

Evaluating the Potential of

Container-Based Sanitation



Clean Team in Kumasi, Ghana

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Clean Team in Kumasi, Ghana

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EVALUATING THE POTENTIAL OF CONTAINER-BASED SANITATION: AN OVERVIEW

The World Bank Water Global Practice (WGP) has developed an approach to urban sanitation based on citywide inclusive sanitation (CWIS) principles, which have been developed in conjunction with sector partners (Bill & Melinda Gates Foundation et al., 2017). This approach aims to shift the paradigm around urban sanitation approaches in World Bank engagements, promoting the following principles:

- **Everybody benefits** from adequate sanitation service delivery outcomes.
- Human waste is **safely managed along the whole sanitation service chain**.
- **Comprehensive approaches** to sanitation improvements are deployed, with long-term planning, technical innovation, institutional reforms, and financial mobilization.
- A **diversity of technical solutions**, which are adaptive, mixed, and incremental, is embraced.
- Effective **resource recovery and reuse** is considered.
- Cities demonstrate **political will** and technical and managerial **leadership**, and they identify **new and creative ways of funding** sanitation.
- **Both on-site sanitation and sewerage solutions**, in either **centralized or decentralized systems**, are considered to better respond to realities faced in cities.
- **Complementary services (including water supply, drainage, greywater, and solid waste)** are considered.

As part of the implementation of these principles, the WGP is developing a suite of tools and other material

to support Bank teams and their clients when engaging in CWIS. One of the aims of this work is to explore innovative approaches to provide safely managed sanitation services along the whole service chain and to support clients in identifying when such options might make sense. The study “Evaluating the Potential for Container-Based Sanitation” aims to answer some of these questions for container-based sanitation (CBS), an emerging sanitation approach.

The objective of this study is to document and assess existing CBS approaches, with a particular focus on evaluating their safety, reliability, affordability, and financial viability. The report also seeks to identify the circumstances in which CBS approaches are most appropriate and whether they could be considered as part of a portfolio of options for CWIS. The study was motivated by growing interest in the emerging CBS experiences and by the fact that many governments, city authorities, and financing entities are often not familiar with the approach.

The study builds on four case studies (Sanergy, Nairobi, Kenya; Sustainable Organic Integrated Livelihoods [SOIL], Cap-Haitien, Haiti; Clean Team, Kumasi, Ghana; and x-runner, Lima, Peru) to provide insights into these questions. The present document is one of these four case studies. The full suite of documents is available at www.worldbank.org/cbs.

Reference

Bill & Melinda Gates Foundation, Emory University, The University of Leeds, WaterAid, Plan International, and World Bank. 2017. *Citywide Inclusive Sanitation: A Call to Action*.

EXECUTIVE SUMMARY

This case study, along with three others, is a component of a wider study by the World Bank of container-based sanitation (CBS) models. CBS consists of an end-to-end service—that is, one provided along the whole sanitation service chain—that collects excreta hygienically from toilets designed with sealable, removable containers and strives to ensure that the excreta is safely treated, disposed of, and reused.¹ Rather than having to build a sanitation facility, households (or public toilet operators) can sign up for the service. The CBS service provider then installs a toilet with sealable excreta receptacles (also referred to as *cartridges*) and commits to emptying them (that is, removing and replacing with clean ones) on a regular basis.

The objective of this study is to document and assess existing CBS approaches with a particular focus on evaluating their safety, reliability, affordability, and financial viability. The report also seeks to identify the circumstances in which CBS approaches are most appropriate and whether they could be considered as part of a portfolio of options for citywide inclusive sanitation (CWIS).

This study is focused on Clean Team, a social enterprise providing CBS services in Kumasi, the second-largest city in Ghana with a population of 2.7 million in 2018.² Clean Team is owned by Water & Sanitation for the Urban Poor (WSUP), a nonprofit partnership between the private sector, civil society, and academia. It is focused on addressing the increasingly global problem of inadequate access to water and sanitation for the urban poor. Clean Team delivers a single service: rental and regular servicing of in-house portable toilets, which includes transporting feces to a centralized treatment facility but not the processing and reuse of excreta.

Clean Team’s Operating Context in Kumasi

A large proportion of the low-income urban community’s population in Kumasi depends on the more than 400 public latrine blocks found around the city for their sanitation needs, with some toilets (pit latrines and septic tanks) found within compounds and minor incidences of open defecation. A few small-scale decentralized sewerage systems exist in Kumasi, serving approximately 100,000 people. The high dependence on public toilets in Kumasi, and the lack of in-house facilities, is due to a combination of historical factors, tenure arrangements, low income of both landlords and tenants, and lack of enforcement of some existing bylaws. Initiatives have been taken to increase the uptake of in-house toilets; however, these have not yielded effective results due to the aforementioned challenges, high interest rates, lack of trained and motivated artisans, and the high cost of toilets.

