs. Only waste listed by the WSP as acceptable at these facilities can be brought to them. No dumping to drains, waterways, or open lands shall be allowed. The contractor shall supervise its personnel and subcontractors to ensure that unauthorized dumping does not occur.

The following administrative and customer service requirements should apply:

- The contractor shall keep records on all customers, service provision to them, and their payment status. All pit latrines serviced shall be photographed during the provision of service with a digital timestamp from the camera. The digital records shall be copied and submitted with monthly progress reports and long-term records maintained for the life of the contract.
- The WSP shall be responsible to review (through the verification agent) and process the contractor's monthly report and invoice based on the performance scorecard.
- The contractor should have a registered office and provide a physical and postal address. The contractor will keep its office open and with available staff at a minimum from 9:00 a.m. to 5:00 p.m. weekdays, except national holidays.
- The contractor is responsible to maintain a customer contact phone, which is open eight hours a day, five days a week. When receiving customer calls, including complaints received and communicated by the WSP, the contractor shall attempt to resolve any complaint in two working days. The contractor shall log and record the details of each customer call and submit a record of all complaints and resolutions as part of the monthly report to the WSP.
- The contractor shall inform and educate the public about the FSM services, especially about the rights and responsibilities relevant for the public.
- The contractor will strictly observe and protect customers' privacy rights under law. The contractor will not market, sell, convey, or donate to anyone any list with the name or address of customers. The contractor will not discriminate against customers based on race, color, national origin, ancestry, religion, creed, physical handicap, medical condition, marital status, or sexual orientation.

7.2 Payment Mechanism

The remuneration for performance of the services shall consist of (i) a regulated charge (contractual household contribution) to be invoiced directly by the contractor to the individual customer for pit latrines emptied; and (ii) a performance-based subsidy element (contractual top-up rate) to be invoiced monthly by the contractor to WSP for the delivered volume of pit latrine sludge to the designated treatment facility.

The household payments shall be directly from the household to the contractor against invoice and at the risk of the contractor. The payment by WSP to the contractor shall be contingent on a set of measurable and verifiable KPIs (table 7.1), which shall be monitored using a simple performance scorecard to be verified by the verification agent contracted by WSP as basis for releasing contractual payments.

When invoicing, the contractor shall subtract the contractual gate fee from the contractual top-up rate in calculating the monthly payment. The contractor can, for the duration of the contract, invoice WSP for the maximum contract amount for delivered pit latrine sludge to the designated treatment facility.

7.2.1 Contractual Gate Fee

The contractual gate fee is to be determined prior to tender based on specific terms in each county, in K Sh per cubic meter, for the duration of the contract.

7.2.2 Contractual Household Contribution

The contractual household contribution is to be determined, in K Sh per cubic meter, for the first year of the contract and shall be increased by a maximum percentage (to be determined) each year thereafter.

7.2.3 Performance-Based Subsidy

The performance-based subsidy (invoiced monthly by the contractor to WSP) shall be calculated based on the performance scorecard for the invoicing period, as follows

Payment based on performance (K Sh) =

Fecal sludge eligible for subsidy in month (m^3) * contractual top-up rate (K Sh/ m^3) * performance adjustment (%)

Where:

Fecal sludge eligible for subsidy in month (m^3) =

Minimum of “volume of fecal sludge emptied in period (m^3)” and “volume of fecal sludge delivered at designated FSTP in period (m^3)”

Contractual top-up rate means the performance-based subsidy element in the calculation of the monthly invoicing by the contractor to WSP. The contractual top-up rate shall be the (bid price) K Sh per cubic meter for the duration of the contract.

Performance adjustment (%) =

100%, if weighted score \geq 70% in performance scorecard for period

Weighted score (%), if weighted score $<$ 70% in performance scorecard for period

Hence, each KPI contained in the performance scorecard will be assessed against a defined target to establish the degree of compliance. The results are weighted to calculate a weighted score for the reporting period (maximum 100 percent).

Weighted scores between 70 percent and 100 percent are compliant and will not affect payment of the performance-based subsidy. Weighted score below 70 percent will reduce performance-based subsidy payments and contractor will receive written warning of possible contract termination if not rectified. Consistent, significant underperformance (defined as total weighted score below 70 percent for more than six months) may lead to contract termination.

7.3 Draft Performance Indicators

The release of the performance-based subsidy to the contractor is contingent on assessment of the KPIs in the contractual performance scorecard. The contractor will self-report the KPIs, which will be verified monthly against performance targets in the performance scorecard by the verification agent. See indicative set of KPIs in table 7.1.

7.4 Funds Flow

Figure 7.2 shows a proposed contract structure and funds flow for an emptying and transport PPP.

7.5 Assessment of Subsidy Need

The assessment of subsidy need is based on the average cost of collection and transport services and the WTP. Data available on WTP for collection and transport suggest the subsidy need is approximately US\$30 to US\$40. In the model, it is assumed that WTP is US\$35 per emptying across all cities. Limited data are available on WTP for emptying and transport services. Preliminary data from Aquaya and WSUP (2020) suggest that K Sh 3,500 to K Sh 4,500 (US\$30 to US\$40) is an acceptable price point for the majority market.

Table 7.1. Indicative Set of KPIs for FSM

| # | INDICATOR | DEFINITION | DESCRIPTION |
|--|--------------------------------------|--|---|
| 1. OHS indicators | | | |
| 1.1 | Valid licenses | Percentage of emptying and transport fleet trips with a NEMA Waste Transport Licence and a permit from WSP to allow dumping at the FSTPs | <p>To operate, a private FSM operator must attain the following three licenses:</p> <ul style="list-style-type: none"> - Business licenses from [competent authority] - NEMA Waste Transport License (vehicle specific) - Permit from WSP to allow dumping at the FSTPs (operator-specific) <p>It is the responsibility of the FSM operator to ensure these licenses are in place prior to the onset of service delivery. Laminated copies of each license must be carried by any operating team undertaking work.</p> |
| 1.2 | Employee health: OHS training | Percentage of service provider staff successfully having completed OHS refresher training and medical tests | <p>FSM operators must ensure that the staff are fit for work. Employers are mandated to present their employees to the Occupational Health and Safety Institute for medical assessments for:</p> <ul style="list-style-type: none"> - Preemployment (baseline examination) - Annual examination (monitoring) - Exit examination (conducted when an employee stops or departs their position) <p>Employees must have undertaken the required training on health and safety and SOPs before undertaking work and participate in regular medical tests.</p> |
| 1.3 | Safety incidents | Safety incidents reported to WSP | Reports of fatalities, reported incidents, 1- to 3-day injury accidents, first aid injuries, road traffic incidents, dangerous occurrences and near misses. |
| 2. Customer service management indicators | | | |
| 2.1 | Households served | Number of households served in reporting period | For all FSM vehicles, the number and identity of households served should be logged. |
| 2.2 | Volume emptied | Volume of fecal sludge emptied in reporting period | For all FSM vehicles, the volume emptied at served customers should be measured and logged. |
| 2.3 | Customer satisfaction | <p>Initially, frequency of customer complaints regarding emptying and transport service providers</p> <p>After first year of operation, intended to be replaced by customer satisfaction index (e.g., a Likert scale form)</p> | <p>Number of households that report complaints to WSP regarding emptying services provided.</p> <p>Intended to be replaced by a new customer satisfaction index established during first year of operation, based on telephone interview data collected by verification agent about the importance customers attach to key attributes and their level of satisfaction on these attributes. The three attributes are (i) response time to call for service; (ii) experienced quality of service delivery; and (iii) courtesy of operator staff.</p> |

(Continued)

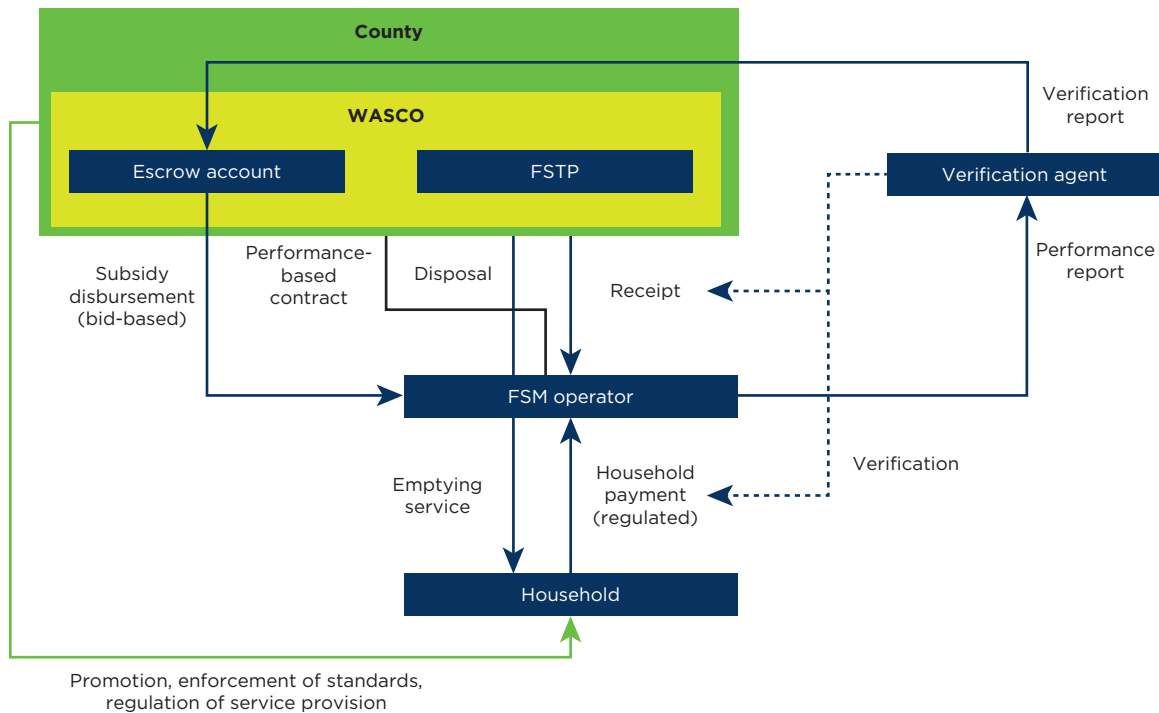
Table 7.1. (Continued)

| # | INDICATOR | DEFINITION | DESCRIPTION |
|--|--------------------------------------|--|--|
| 2.4 | OSS customers in database | Percentage of the OSS customers served in period for which data have been provided to the WSP toilet database in accordance with simple template provided by WSP | A system of monitoring Pit Latrine sludge emptying, transport, and disposal (NSS manifest) will be put in place to ensure compliance in service delivery and establishing WSP oversight and understanding of the market. The NSS manifest should be serial-numbered and issued to all permitted emptying operators, who must complete them once a service has been provided and submit it to the WSP. |
| 3. Public safety during collection and transport indicators | | | |
| 3.1 | Volume delivered | Volume of fecal sludge delivered at designated FSTP | For all FSM vehicles entering the designated FSTP facilities, the load volume should be measured and logged. |
| 3.2 | Share emptied at FSTP | Percentage of total volume collected emptied at designated FSTP | For all FSM vehicles entering the designated FSTP facilities, the load volume should be measured and logged and be compared to the volume emptied at the customer. |
| 3.3 | Safe collection and transport | Five subindicators based on visual inspection (spot check) of sample | |
| 3.3.1 | Worksite preparation | Clearing prior to service | Worksite is cleared of all household items and plastic sheeting is placed on the ground in the workspace on key risk areas. |
| 3.3.2 | Safe worksite | Safe worksite procedures | Only authorized personnel in the workspace (in 5 m of emptying operations) and contaminated objects kept in worksite unless being transported to the vehicle. |
| 3.3.3 | Equipment | Use of PPE | Personnel are wearing PPE: protective gloves, protective clothing, safety boots, mask (if working directly with the emptying), face shield (in case of using high-pressure washers). |
| 3.3.4 | Transport | Safe transport of collected fecal sludge | Collected fecal sludge is transported in a safe manner: methods of transporting fecal sludge incorporate reasonable measures for preventing spillage in route to disposal sites (sealed lid on barrel/closed tank lid). |
| 3.3.5 | Disposal | Disposal at designated facility | Collected fecal sludge is disposed only at designated FSTP (no informal dumping). |

Source: World Bank.

Note: FSM = fecal sludge management. FSTP = fecal sludge treatment plant; NEMA = National Environmental Management Authority; NSS = non-sewered sanitation; OHS = occupational health and safety; PPE = personal protective equipment; SOP = standard operating procedure; WSP = water service provider.

Figure 7.2. Contract Structure and Funds Flow for Emptying and Transport PPP in Kenya



Source: World Bank.

Note: FSM = fecal sludge management; FSTP = fecal sludge treatment plant; WASCO = Water and Sewage Company.

In the short term, possible sources of funds for the viability gap funding to bridge the gap between the WTP and the cost of collection and transport services and ensure financial viability for operators will have to come from public budgets and donors. We expect that gradual efficiency improvements driven by improved operation and management practices and increasing return to scale, as well as gradual increases in WTP as the service is recognized in the market, may bridge the gap over a five-year period. Nevertheless, counties should move toward a sustainable source of financing for NSS, and a sanitation surcharge paid by households through the water bill may be the best option.

7.5.1 Kisumu

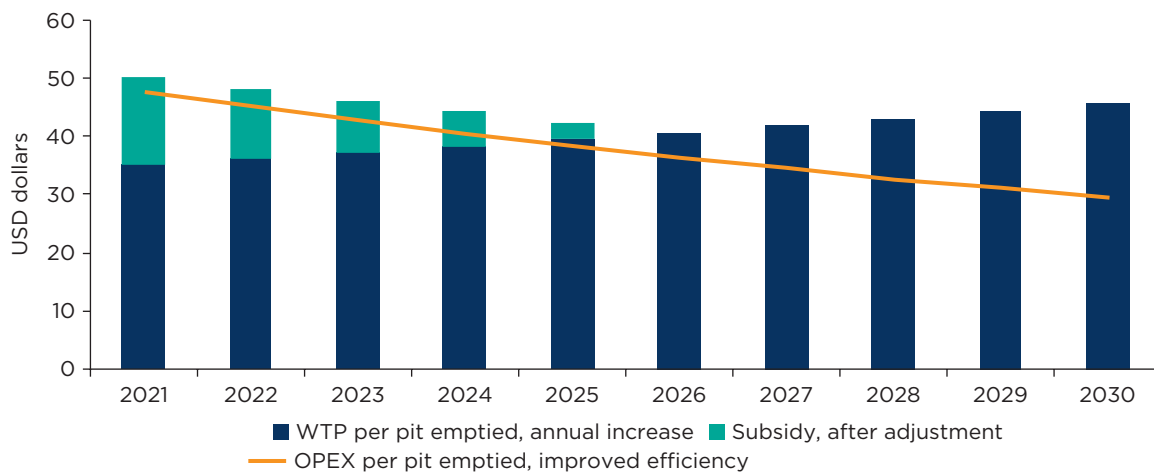
In Kisumu the viability gap is US\$341,859 over five years,² assuming the current average price per emptying falls by 5 percent per year and the WTP level increases by 3 percent per year. Figure 7.3 shows sample collection and transport data from Kisumu. Figure 7.4 shows the projected cost of pits emptied compared to WTP with a subsidy in Kisumu, 2021–30.

Figure 7.3. Screenshot of Sample Collection and Transport Data, Kisumu

| COLLECTION AND TRANSPORT | | | | |
|--------------------------|-----------|--|------------------------------------|---|
| Select city | Drop-down | <input type="text" value="Kisumu"/> | City | <input type="text" value="Kisumu"/> |
| Subsidy | | | Without subsidy | |
| Subsidy | USD/pit | <input type="text" value="15,0"/> | IRR | % <input type="text" value="-1%"/> |
| Subsidy scheme | Drop-down | <input type="text" value="phase-out"/> | NPV | USD <input type="text" value="-290.106"/> |
| Subsidy phase out period | years | <input type="text" value="5"/> | With subsidy | |
| Subsidy phase out rate | %/year | <input type="text" value="20%"/> | IRR | % <input type="text" value="12%"/> |
| Improved VTO efficiency | %/year | <input type="text" value="5%"/> | NPV | USD <input type="text" value="4.288"/> |
| Increased WTP | %/year | <input type="text" value="3%"/> | Total viability gap funding needed | USD <input type="text" value="341.859"/> |

Source: World Bank.

Figure 7.4. Projected Cost of Pit Emptied Compared to WTP with Subsidy, Kisumu, 2021–30



Source: World Bank.

Note: OPEX = operating expense; WTP = willingness to pay.