In Ghana, Metropolitan, Municipal and District Assemblies (MMDAs) are responsible for sanitation service delivery. In the target city, the Kumasi Metropolitan Assembly (KMA) is responsible for sanitation. The municipality has introduced several sanitation bylaws in support of developing in-house toilets but has made little progress in terms of increasing coverage. The Environmental Sanitation Policy revised in 2009 calls for the majority of environmental sanitation services to be provided by the private sector, which includes public toilet management and construction and maintenance (desludging) of toilet facilities. In January 2017, the government of Ghana (GoG) created a new Ministry of Sanitation and Water Resources.

Overview of Clean Team's Business Model

WSUP, in partnership with IDEO and Unilever, established Clean Team in 2011 as a Ghanaian social enterprise with the aim of developing and testing a niche sanitation business. The service had approximately 1,200 customers in May 2017,³ by which time it operated in four service areas. Clean Team had more than 40 employees divided into three main teams: finance and administration, sales, and operations.

Collectors transport the feces in sealed cartridges 1 to 2 kilometers to the transfer station using *tuk tuks*, then another 10 kilometers to the centralized treatment facility using a tractor-and-trailer system. The containers are emptied, cleaned, and prepared for redeployment with sawdust as cover material.

The feces is disposed of at the municipal waste treatment facility, where it is dried and sent to a landfill. The treatment process is currently not monitored, though Clean Team is planning to prepare and implement a sanitation safety plan.

Although not explicitly disallowed by authorities, CBS is not explicitly encouraged either. In January 2018, the KMA recognized that Clean Team services were compliant with local sanitation bylaws. However, it was unclear which sanitation category CBS services, such as Clean Team, would be classified under the Ghana census. Neighborhoods where Clean Team intervenes share several commonalities: prevalence of shared housing, often with more than eight households sharing a house and the facilities (courtyard, kitchen, and bathroom); few houses with toilet facilities; and a relatively high number of public toilets.

Assessment of Clean Team's Services

Customers find the Clean Team toilet appealing, with no reported similarities to the "traditional" and now banned bucket toilet. Many have criticized the move

from three to two pickups per week, however, which was introduced as a way to cut operating costs. They claim that it had led to the development of maggots and the presence of ants in the sawdust, whereas Clean Team says this is likely due to poor household-level cleaning and toilet management. In January 2017, Clean Team introduced some house visits to ensure proper usage and adopted some internal performance indicators as a tracking measure. At the time of data collection, it was too early to assess whether such measures had been successful. People interested in but unable to use the service are those who typically live outside the Clean Team service area; have insufficient space to install the toilet; have an ultimate decision maker who does not support subscribing to the service; or are unable to afford the monthly fee paid in a single installment, which the introduction of small but regular mobile payments should help overcome.

Clean Team services are affordable compared to other alternatives. Clean Team charges ₵38 per household per month (US\$8.80) for those making mobile payments. By comparison, the monthly cost of using a public toilet for a family of five ranges between ₵45 and ₵60 per month (US\$10.42 and US\$13.89). In addition, the capital cost of investing in a new in-house toilet can range between ₵1,500 and ₵5,000 (US\$350 and US\$1,160), with an annualized desludging cost between ₵30 and ₵175 (US\$7.50 and US\$40.50), depending on the number of users and type of technology.

Clean Team has been working, with support from funders and external advisers, on improving the efficiency of its services and reducing costs. As of May 2017, Clean Team was expecting to recover only 20 percent of its total costs through its customers in fiscal year (FY) 2016–17 (that is, 80 percent subsidy), but it was looking to increase this cost recovery ratio to 60 percent by FY 2017–18 (that is, 40 percent subsidy) through a combination of cost-reduction measures and an increase in service fees. A study prepared by Ernst & Young (EY)

and WSUP identified the following cost drivers for the CBS business: payment collection, collection frequency, densification, customer churn, waste-to-resource, and cost of toilets. The move from door-to-door collections to mobile payments was estimated to potentially improve the gross margin of the business by 26 percent. A reduction in collection frequency from three times to one time per week, as well as the move from “wet” to “dry” toilets, was estimated to improve the gross margin by 34 percent. Clean Team is working toward addressing both of these cost drivers. The EY-WSUP study did not estimate the financial impact of densification; however, Clean Team introduced key performance indicators (KPIs) for this and is targeting neighborhoods within the existing service areas to increase customer density.

External subsidies have been necessary for Clean Team (as is the case for other sanitation service providers).

These subsidies have been provided through public and philanthropic grant funding, with heavy dependence on the latter. Public funding has been through in-kind provision of land and services. Clean Team is seeking further public subsidies through tax relief (value-added tax (VAT) exemption). Grant funding has been mainly provided by foundations and bilateral to cover startup costs, research and development costs, capital expenditure on infrastructure and equipment, and operational losses.

Key Lessons

Despite offering a better quality and more affordable service than most of the available public toilets in the area, the number of customers using the service remains limited. Shared housing arrangements, lack of space, limited affordability for the poorest, and absence of explicit position of institutions toward CBS were identified as key limitations.

In Kumasi and Ghana, the social and legal environment relating to the CBS approach is unclear. From the perspective of national authorities, the CBS technology lies in a gray zone between the banned bucket toilets, “composting toilets,” and “other toilets.” Similar to other cities in Ghana, the local government in Kumasi is encouraging the uptake of the “one house, one toilet” policy, but they have also invested massively in improving public toilets, even in residential areas. Some officials perceive CBS to be a transitional solution that may interfere with in-house toilet support programs. In general, the lack of urgency and pressure to deliver toilets in every household seems to hinder the provision of full support for and strong partnerships with innovative solutions such as CBS.