7.5.2 Malindi

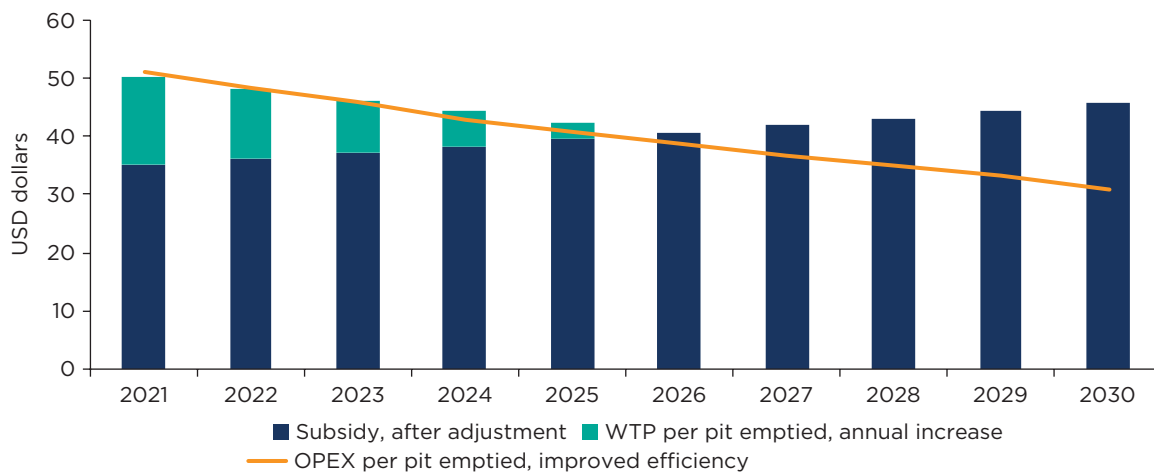
In Malindi the viability gap is US\$119,574 over five years,³ assuming the current average price per emptying falls by 5 percent per year and the WTP level increases by 3 percent per year. Figure 7.5 shows sample collection and transport data from Malindi. Figure 7.6 shows the projected cost of pits emptied compared to WTP with a subsidy in Malindi, 2021–30.

Figure 7.5. Screenshot of Sample Collection and Transport Data, Malindi

| COLLECTION AND TRANSPORT | | | | |
|--------------------------|-----------|--|------------------------------------|---|
| Select city | Drop-down | <input type="text" value="Malindi"/> | City | <input type="text" value="Malindi"/> |
| Subsidy | | | Without subsidy | |
| Subsidy | USD/pit | <input type="text" value="15,0"/> | IRR | % <input type="text" value="-8%"/> |
| Subsidy scheme | Drop-down | <input type="text" value="phase-out"/> | NPV | USD <input type="text" value="-157.638"/> |
| Subsidy phase out period | years | <input type="text" value="5"/> | With subsidy | |
| Subsidy phase out rate | %/year | <input type="text" value="20%"/> | IRR | % <input type="text" value="3%"/> |
| Improved VTO efficiency | %/year | <input type="text" value="5%"/> | NPV | USD <input type="text" value="-54.858"/> |
| Increased WTP | %/year | <input type="text" value="3%"/> | Total viability gap funding needed | USD <input type="text" value="119.574"/> |

Source: World Bank.

Figure 7.6. Projected Cost of Pit Emptied Compared to WTP with Subsidy, Malindi, 2021–30



Source: World Bank.

Note: OPEX = operating expense; WTP = willingness to pay.

7.5.3 Nairobi

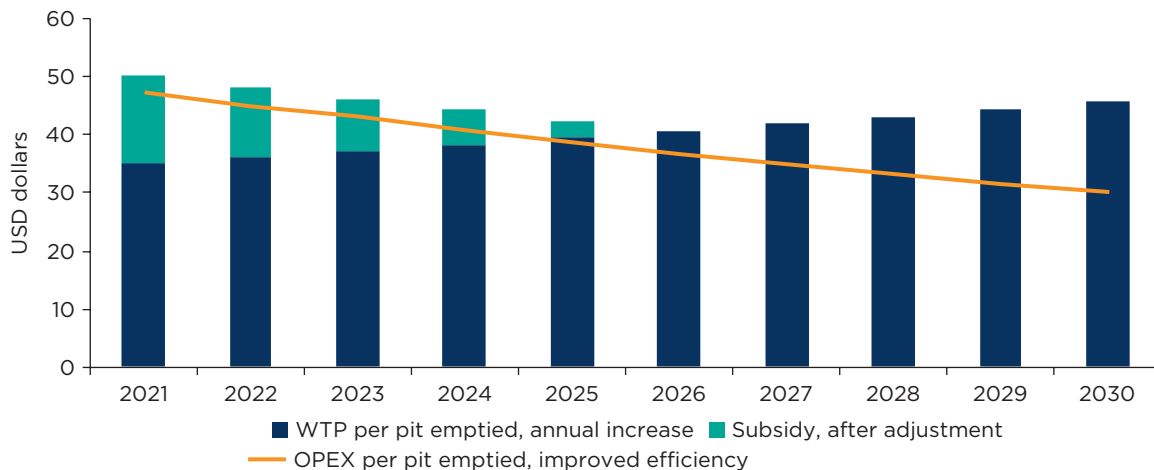
In Nairobi the viability gap is US\$1,399,629 over five years,⁴ assuming that the current average price per emptying falls by 5 percent per year and the WTP level increases by 3 percent per year. Figure 7.7 shows sample collection and transport data from Nairobi. Figure 7.8 shows the projected cost of pits emptied compared to WTP with a subsidy in Nairobi, 2021–30.

Figure 7.7. Screenshot of Sample Collection and Transport Data, Nairobi

| COLLECTION AND TRANSPORT | | | |
|------------------------------------|-----------|------------|--|
| Select city | Drop-down | Nairobi | |
| Subsidy | USD/pit | 15,0 | |
| Subsidy scheme | Drop-down | phase-out | |
| Subsidy phase out period | years | 5 | |
| Subsidy phase out rate | %/year | 20% | |
| Improved VTO efficiency | %/year | 5% | |
| Increased WTP | %/year | 3% | |
| City | | Nairobi | |
| Without subsidy | | | |
| IRR | % | 0% | |
| NPV | USD | -1.155.753 | |
| With subsidy | | | |
| IRR | % | 13% | |
| NPV | USD | 49.541 | |
| Total viability gap funding needed | USD | 1.399.629 | |

Source: World Bank.

Figure 7.8. Projected Cost of Pit Emptied Compared to WTP with Subsidy, Nairobi, 2021–30



Source: World Bank.

Note: OPEX = operating expense; WTP = willingness to pay.

7.5.4 Naivasha

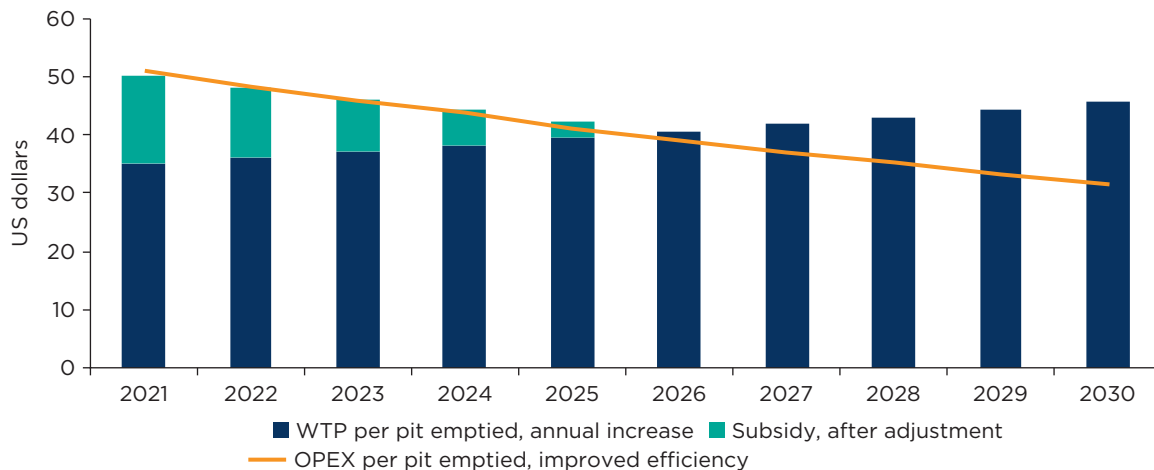
In Naivasha, the viability gap is US\$162,498 over five years,² assuming that the current average price per emptying falls by 5 percent per year and the WTP level increases by 3 percent per year. Figure 7.9 shows sample collection and transport data from Naivasha. Figure 7.10 shows the projected cost of pits emptied compared to WTP with a subsidy in Naivasha, 2021–30.