Going forward, Clean Team could benefit from a clearer policy environment, which would allow them to increase the scale of their operations based on a more cost-efficient business model.

Notes

- 1 In this report, the term *excreta* is used instead of *waste* to avoid any potential confusion with solid waste. Tilley et al. (2014) define excreta as “urine and feces that is not mixed with any flushwater.” Note that for the four CBS case studies and the main report, feces and urine are separated using urine-diverting toilet technologies. Cases where the CBS service provider collects only feces is referred to accordingly as *feces*. Also note that cover material (for example, sawdust or carbon cover) is added to the excreta in all cases.
- 2 Index Mundi data portal. “Ghana Demographics Profile 2018.” Last updated January 20, 2018. http://www.indexmundi.com/ghana/demographics_profile.html.
- 3 This figure had grown to 1,500 by December 2017.

Reference

Tilley, E., L. Ulrich, C. Lüthi, P. Reymond, and C. Zurbrügg. 2014. “Compendium of Sanitation Systems and Technologies.” 2nd rev. ed. Duebendorf, Switzerland: Swiss Federal Institute of Aquatic Science and Technology (Eawag).

ABBREVIATIONS

BMGF	Bill & Melinda Gates Foundation
CBS	container-based sanitation
CBO	community-based organization
CEO	chief executive officer
CRM	customer relationship management
CWIS	citywide inclusive sanitation
CWSA	Community Water and Sanitation Agency
DFID	Department for International Development
EBITDA	earnings before interest, taxes, depreciation, and amortization
EHSD	Environmental Health and Sanitation Directorate
EY	Ernst & Young
FY	fiscal year
GAMA	Greater Accra Metropolitan Area
GoG	government of Ghana
KMA	Kumasi Metropolitan Assembly
KPI	key performance indicator
LIUC	low-income urban community
MLGRD	Ministry of Local Government and Rural Development
MMDAs	Metropolitan, Municipal and District Assemblies
MOSS	mobile operations and services system
NGO	nongovernmental organization
OSS	on-site sanitation
PPP	public–private partnership
PSI	Population Services International
SFD	fecal waste flow diagram
SFF	Stone Family Foundation
SSD	Sanitation Service Delivery
SSP	Sanitation Safety Plan
sq. km	square kilometer
TP	treatment plant
USAID	United States Agency for International Development
US\$	United States dollar
VAT	value-added tax
VIP	ventilated improved pit
WASH	water, sanitation, and hygiene

WEDC	Water, Engineering and Development Centre
WHO	World Health Organization
WMD	Waste Management Department
WSUP	Water & Sanitation for the Urban Poor

Exchange rate: US\$1 = C4.32, as of June 10, 2017.

INTRODUCTION

Background

This case study, along with three others, is a component of a wider study by the World Bank of container-based sanitation (CBS) models. CBS models have emerged over the past 10 years as an alternative to network-based sanitation or on-site sanitation (OSS) services. Clean Team launched a CBS model in 2011 in Kumasi, Ghana, where Water & Sanitation for the Urban Poor (WSUP) was already supporting various water and sanitation interventions.

CBS consists of an end-to-end service—that is, one provided along the whole sanitation service chain—that collects excreta hygienically from toilets designed with sealable, removable containers and strives to ensure that the excreta is safely treated, disposed of, and reused.¹ Rather than having to build a sanitation facility, households (or public toilet operators) can sign up for the service. The CBS service provider then installs a toilet with sealable excreta receptacles (also referred to as *cartridges*) and commits to emptying them (that is, removing and replacing with clean ones) on a regular basis. Transport methods can vary—in Ghana, they include *tuk tuks*, tractors, and trailers—and adapt to a variety of space and logistical constraints. Some CBS entrepreneurs build and operate resource recovery facilities to produce byproducts; Clean Team focuses on collection of feces and transports it to the municipal treatment site.

Study Objectives

The objectives of the overall study are to document and assess existing CBS solutions with a particular focus on evaluating their safety, reliability, affordability, and financial viability. The study also seeks to identify

the circumstances in which CBS solutions are most appropriate. The ultimate objective is to identify whether these solutions could be considered as part of a mix of options for citywide inclusive sanitation (CWIS).

The objective of this case study is to better understand how the Clean Team CBS business model fits within the overall context of Kumasi and Ghana, from the point of view of customers and of the authorities in charge of delivering reliable and inclusive citywide sanitation services. Clean Team acts as a research-and-development nonprofit organization that intends to develop sustainable business models to increase access to safely managed sanitation in vulnerable urban communities.

Study Methodology

The field work for this case study was carried out in early 2017 based on interviews with key Clean Team staff, covering the range of activities and functions of the organization, and local stakeholders, as well as focus group discussions. Relevant data and documents were collected and analyzed until May 2017, though major developments and updates through May 2018 are reflected.