Figure 7.9. Screenshot of Sample Collection and Transport Data, Naivasha, 2021

| COLLECTION AND TRANSPORT | | | | |
|--------------------------|-----------|-----------|------------------------------------|--------------|
| Select city | Drop-down | Naivasha | City | Naivasha |
| Subsidy | USD/pit | 15,0 | Without subsidy | |
| Subsidy scheme | Drop-down | phase-out | IRR | % -10% |
| Subsidy phase out period | years | 5 | NPV | USD -241.071 |
| Subsidy phase out rate | %/year | 20% | With subsidy | |
| Improved VTO efficiency | %/year | 5% | IRR | % -1% |
| Increased WTP | %/year | 3% | NPV | USD -100.608 |
| | | | Total viability gap funding needed | USD 162.498 |

Source: World Bank.

Figure 7.10. Projected Cost of Pit Emptied Compared to WTP with Subsidy, Naivasha, 2021–30



Source: World Bank.

Note: OPEX = operating expense; WTP = willingness to pay.

NOTES

1. The rationale is that the current market is quite underdeveloped and not systematized. Much of the current contracting costs and practice are still largely ad hoc (with no clear similar reference points) and for small volumes and scopes of works and services. It is expected that scaling through larger contract sizes coupled with standards development, private sector innovations

based on these baseline standards, and the increased capacity that private sector players will gain through new contracts, will generate more market knowledge and improve economies of scale that will in turn improve construction efficiency and reduce the unit costs.

2. For Kisumu, it is assumed that the service covers 7,100 pits in the first year, increasing to 9,700 pits in 2030, following the assumed population growth of 3.4 percent per year.
3. For Malindi, it is assumed that the service covers 2,600 pits in the first year, increasing to 3,600 pits in 2030, following the assumed population growth of 3.4 percent per year.
4. For Nairobi, it is assumed that the service covers 29,600 pits in the first year, increasing to 41,400 pits in 2030, following the assumed population growth of 3.8 percent per year.
5. For Naivasha, it is assumed that the service covers 3,600 pits in the first year, increasing to 4,600 pits in 2030, following the assumed population growth of 3.1 percent per year.

REFERENCE

Aquaya and WSUP (Water and Sanitation for the Urban Poor). “Expanding Safe Fecal Sludge Management In Kisumu, Kenya: An Analysis of the Gap Between Supply And Demand.” *Research Brief* (blog), August 2020. https://www.wsup.com/content/uploads/2020/12/3.-Sanitation_Kisumu_SupplyDemand_oneSheeter_v3.pdf.

8. FSTP O&M Contract PPP

The treatment and reuse business model “FSTPs based on public construction with delegated O&M” is based on construction of the FSTP under public procurement with subsequent delegated O&M contracted to private operator under a management contract. The contract should incentivize use of fecal sludge–based reuse products for commercial businesses.

The private operator is responsible for operation of the FSTP plant and subsequent upscaling of the dried solids for briquetting, compost, or other uses. The revenue for the private operator is in the form of payment for services (management fee). An additional revenue is expected from selling fecal sludge–based reuse products. The operator is responsible for sourcing all inputs to the facility, including procuring organic biowaste or other additives. Figure 8.1 shows a business model canvas for the treatment and reuse business model, “FSTPs based on public construction with delegated O&M.”

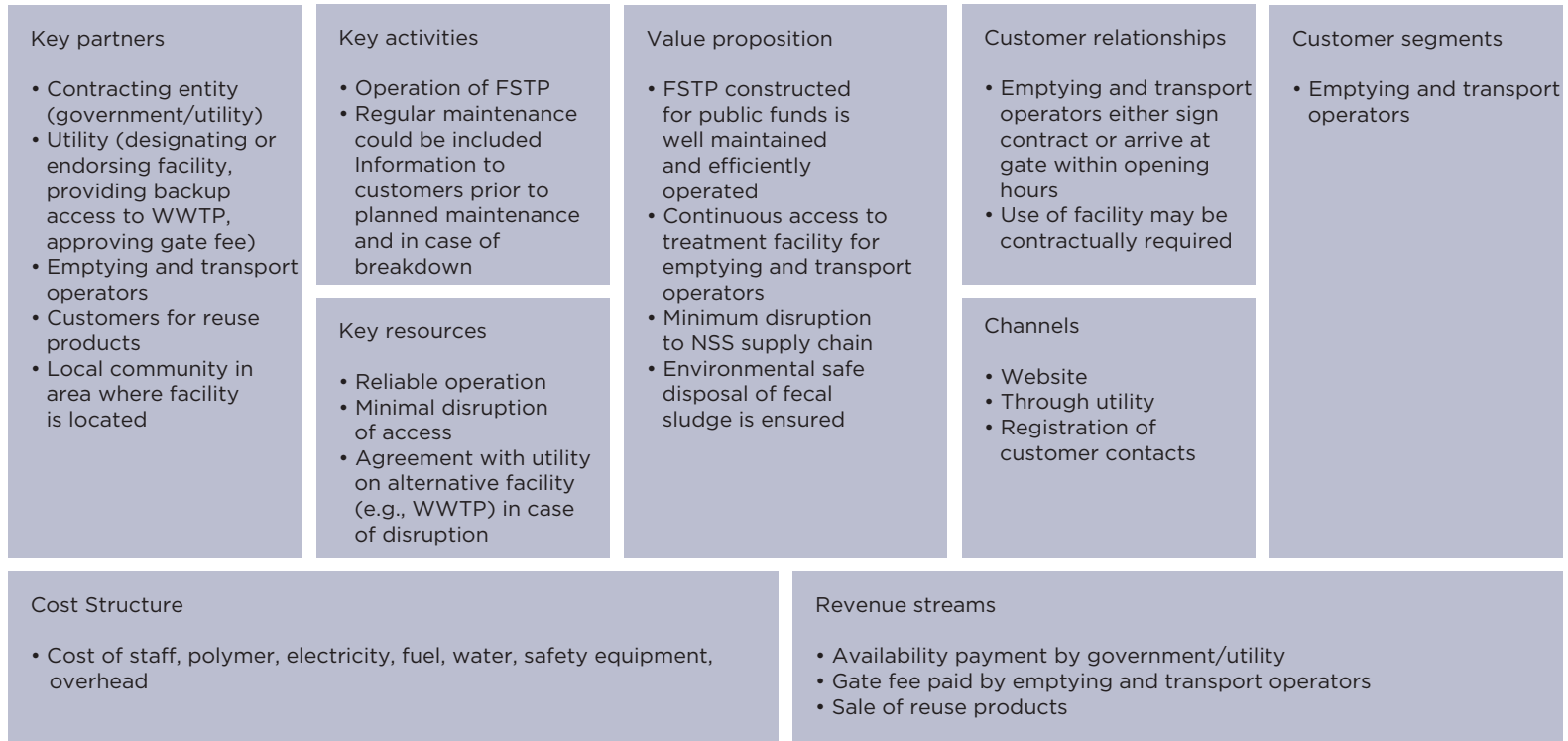
In the NSS business model report, the treatment and reuse business model “FSTPs based on public construction with delegated O&M” is relevant for the new FSTP in Malindi and subject to public construction and renovation in Kisumu and Naivasha. The business model includes sale of reuse products from the processing of dried sludge into briquettes to commercial industries, substituting other use of biomass for energy production. The operator should report volumes and prices for reuse products to the county to facilitate future sector planning.

8.1 PPP Options

The proposed approach to the treatment market in which a WSP will design, construct, and own treatment facilities, with the O&M contracted to private treatment operators, is consistent with experience on private sector involvement in WWTPs. The envisioned private sector involvement is isolated to the O&M of the treatment plants and may be more attractive to private parties interested in management of the infrastructure rather than those with an interest in vertical integration from sludge collection over treatment to reuse (if such parties exist).

Similarly, to the extent that a market can be justified for sludge reuse (briquettes or compost), the involvement of private reuse operators makes sense. However, we advise caution if significant revenues from briquettes or, especially, compost were projected to contribute to value creation in earlier stages of the value chain. We have carried out a market study of the local market indicating a possible but highly competitive market.