The case study was based on the analysis of primary and secondary data. This includes papers written by Clean Team and WSUP, Clean Team activity reports, policy documents, statistical data from a range of organizations, and nonpublished material from consultants and nongovernmental organizations (NGOs). To further corroborate this information, a field visit to Kumasi was organized during the last two weeks of May 2017. Questionnaires common to all four case studies were used to interview ministry representatives, local authorities, the World Bank in Ghana, Clean

Team staff, WSUP staff, other sanitation providers, local traditional leaders, and independent consultants. Appendix A provides details on the interviewees. Interviews were also organized with customers from Asawase and Tafo and noncustomers from Oforikrom and Asawase.

The fieldwork contributed to providing an overview of the urban sanitation conditions in the case study locations, highlighting how access to sanitation is currently provided, by whom, and at which service level.

Report Structure

Chapter 1 describes the CBS operation's service area and the basic geographic, economic, and demographic characteristics of Kumasi and its low-income areas. Chapter 2 provides an overview of the CBS operation,

with a technical description of the different components of the operation as well as the management strategies, systems, and processes behind them. The impact of the policy and regulatory environment is briefly examined. Chapter 3 assesses the performance of the service from the customers' points of view and reviews customer growth. Chapter 4 presents a financial analysis of the operation and briefly discusses the main cost drivers. Chapter 5 summarizes key lessons.

Note

1 In this report, the term *excreta* is used instead of *waste* to avoid any potential confusion with solid waste. Tilley et al. (2014) define excreta as "urine and feces that is not mixed with any flushwater." Note that for the four CBS case studies prepared for this report, the feces and urine are separated using urine-diverting toilet technologies. In cases where only feces are collected by the CBS service provider, this is referred to accordingly as feces. Also note that cover material (for example, sawdust or carbon cover) is added to the excreta in all cases.

CHAPTER 1 • CBS SERVICE AREA CONTEXT

Implementation of Clean Team in Kumasi

Water & Sanitation for the Urban Poor (WSUP), in partnership with IDEO and Unilever, established Clean Team as a social enterprise registered in Ghana with the intention of occupying a sanitation niche, filling a market gap, and developing, then testing, a new sanitation business. This nonprofit partnership between the private sector, civil society, and academia is focused on addressing the increasingly global problem of inadequate access to water and sanitation for the urban poor and thus contributing to the attainment of the Millennium Development Goals, particularly those relating to water and sanitation. WSUP empowers service providers to demonstrate effective models in order to mobilize investments for further improvements.

Clean Team delivers a single service of rental and regular servicing of in-house portable toilets in several low-income urban community (LIUC) neighborhoods in Kumasi (approximately one-fifth of the total area). More than 40 employees, including a chief executive officer (CEO), finance and administrative team, sales team, and operations team are all based in Kumasi.

During an expansion phase from 2012 to 2015, services used mainly urine-diverting toilets with a liquid chemical to suppress odor. In 2015, to reduce operating costs, there was a move to “dry” toilets with a sawdust cover material to control odor. As part of its growth process, Clean Team has received several rounds of grant funding from the Department for International Development (DFID), Bill & Melinda Gates Foundation (BMGF), and Stone Family Foundation (SFF).

Urban Context of Kumasi

According to the 2010 census data, Kumasi is Ghana’s second-largest city with a population of 2 million people. However, 2018 projections suggest a current population of 2.7 million.¹ Kumasi has an annual population growth rate of around 5.5 percent. Migration, both internal and external, is a factor contributing to this high rate (Water, Engineering and Development Centre [WEDC] 2015a).

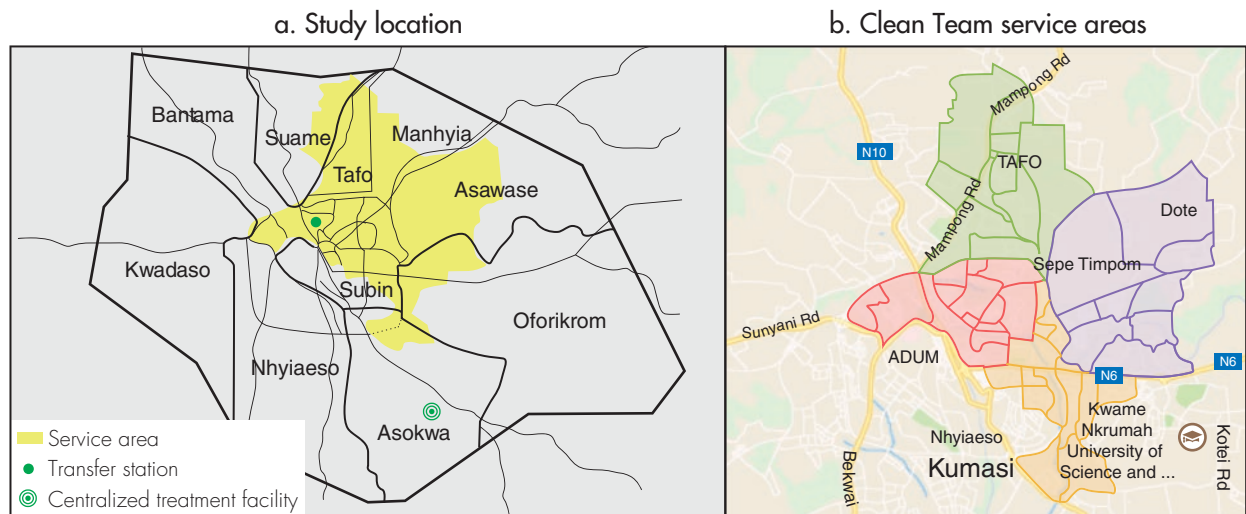
The service area of the container-based sanitation (CBS) business under consideration by Clean Team is highlighted in map 1.1.

Given its central geographical position in the country, Kumasi acts as a commercial hub, both within Ghana and for bordering countries. Local large-scale economic activities include timber trade and mining.

The main types of settlements in Kumasi are (UN-Habitat 2011):

- **Indigenous sectors**, which are old villages that have been incorporated into the city. These sectors accommodate low-income households and are characterized by high-density compound houses, many of which are built with mud.²
- **Tenement sectors**, which are also high-density areas, accommodating low- to middle-income households and are characterized by multistory compound houses.
- **Government-built estate sectors** comprising low-cost housing estates. These areas are well-serviced and occupied by middle-income households.
- **High-cost sectors**, which are low-density areas characterized by large compound houses, each accommodating only one household.

Map 1.1 • Map of Kumasi, Showing Study Location and the Four Service Areas Designated by Clean Team



Sources: Adapted from UD Studio III 2012; BBC World Service 2008; and Clean Team.

Poverty levels in Kumasi are relatively high at 5.3 percent, compared to Accra at 2.6 percent (Ghana Statistical Service [GSS] 2015).³ Many neighborhoods have mixed socioeconomic status, and it is estimated that between 60 and 75 percent of the Kumasi population lives in LIUCs, which are essentially the indigenous and tenement sectors (Amoako and Korboe 2011).⁴ These LIUCs are congested, with population densities ranging from 100 to 270 persons per hectare (Awortwi 2006).

As observed elsewhere in West Africa, a combination of events related to climate change, such as increased intensity and frequency of rainfall, and “local urban changes,” consisting of alterations of the urban landscape and water bodies, has led to increased incidences of flooding and flood-related damage in Ghana’s major cities (Douglas et al. 2008), including Kumasi (Oppong 2011).

Water and Sanitation Service in Kumasi

Kumasi is served by a dense water supply network managed by Ghana Water Company Limited.

The water transmission mains were upgraded and extended in 2010 under a World Bank/government of Ghana (GoG) urban water project (World Bank 2017). In LIUCs, some households use water kiosks, but based on observations and informal discussions, it seems a large part of the population shares a water tap within the compound.⁵

Sanitation access for LIUCs in Kumasi is characterized by dependence on public toilets: About 700,000 people use at least one of Kumasi’s 419 public latrine blocks every day (40 percent of the city’s population) (WSUP 2016). The remaining households depend on “compound toilets,” with minor incidences of open defecation. A certain number of in-house or compound toilets are shared by both tenants and landlords. Septic tanks provide containment and partial treatment for the majority of in-house toilets. Access levels are summarized in table 1.1.

According to 2010 census data, approximately 100,000 people are connected to decentralized sewerage systems in Kumasi. The two largest systems serve universities, which are reported to reach 50,000 and 25,000 people,

Table 1.1 • Frequency of Different Sanitation Types for Kumasi

	Sewerage Systems	Septic Tank	Ventilated Improved Pit (VIP) Latrine	Pit Latrine	Public Toilet	No Facilities
Percent	4	36	7	11	39	3

Source: (WEDCa 2015) based on 2010 Population and Housing Census, Government of Ghana.

Note: The main uncertainty in the data is the reliance on census data for technology types used to generate the SFD. This is because the city is rapidly developing and the census data was from 2010 (GSS 2012).

respectively (WEDCa 2015). The remaining five systems serve fewer than 12,000 people each, and only three of them have a functioning decentralized treatment plant.

During the 2010s, several public and private sector sanitation initiatives have been implemented in Kumasi, including the rehabilitation of a large number of public toilets and a modification of their management models, as well as the construction of a septage treatment plant in 2004 (World Bank 2004) in Dompoase, which is now in need of rehabilitation.

Private sector investment and innovation in sanitation is growing in Ghana, including Kumasi. This includes, for instance, Clean Team, as well as distribution networks of Accra-based businesses such as Biofilcom toilets and DURAPLAST® septic tanks. These services and technologies remain limited in terms of direct uptake by customers; they account for fewer than 1 percent of the sanitation coverage in Kumasi and, therefore, do not appear in the latest statistics or fecal waste flow diagrams (SFDs).