Figure 8.1. Business Model Canvas: Treatment and Reuse



Source: World Bank.

Note: FSTP = fecal sludge treatment plant; NSS = non-sewered sanitation; WWTP = wastewater treatment plant.

8.1.1 Market Structure

The FSTP is a centralized facility open to all registered transporters of fecal sludge. Success of the facility requires a consistent supply of sludge from the local communities. This means that a large amount of the disposal of sludge to the public dumping sites is channelled to the facility instead. For this to happen, there needs to be a substantial engagement and incentivization of the local exhauster trucks and emptier that discharge the sludge without or at very low costs. A key element is the requirement to use designated facility (and designation of the FSTP as this facility) to which all fecal sludge is delivered under FSP operator licenses and contracts.

Processing of the dried fecal sludge into briquettes requires sourcing a large amount of biowaste to be mixed in the dried sludge to increase the heating value of the briquettes. To be able to source the right quantity and quality, the facility will need to purchase it from local agricultural processors that have found alternative markets and uses for it. The ability to procure the waste at low cost will be crucial to the sustainability of the plant.

The market for briquettes is a niche market because briquettes will be sold in a highly competitive market, displacing existing suppliers. Since this is a competitive market, substantial marketing efforts are required. The bulky nature of briquettes requires the facility to find a market along the coastal region to reduce transportation costs.

8.2 Proposed PPP Option: Public Procurement of O&M Services with Performance Incentives

The proposed PPP would allow the WSPs (as the public sector contracting authorities) to partner with a private operator to run daily operations of the facility. The private operator will be incentivized to use the dried sludge to produce products for the commercial market. This will increase the willingness to increase the production and gradually increase operating cost recovery through additional income. The operator payment will consist of contractual O&M payments (management fee) for the O&M services.

An independent verification agent will verify the delivered volume to the FSTP and amount of dried sludge processed into products or storage in a warehouse, as well as confirm compliance with operating requirements. Disbursements of the performance-based subsidy to the private operators will be made upon completion of invoicing period against FSTP entrance records; operator self-reporting; sales records of produce; and on-site spot checks.

An escrow account will be established for the performance-based subsidy to mitigate WSP payment risk. A contingency fund will be established for funding spare parts to ensure a fully operational plant.

8.2.1 Subsidy Determination

Fecal sludge production in the communities is sufficient to sustain FSTP facilities, but there is a need to boost collection and develop the septic tank emptying and pit latrine markets. The proposed

pit latrine transport will have a positive impact on the supply of sludge to the FSTP facility, and the expected increase in capacity of the exhauster trucks will improve both the supply of sufficient sludge to the facility and the efficient receiving and processing of the sludge at the plant.

The management fee will be linked to the volume processed, possibly including a fixed or minimum element. The level of the management fee would be subject to tender. We expect income from sale of products such as briquettes will accrue fully to the operator to incentivize active participation in the development of the reuse market.

8.2.2 Contract Length

We propose to tender contracts with one private operator. The length should be at least two years, preferably three with an option to extend by two years to allow operators to build operation experience, hire and train qualified staff, and establish a sustainable market for produce.

8.3 Performance Requirements

We propose that a set of SOPs for O&M of the FSTP is developed and adopted by the county and WSPs prior to tendering O&M services. The private operator should ensure that all preventive and curative measures outlined in the SOPs are followed. The SOPs for the FSTP should address:

- Overall operation
- Receiving and registration of the sludge at the plant from registered transporters
- Overseeing the transporters emptying the sludge into an equalization tank
- Ensuring proper mixing of the received sludge into a uniform sludge
- Screening and disposal of unwanted solids
- Operating pumps and polymer mixers and the screw press that separates solids and liquids
- Transferring the dewatered sludge by wheelbarrows to the sun-drying beds
- Marketing and selling the dried sludge or processed sludge, or safely disposing of it

For each separate facility, for further processing of the dried sludge, similar SOPs should be developed by the operator and accepted by WSP.

Under the O&M PPP, the SOPs for O&M of the FSTP should specify performance requirements for overall operation; equipment and procedures on operation, dewatering, and treatment of the liquids from the sludge according to wastewater regulation, and drying and discharge of the sludge.

General performance requirements should apply:

- The private operator must manage labor and equipment to be available adequately at times needed for performance of the services.
- The private operator must provide all additional equipment needed to fully perform above services and have a backup to handle expected downtime.

- The private operator should deposit in the WSP account the contractual gate fee based on weighbridge records.
- Equipment shall be maintained in a clean and orderly manner.
- The operator will ensure that the operations do not create any nuisance or disturbance to neighboring structures and inhabitants.
- The private operator will take care of the polymer, water, and electricity costs as well as any other cost while undertaking the O&M of the FSTP during the contract period, except for any capital or replacement costs, which are to be borne by a contingency fund.
- All O&M records are to be maintained and readily available for review.
- Equipment provided by the private operator shall be the property of the operator at the end of the contract period. Equipment made available to the operator by the WSP (if any) shall be the property of the WSP at the end of the contract period.
- The private operator is responsible for training all personnel on health and safety issues and maintaining health and safety records of any incidents. WSP will provide initial training for all the staff of the successful bidder; however, the contractor must ensure that subsequent training required is provided. Further, the operator must provide all personnel with uniforms, identification badges, and protective equipment according to the SOP for the FSTP. The operator must instruct supervisors and labor to perform the services in an orderly, polite, and productive manner.
- The private operator shall adhere to wastewater regulations and NEMA standards when discharging treated wastewater and liquids from the sludge into nearby water bodies and disposing of any solid waste.

The following administrative and customer service requirements should apply:

- Records shall be kept by the private operator on all deliveries from sludge transporters and their payment for the services. The digital records shall be copied and submitted with monthly progress reports and long-term records maintained for the life of the contract.
- The WSP shall be responsible for reviewing (through the verification agent) and processing the operators' monthly report and invoice based on the performance scorecard.
- The operator should have a registered office and provide a physical and postal address. The contractor will keep its office open and with available staff at a minimum from, say, 9:00 a.m. to 5:00 p.m. weekdays, except national holidays.
- The operator is responsible for maintaining a customer contact phone, which is open eight hours a day, five days a week. When receiving customer calls, including complaints received and communicated by the WSP, the contractor shall attempt to resolve any complaint in two working days. The contractor shall log and record the details of each customer call and submit a record of all complaints and resolutions as part of the monthly report to the WSP.
- The operator shall inform and educate the sludge transporters about the FSTP services, and about the rights and responsibilities relevant for the transporters.
- The operator will strictly observe and protect customers' privacy rights under law. The contractor will not market, sell, convey, or donate to anyone any list with the name or address of customers. The contractor will not discriminate against customers on the basis of race, color, national origin, ancestry, religion, creed, physical handicap, medical condition, marital status, or sexual orientation.

Additional SOPs for O&M for the fecal sludge-based reuse products should be developed for each product line. The operator will be responsible for sourcing all inputs to the facility, including procuring organic biowaste or other additives, and for proper storage and handling hereof.

8.4 Payment Mechanism

Remuneration for the performance of the O&M services consists of a performance-based management fee (fixed element and performance element) linked to the amount of fecal sludge received and treated and a set of measurable and verifiable KPIs (table 8.1). The performance element payment by WSP to the private operator is contingent on a set of measurable and verifiable KPIs, described below, which shall be monitored using a simple performance scorecard (equations 8.1 and 8.2). The scorecard will be verified by the verification agent contracted by WSP as basis for releasing contractual payments.

Each KPI in the performance scorecard will be assessed against a defined target to establish the degree of compliance. The results are weighted to calculate a weighted score for the reporting period (maximum 100 percent). Weighted scores between 70 percent and 100 percent are compliant and will not affect payment of the performance-based subsidy. Weighted scores below 70 percent will reduce payments of the performance-based subsidy and result in written warnings of possible contract termination if not rectified. Consistent, significant underperformance (defined as total weighted score below 70 percent for more than six months) may lead to contract termination. On this basis the performance-based management fee will be the sum of the fixed element (equation 8.1) and the performance element (equation 8.2) as follows:

The fixed element shall be determined as: (8.1)

[fixed operating costs (management fee) in K Sh/month] +

[volume of fecal sludge received and treated in tons] * [variable operating cost in K Sh/ton]

The performance element shall be determined as: (8.2)

[20% of fixed element], if weighted KPI for month is between 70% and 100% (considered to be compliant)

[20% of fixed element] * [weighted KPI], if weighted KPI for month is below 70%

8.5 Draft Performance Indicators

The release of the management fee to the O&M operator shall be contingent on assessment of the KPIs in the contractual performance scorecard. The contractor will self-report the KPIs and verified monthly by the verification agent against performance targets in the performance scorecard. Table 8.1 includes an indicative set of KPIs.