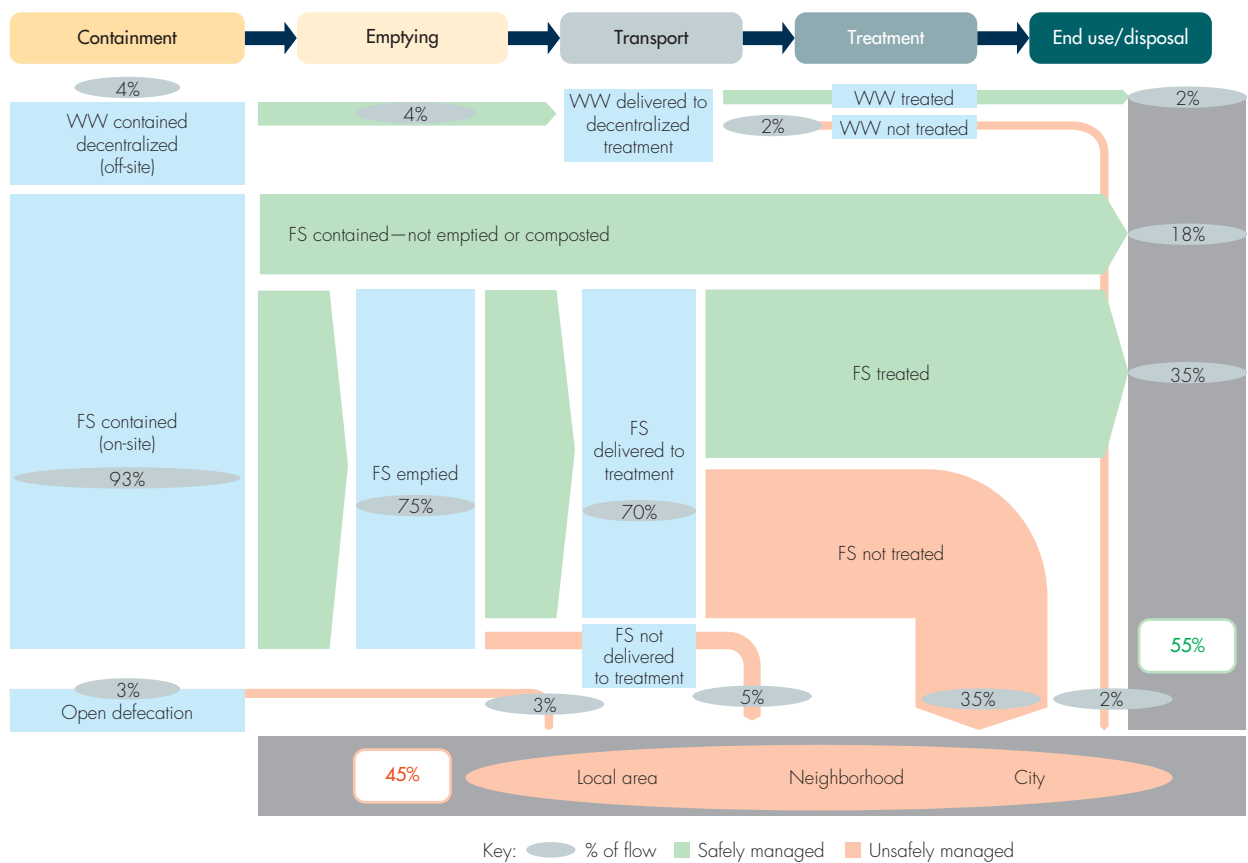
The SFD seen in figure 1.1 provides a representation of the flow of excreta along the service chain in Kumasi. Although the containment section is based on 2010 census data, other estimates are based on interviews and field observations conducted in 2015 by the WEDC as part of the SFD Promotion Initiative. According to the SFD study, 45 percent of fecal waste produced by households in Kumasi is not safely managed.

The statistics on types of sanitation facilities, as seen in table 1.2, are based on 2008 census data. Since then, the population is likely to have increased overall in the city and at a much higher rate in LIUCs. The condition and geographic location of settlements in Kumasi influence the type of sanitation adopted (Maoulidi 2010).

Dependence upon public toilets and lack of in-house toilets is pronounced in LIUCs. A combination of historical events and social and policy initiatives explain the difficulties of increasing coverage of in-house toilets in these areas. Some of these issues are summarized below:

- Poor management, followed by the banning of bucket toilets (pan latrines) (Addai 2009) has reduced a large number of in-house (yet unsafe) toilets during the past 20 years. Most of these toilets have not been replaced. Clean Team's toilets are different in their design in that they are urine-diverting and safe to use, they contain excreta effectively, and they are associated with a professional, regular, and safe emptying service.
- Although the number of tenants per compound has increased (Mazeau et al. 2014), landlords find it increasingly difficult to maintain in-house shared toilet facilities (due to conflict between multiple families/users) and expensive (due to high cost of irregular desludging).
- Some rooms initially dedicated to bucket toilets have now been converted into shower rooms or rooms for rent (Water and Sanitation Program (WSP) 2011).

Figure 1.1 • Fecal Waste Flow Diagram for Kumasi



Source: WEDCa 2015. WW = wastewater; FS = fecal sludge.
 Note: Kumasi, field-based assessment 10/27/2015.

Table 1.2 • Typology of Housing and Sanitation in Kumasi

House/settlement	Population (estimation in 2000)	Main sanitation facilities
Indigenous housing	55 percent	60 percent public latrines 25 traditional pit latrines
Tenement housing	22 percent	45 percent septic tanks 40 percent public latrines
Low-density housing	15 percent	100 percent septic tanks
High-cost housing	10 percent	100 percent septic tanks
New government housing	8 percent	100 percent septic tanks

Source: Adapted from Salifu 2008.