Table 8.1. Indicative Set of KPIs for FSTP O&M

| # | INDICATOR | DEFINITION | DESCRIPTION |
|--|---------------------------------------|---|---|
| 1. OHS indicators | | | |
| 1.1 | Employee health - OHS training | Percentage of service providers staff successfully having completed OHS refresher training and medical tests. | <p>The O&M operator must ensure that the staff are fit for work. Employers are mandated to present their employees to the Occupational Health and Safety Institute for medical assessments for:</p> <ul style="list-style-type: none"> - Preemployment (baseline examination) - Annual examination (monitoring) - Exit examination (conducted when an employee stops or departs their position) <p>Employees must have undertaken the required training on health and safety and Standard Operating Procedures before undertaking work and participate in regular medical tests.</p> |
| 1.2 | Safety incidents | Safety incidents reported to WSP | Reports of fatalities, reported incidents, 1- to 3-day injury accidents, first aid injuries, road traffic incidents, dangerous occurrences and near misses. |
| 2. Customer service management indicators | | | |
| 2.1 | Volume delivered | Volume of fecal sludge received in reporting period | For all FSM vehicles entering the designated FSTP facilities, the load volume should be measured and logged. A standard mapping of volume for typical vehicles may be used if measurement (weighing bridge) is not available. |
| 2.2 | Customer satisfaction | <p>Initially frequency of customer complaints regarding reception and emptying service provision.</p> <p>After first year of operation intended to be replaced by CSI</p> | <p>Number of exhauster trucks and manual emptiers who report complaints to WSP regarding reception and emptying services provided.</p> <p>Intended to be replaced by a new CSI, to be established during first year of operation, based on telephone interview data collected by verification agent about the importance transporters attach to key attributes and their level of satisfaction on these attributes. The three attributes: access to facility; experienced quality of service delivery; and courtesy of operator staff.</p> |
| 3. Public safety | | | |
| 3.1 | Safe discharge and operation | Five subindicators based on visual inspection (spot check) of sample | |
| 3.2 | Worksite preparation | Clearing prior to service | Access to equalization tank for exhauster trucks and manual emptiers is clear from obstacles. |
| 3.3 | Safe worksite | Safe worksite procedures | Only authorized personnel in the workspace. |

(Continued)

Table 8.1. (Continued)

| # | INDICATOR | DEFINITION | DESCRIPTION |
|----------|--|---|---|
| 3.4 | Equipment | Use of PPE | Personnel are wearing PPE: protective gloves, protective clothing, safety boots, mask (if required), face shield (in case of using high-pressure washers). |
| 3.5 | Transport | Safe transport of dewatered fecal sludge | Collected fecal sludge is transported in a safe manner: methods of transporting fecal sludge incorporate reasonable measures for preventing spillage in route to disposal sites (sealed lid on barrel/closed tank lid). |
| 3.6 | Disposal | Disposal at designated facility | Dewatered fecal sludge is disposed only at designated municipal dump or processed further for commercial sale. |
| 4 | Operational efficiency and environmental safety | | |
| 4.1 | Plant availability | Hours of nonavailability of pump and polymer mixer | The amount of fecal sludge not being processed, but either stored or disposed at municipal dump. Provision should be made for storage during the rainy season when sun drying of the sludge can be a challenge. |
| 4.2 | Plant efficiency | Water content of separated solids | Moisture content after separation and settling of the solids is measured [daily] according to SOPs. |
| 4.3 | Treatment of liquids | Compliance with regulations for discharge | Measurements of key compounds. |
| 4.4 | Water consumption | m ³ of utility water consumed | Metered consumption of utility water. |
| 4.5 | Electricity consumption | kWh of electricity consumed | Metered consumption of grid electricity. |
| 5 | Processing of dewatered and dried sludge into valuable products | | |
| 5.1 | Volume processed | Volume of fecal sludge being processed further into valuable products | The amount of fecal sludge <i>not</i> being processed and either stored or disposed at municipal dump is measured. Provision should be made for storage during the rainy season when sun drying of the sludge can be a challenge. |

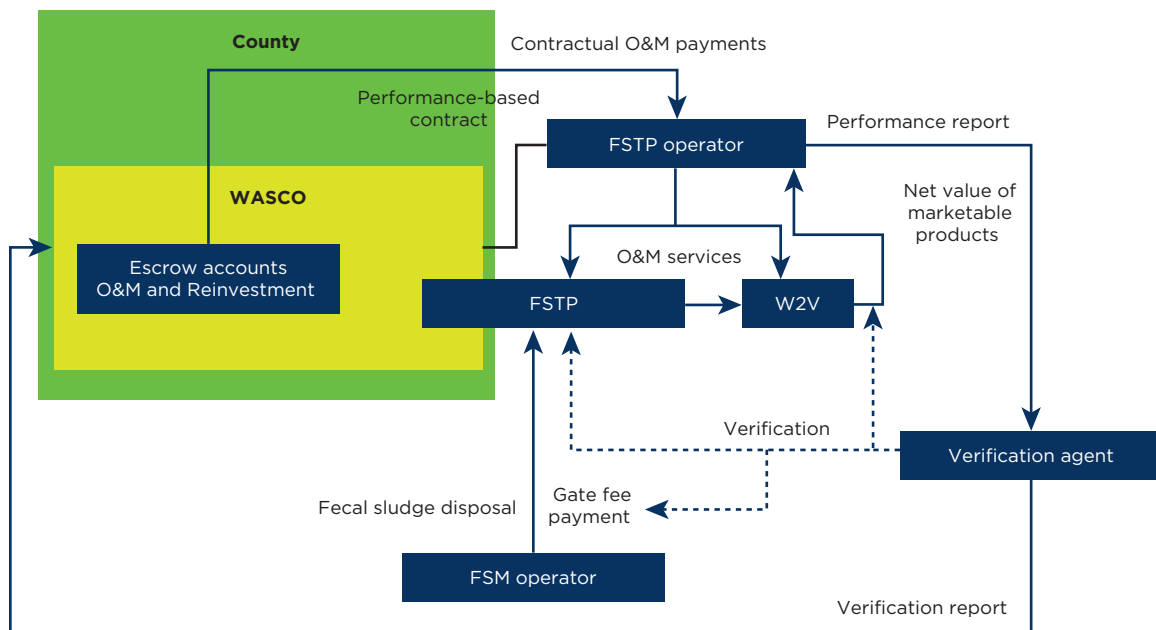
Source: World Bank.

Note: CSI = Consumer Satisfaction Index; FSM = fecal sludge management; FSTP = fecal sludge treatment plant; OHS = occupational health and safety; PPE = personal protective equipment; SOP = standard operating procedure; WSP = water service provider.

8.6 Funds Flow

The funds flow has to be adapted to the specific responsibilities of the contractor (regular O&M only or also implementing reinvestments), the final risk sharing arrangements (including whether contractors have a risk on the revenues from gate fee), and the final structure of the payment mechanism (including whether waste-to-value revenues accrue directly to the contractor or are channelled through the operations escrow account). Figure 8.2 shows the proposed contract structure and funds flow for the PPP.

Figure 8.2 Contract Structure and Funds Flow: Treatment and Reuse



Source: World Bank.

Note: FSTP = fecal sludge treatment plant; W2V = Waste to Value; FSM = fecal sludge management; O&M = operations and management; WASCO = Water and Sewage Company.

8.7 Assessment of Subsidy Need

The needed operational subsidy is relatively limited, but the investment subsidy is substantial. FSTP investments will have to be fully covered by donors or government; however, the operation of the most successful value generating FSTPs could become viable. If the investment were funded by an investment subsidy, the resulting funding gap is shown in table 8.2.

Table 8.2. Assessed Funding Gap: FSTP

| | CAPACITY NEED (M ³ /YEAR) | NECESSARY INITIAL INVESTMENT SUBSIDY (US\$) | NECESSARY OPERATIONAL SUBSIDY PER YEAR (US\$) |
|-----------------|---|---|---|
| Kisumu | 151,000 | 24,100,000 | 200,000 |
| Malindi | 39,000 | 6,200,000 | 52,000 |
| Naivasha | 55,000 | 8,800,000 | 73,000 |

Source: World Bank.

Note: FSTP = fecal sludge treatment plant.

9. Enabling Environment for NSS PPPs

Successful implementation of the PPPs in the NSS sector requires a conducive enabling environment in terms of:

- Dialogue and obtaining legal opinion from the PPP Directorate (in practice, the PPP Unit) to clarify which PPPs are included under the 2021 PPP Act (assumed to be the O&M of FSTPs, but not the micro PPPs for OSS and FSM).
- Identification of the sources of funds for viability gap funding to make projects financially viable in the short term (public budgets and donors) and the longer term (sanitation surcharge paid by households).
- Capacity building for the contracting authorities (county governments and WSPs) on their role in PPPs in NSS.
- Capacity building for potential SME bidders on PPPs in NSS.
- Engagement with the Kenyan financial sector on NSS market opportunity, CSR aspects, and possibility of using asset financing with the financed vehicle as security (and possible access to partial credit guarantees for participating financial institutions to cover potential defaults on loans to SMEs).
- County and WSP acceptance of independent verification and escrow accounts to alleviate any lack of trust of public sector counterparts.
- Development of standards supporting the service-level specifications for operators: standard designs of emptiable containment units; SOPs for emptying and transport of fecal sludge; and SOPs for operation of FSTPs.

Appendix A: Indicative Term Sheet for Containment

Table A.1. Draft Term Sheet: Performance-Based Contract for Construction of Household On-Site Sanitation

| AREA | [DELINEATION OF SERVICE AREA] (THE AREA) |
|--|---|
| Name of contract | Performance-based contract for Construction of Household on-site sanitation in [Area] |
| Scope of Services | [County] Water Service Provider (WSP) delegates responsibility for construction of Household on-site sanitation in the [Area] to the Operator (Private Operator) for a period of [5] years starting [date]. |
| Duration of Contract | Five years unless terminated by one of the parties. After the end of year [2], both parties may terminate the contract with a [3]-month notice. Prior to the end of year [2], the contract may only be terminated in case of gross negligence. |
| Parties to the Contract | The contract is signed between: - WSP (the Authority); and - [name of private Operator] (the Operator) |
| Duties, Rights, and Obligations of the Authority | The Authority has following Duties, Rights, and Obligations: <ul style="list-style-type: none"> • to delegate to the Operator on the responsibility for construction of household on-site sanitation in the specified geographical area [name of the area] • to ensure that the Operator receive training and materials by the Sanitation Marketing Consultant • to verify reception of customer deposit and [weekly] provide a list of customers having confirmed demand to the Operator and the Verification Agent. Signed-up customers will confirm demand by paying a predefined deposit into a designated WSP account • to liaise with the Operator on joint marketing efforts and provide available information on OSS facilities in the Area • to control implementation of the contract in accordance with the contractual service quality provisions • to pay the Operator timely based on received invoices as verified by the independent Verification Agent • if the Operator does not fulfill contractual duties, to demand the Operator to fulfill them, and in case of continued nonfulfillment, to terminate the contract before expiry date |

(Continued)

Table A.1. (Continued)

| | |
|---|---|
| Duties, Obligations, and Rights of the Private Operator | <p>The Operator has following Duties, Rights, and Obligations:</p> <ul style="list-style-type: none"> • to receive training and materials by the WSP or a Sanitation Marketing Consultant • to promote the OSS units to create demand in coordination with ward development committees, CBOs, and women’s groups • to ask interested customers to sign up on designated standard forms with WSP logo and details of customer, OSS solution, size of household contribution and how to pay the household contribution • to regularly (e.g., weekly) provide list of signed-up customers to the WSP and the Verification Agent • to initiate the construction work and in parallel issue an invoice to WSP for 30% of the fixed price of the unit for each customer having signed up as indicated by verified customer contributions • to initiate construction of the standardized OSS units demanded: <ul style="list-style-type: none"> • Once construction of a unit is completed, the Operator will notify the Technical Consultant, who will verify that the facility has been constructed in accordance with the provided technical specification and provisions of the contract. • After the verification and confirmation process, the Operator will be paid the remaining 70% of the fixed price of the OSS facility in conformity with the payment procedure. • Depending on the type of contribution made toward the construction of the superstructure by the customer, the final payment will be reduced by the cost of materials contributed by the customer. • operators will be encouraged but not obliged to engage CBOs. Similarly, operators will be encouraged but not obliged to subcontract or hire individuals and CBEs in their contracting area. |
| Sources of funds | <p>The Operator is remunerated based on actual service provision from:</p> <ul style="list-style-type: none"> • The Operator shall invoice WSP monthly based on developments in verified customer sign-up (first payment) and verified completion of units (second payment). |
| Payment Mechanism | <p>The payment mechanism includes two installments which together constitutes the full and final payment for both demand creation and construction:</p> <ul style="list-style-type: none"> • First Payment: 30% of the fixed unit price for a given unit to be paid up-front by WSP upon verification of payment by customer. • Second Payment: 70% of the fixed unit price for a given unit to be paid by WSP upon verified completion of construction of the unit according to prespecified quality standards. <p>The Operator may invoice monthly based on developments in verified customer sign-up (first payment) and verified completion of units (second payment). Verification for the first payment request will be performed by the Verification Agent by WSP. Technical verification for the second payment request is done on-site by a Verification Agent on behalf of WSP.</p> <p>An optional 10% advance could be available upon contract signature against bank guarantee.</p> |

(Continued)

Table A.1. (Continued)

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| Service quality provisions | <p>The Operator shall be responsible for the construction of Household on-site sanitation in the area as described in the Service Quality Specifications (to be further detailed based on existing standards in sector and reflecting service delivery reliability and quality).</p> <p>All Personnel employed by the Operator shall hold relevant qualifications and appropriate training and shall have sufficient relevant experience in provision of environmentally safe construction of Household on-site sanitation.</p> <p>The Operator shall familiarize himself with the requirements of NEMA and the Authority in relation to performance of constructing Household on-site sanitation.</p> |
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Appendix B: Indicative Term Sheet: Emptying and Transport

Table B.1. Draft Term Sheet: Performance-Based Contract for Fecal Sludge Management for Pit Latrines

| AREA | [DELINEATION OF SERVICE AREA] (THE AREA) |
|--|--|
| Name of contract | Performance-based contract for Fecal Sludge Management for pit latrines in [Area] |
| Scope of Services | [County] Water Service Provider (WSP) delegates responsibility for FSM for pit latrines in the [Area] to the Operator (Private Operator) for a period of [5] years starting [date]. |
| Duration of Contract | Five years unless terminated by one of the parties. After the end of year [2], both parties may terminate the contract with a [3]-month notice. Prior to the end of year [2], the contract may only be terminated in case of gross negligence. |
| Parties to the Contract | The contract is signed between WSP (the Authority); and [name of private Operator] (the Operator) |
| Duties, Rights, and Obligations of the Authority | The Authority has following Duties, Rights, and Obligations: <ul style="list-style-type: none"> to delegate to the Operator on a limited competition basis with [1] other contract in the same area the responsibility for emptying pit latrines in the Area to liaise with the Operator on joint marketing efforts and provide available information on OSS facilities in the Area to ensure availability of the designated FSTP at the contractual opening hours and with functioning weighbridge to charge upon Operator's delivery to the designated FSTP the contractual dumping charge based on weighbridge records to identify alternative FSTPs on similar terms in case of nonavailability of the designated FSTP to control implementation of the contract in accordance with the contractual service quality provisions to pay the Operator timely based on received invoices as verified by the independent Verification Agent if the Operator does not fulfill contractual duties, to demand the Operator to fulfill them by issuing formal written warning/letter, and in case of continued nonfulfillment, to terminate the contract before expiry date |

(Continued)

Table B.1. (Continued)