- Although toilets are a legal requirement in homes (according to the House Owner and Occupier Bylaw 7 (1, 2013)—see Policy and Regulatory Environment for Sanitation Services, Local Level.), the prevalence of public toilets further discourages landlords to invest in providing toilets to their tenants (Caplan 2010).
- Strict rent control in LIUCs has prevented landlords from increasing rent for many years, resulting in poor incentives for further investment into compounds.
- The economic status of both landlords and tenants limits their capacities to find desirable, affordable, and appropriate sanitation technologies (UN-Habitat 2011).

In 2014, the Kumasi Metropolitan Assembly (KMA), supported by WSUP, launched an initiative to increase the uptake of in-house toilets through a combination of artisan training, marketing campaigns, enforcement strategies, and easier access to financing. The project targeted more than 5,000 households within four years, but by April 2017, fewer than 100 landlords had built in-house toilets. Along with the challenges previously stated, and according to the different stakeholders, the main reasons for the slow progress are failure to train and motivate artisans, inappropriate enforcement strategies, high interest rates from local banks, the high cost of toilets, and low priority with competing demands on household income. Though the initiative identified the right measures, implementation has not yet realized the 2014 vision.

In Accra, the World Bank-financed Greater Accra Metropolitan Area (GAMA) Sanitation and Water Project has, since 2014, been seeking similar objectives of toilets in every home and is facing similar challenges, despite a 50 percent subsidy being offered under the component supported by the Global Partnership on Output-Based Aid.

Policy and Regulatory Environment for Sanitation Services

Despite the efforts from the government (both national and local), private companies, and CBS service providers themselves, initiatives to increase the number of in-house toilets and strengthen existing services continue to face challenges.

Urban Sanitation Policy

Ghana's current National Environmental Sanitation Policy was developed by the Ministry of Local Government and Rural Development (MLGRD) and was last updated in 2009. The policy sought to have 90 percent of the population with their own in-house toilets by 2015, with the remaining 10 percent using hygienic public toilets. These targets have not been met. Sanitation provision in Ghana has suffered from a high dependence on shared toilets, as well as a lack of comprehensive planning and funding allocations.

Night soil and sewage (liquid waste) collection and disposal is listed among the basic programs and services that district assemblies are required to provide (directly or by enabling service providers). The policy recommends cistern and pour-flush toilets, VIP toilets, aqua-privies, chemical toilets, and “other proven technologies recommended by MLGRD” while also emphasizing that they should be appropriate and affordable. Furthermore, the policy reemphasizes the nationwide ban on “bucket latrines” and encourages district assemblies to phase them out by passing and enforcing relevant bylaws.

According to the policy, waste recycling should be used when there is either a financial or environmental benefit. This policy establishes six guiding principles: increasing value for money, transferring risks to the private sector, ensuring end users' ability to pay, promoting local operators and technologies, safeguarding the public, and conforming to national laws (WaterAid 2016).

Institutional Arrangements for Sanitation

In January 2017, the GoG created a new Ministry of Sanitation and Water Resources, following a long period of campaigning by donors and nongovernmental organizations (NGOs). Previously, MLGRD was the lead agency responsible for sanitation policy development, with its Environmental Health and Sanitation Directorate (EHSD) coordinating the activities of the various institutions involved in the sector.

Metropolitan, Municipal and District Assemblies (MMDAs) are responsible for delivering sanitation services in small towns and rural areas, and they perform regulatory functions, including the approval of tariffs. The Community Water and Sanitation Agency (CWSA) of the Ministry of Works and Housing is also involved in rural and small-town sanitation provision (WEDC 2015b). The national sanitation and hygiene policy mentions the role of the Ministry of Health in regulation and standard setting without giving details.

In May 2018, responsibilities of the Ministry of Sanitation and Water Resources were in the process of being firmed up. The Ministry intended to review the National Environmental Sanitation Policy and introduce a sanitation authority at national and local levels to facilitate coordination and implementation of sanitation activities at district and municipal levels (Mubarik 2017; field interviews). The implementation of sanitation strategies and activities would likely remain in the hands of municipal and district assemblies, and the funding for sanitation activities was still under discussion.

To date, the main source of domestic finance for water and sanitation facilities is the District Assemblies' Common Fund, which is shared between MMDAs. Government investment in sanitation has been minimal. International donors have largely taken on the burden of capital investment, whereas the private sector has been increasingly filling the gap in the operation of public toilets and treatment of liquid waste (that is, septage). Monitoring is poor and lacks a set of agreed-upon national indicators.

Private Sector Participation

The National Environmental Sanitation Policy (revised in 2009) calls for the majority of environmental sanitation services to be provided by the private sector, including the management and maintenance of all public toilets and all desludging of septic tanks and VIP toilets, unless insufficient capacity or interest is manifest. The policy includes NGOs and community-based organizations (CBOs) in the definition of the private sector, reserves a minimum of 20 percent of service provision for the public sector, and forbids monopoly by a single private-sector actor in towns with populations of more than 15,000 (which are to be zoned for sanitation services provision) in order to maintain pressure for good standard services.