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| Duties, Obligations, and Rights of the Private Operator | <p>The Operator has following Duties, Rights, and Obligations:</p> <ul style="list-style-type: none"> • to provide pit latrine emptying service in the designated contractual area • to deliver collected pit latrine sludge at the designated FSTP or alternative FSTPs identified by the Authority in case of nonavailability of the designated FSTP • to pay the contractual gate fee based on weighbridge records • to invoice the customers for the household contribution in accordance with the contractually regulated prices • to invoice the Authority in accordance with the contractually regulated Authority contribution rates • to provide the required documentation on service performance (FSTP weighbridge receipt and entrance record, household payment documentation, monthly report on service provision and KPI fulfillment) together with each invoice to the Authority with a copy to the Independent Verification Agent • to carry out the FSM services in accordance with the service quality provisions of the contract • to have at all times three valid licenses: one to operate a business; a license to transport waste issued by the National Environment Management Authority; and a Hygiene and Operational License from the County Public Health Office • to follow strictly the Standard Operating Procedures (SOPs), including in relation to safety rules, hygienic requirements, emptying equipment, best practice for transporting and disposing of waste in the FSTP, and guidelines relating to customer relations and acquisition • to ensure that all employees are immunized against typhoid, hepatitis B and cholera, have health insurance, and receive training from the County Public Health Office • to pay all operational and maintenance expenses as well as investments in vehicles and own equipment necessary for the service provision |
| Sources of funds | <p>The Operator is remunerated based on actual service provision from two sources:</p> <ul style="list-style-type: none"> • The Operator shall invoice the households for pit latrines emptied in accordance with the contractual price schedules. • The Operator shall invoice the Authority for the delivered volume of pit latrine sludge to the designated FSTPs in accordance with the contractual price schedules. |
| Payment Mechanism | <p>The payment by the household to the Operator shall be directly from the household to the Operator against invoice and at the risk of the Operator.</p> <p>The payment by the Authority to the Operator shall be subject to verification of contractually required documentation by the Independent Verification Agent.</p> <p>An escrow account will be established by the Authority for the grant funding, financing the Authority payment to mitigate payment risk.</p> <p>The Operator can maximally invoice the Authority for a delivered volume of pit latrine sludge of [5,000] m³ per year during the duration of the contract.</p> |

(Continued)

Table B.1. (Continued)

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| Service quality provisions | <p>The Operator shall be responsible for the provision of FSM service in the area as described in the Service Quality Specifications (to be further detailed based on existing standards in sector and reflecting service delivery reliability and quality) and the Standard Operating Procedures (SOPs).</p> <p>The Operator shall manage, operate, and maintain all vehicles, facilities, and ancillary equipment that support its provision of the pit latrine emptying and transport services.</p> <p>All Personnel employed by the Operator shall hold relevant qualifications and appropriate training and shall have sufficient relevant experience in provision of environmentally safe FSM services.</p> <p>The Operator shall familiarize itself with the requirements of KEMA and the Authority in relation to performance of FSM services.</p> |
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Appendix C: Sample Term Sheet for FSTP O&M

Table C.1. Performance-Based Contract for Construction of Household On-Site Sanitation

| AREA | [DELINEATION OF FSTP] (THE SITE) |
|-------------------------|--|
| Name of contract | Performance-based contract for Operation and Maintenance of FSTP in [Area] |
| Scope of Services | <p>[County] Water Service Provider (WSP) delegates responsibility for Operation and Maintenance for the FSTP in [Area] for to the Operator (Private Operator) for a period of [3] years starting [date].</p> <ul style="list-style-type: none"> • Overall operation and maintenance of the FSTP facilities. • Receiving and registration of the sludge at the plant from registered transporters. • Overseeing the transporters emptying the sludge into an equalization tank. • Ensuring proper mixing of the received sludge into a uniform sludge. • Screening and disposal of unwanted solids. • Operating pumps and polymer mixers as well as the screw press that separates solids and liquids. • Transferring the dewatered sludge by wheelbarrows to the sun-drying beds. • Marketing and selling the dried sludge or processed sludge, or safely disposing of it. |
| Duration of Contract | <p>3 years unless terminated by one of the parties.</p> <p>After the end of year [2], both parties may terminate the contract with a [3]-month notice.</p> <p>Prior to the end of year [1], the contract may only be terminated in case of gross negligence. Option for extension of 2 years.</p> |
| Parties to the Contract | <p>The contract is signed between:</p> <ul style="list-style-type: none"> - WSP (the Authority); and - [name of private Operator] (the Operator) |

(Continued)

Table C.1. (Continued)

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| Duties, Rights, and Obligations of the Authority | <p>The Authority has following Duties, Rights, and Obligations:</p> <ul style="list-style-type: none"> • to delegate to the Operator on the responsibility for Operating and Maintaining the FSTP in [site] • to ensure that the Operator receives training and materials by the Sanitation Marketing Consultant • to verify reception of customer deposit and [weekly] provide a list of customers who have confirmed demand to the Operator and the Verification Agent. Signed-up customers will confirm demand by paying a predefined deposit into a designated WSP account • to liaise with the Operator on joint marketing efforts and provide available information on the FSTP services provided in the Area • to control implementation of the contract in accordance with the contractual service quality provisions • to pay the Operator timely based on received invoices as verified by the independent Verification Agent • if the Operator does not fulfill contractual duties, to demand the Operator to fulfill them, and in case of continued nonfulfillment, to terminate the contract before expiry date |
| Duties, Obligations, and Rights of the Private Operator | <p>The Operator has following Duties, Rights, and Obligations:</p> <ul style="list-style-type: none"> • to manage labor and equipment to be available adequately at times needed for the performance of the Services • to provide all additional equipment needed to fully perform above services and have a backup to handle expected downtime • to maintain equipment in a clean and orderly manner • to ensure that the operations do not create any nuisance or disturbance to any neighboring structures and inhabitants • to receive the contractual gate fee based on weighbridge records from customers • to invoice the Authority in accordance with the contractually regulated Authority contribution rates • to maintain all O&M records and ensure they are readily available for review • to maintain the required documentation on service performance (FSTP weighbridge receipt and entrance record, customer payment documentation, monthly report on service provision and KPI fulfillment) together with each invoice to the Authority with a copy to the Independent Verification Agent • to carry out the operations and maintenance in accordance with the service quality provisions of the contract • to follow strictly the Standard Operating Procedures (SOPs) including in relation to safety rules, hygienic requirements, receiving equipment, best practice for processing the sludge, and guidelines relating to customer relations and acquisition • to ensure that all employees are immunized against typhoid, hepatitis B, and cholera, have health insurance, and receive training from the County Public Health Office • to take care of the polymer, water and electricity costs as well as any other cost while undertaking the O&M of the FSTP during the contract period except for any capital or replacement cost which are to be borne by a contingency fund set up for this specific purpose |

(Continued)

Table C.1. (Continued)

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| Sources of funds | <p>The Operator is remunerated based on actual service provision from:</p> <ul style="list-style-type: none"> • The Operator shall invoice WSP monthly based on the amount of fecal sludge received and treated and the Key Performance Indicators 'KPIs' which shall be monitored using a simple Performance Scorecard to be verified by the Verification Agent contracted by WSP as basis for releasing contractual payments. • Waste-to-value accrue directly to the Operator, but shall be reported to the WSP and confirmed by the Verification Agent |
| Payment Mechanism | <p>The remuneration for the performance of the O&M services consists of a performance-based management fee (fixed element and performance element) linked to the amount of fecal sludge received and treated and a set of measurable and verifiable Key Performance Indicators.</p> <p>The fixed element shall be determined as:</p> <p style="padding-left: 40px;">[fixed operating costs in KES/month] + [volume of fecal sludge received and treated in tons] * [variable operating cost in KES/ton]</p> <p>The performance element shall be determined as:</p> <p style="padding-left: 40px;">[20 percent of fixed element], if weighted KPI for month is between 70 percent and 100 percent (considered to be compliant)</p> <p style="padding-left: 40px;">[20 percent of fixed element] * [weighted KPI], if weighted KPI for month is below 70 percent</p> <p>Weighted score below 70 percent will hence lead to a reduction in payments of the Performance Based Subsidy and will furthermore initiate a written warnings of possible contract termination if not rectified.</p> <p>Consistent significant under-performance (defined as total weighted score below 70 percent for more than six [6] months) may lead to contract termination.</p> |
| Service quality provisions | <p>The Operator shall be responsible for the operations and maintenance of the FTSP as described in the Service Quality Specifications (to be further detailed based on existing standards in sector and reflecting service delivery reliability and quality).</p> <p>All Personnel employed by the Operator shall hold relevant qualifications and appropriate training and shall have sufficient relevant experience in provision of environmentally safe construction of Household on-site sanitation.</p> <p>The Operator shall familiarize himself with the requirements of NEMA and the Authority in relation to discharge of wastewater and disposal of any solids.</p> |

Appendix D: Indicative Table of Contents for FSM SOPs

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- 1.1 Licensing
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- 1.3 Insurance
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