A full-cost recovery principle for sanitation has been adopted. Public toilet management is listed among the services to be provided by the private sector, as is the management of septage tankers. The private toilet servicing model of CBS is not included in the policy as it did not exist at the time of its drafting.

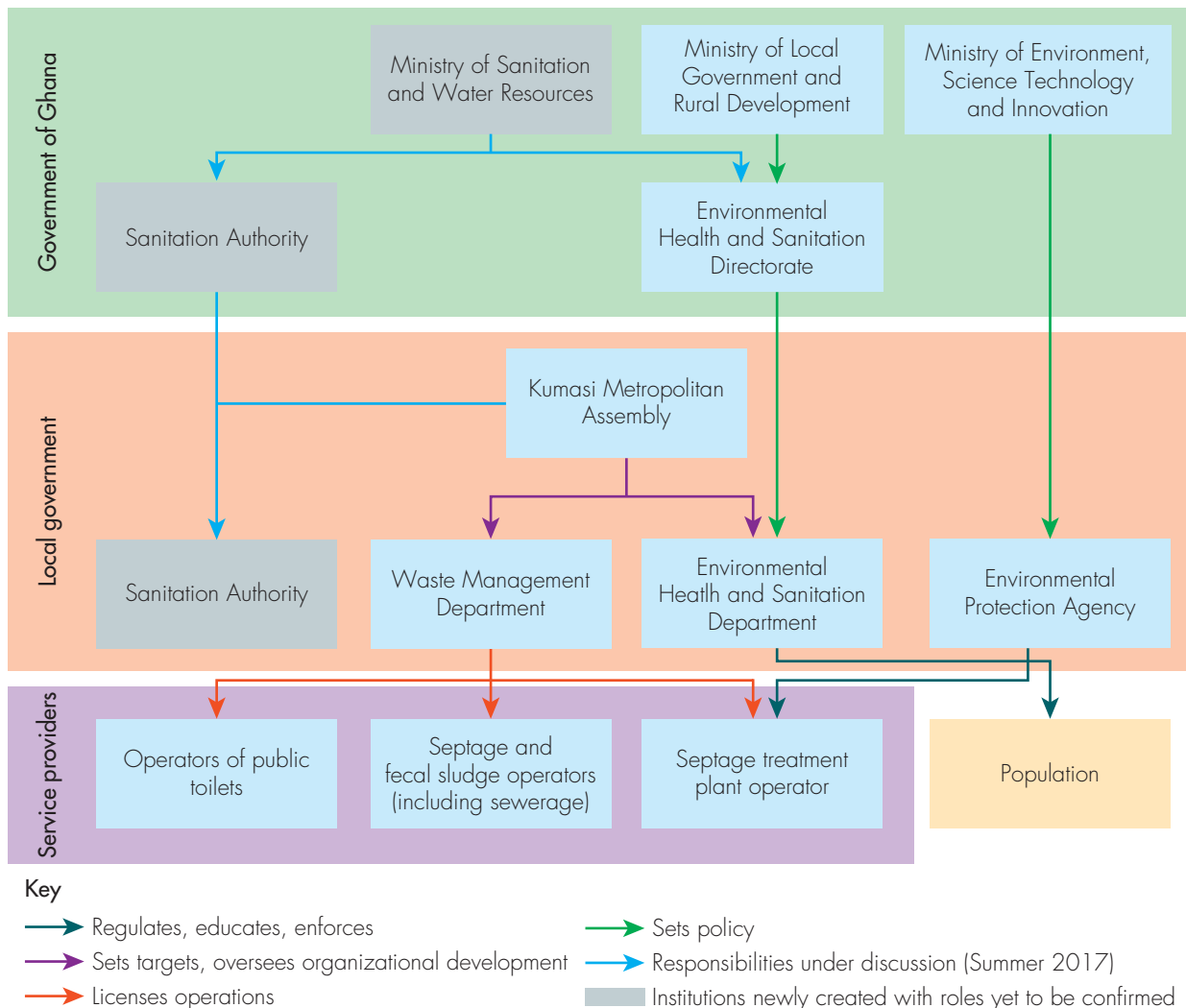
Local Level

During the 2010s, Kumasi's sanitation landscape has witnessed several major improvements: enhanced quality of services by public toilet operators, the near eradication of open defecation, and a number of new sanitation initiatives tested in the city (for example, Clean Team, Biofilcom, DURAPLAST, and Waste Enterprises) (WaterAid 2016; WEDC 2015a). The summary of key roles and responsibilities for sanitation in Kumasi is provided in figure 1.2.

According to the representatives interviewed, the main strategy for human excreta management in the municipality is to guarantee the proper management of public toilets and increase the uptake of in-house toilets.

The KMA, through its Waste Management Department (WMD), oversees the quality of public toilet facilities

Figure 1.2 • Key Institutional Relationships for Sanitation Services in Kumasi and Ghana



and encourages private-sector participation in the construction, rehabilitation, and/or management of them, as well as overseeing the delivery of fecal sludge management services.

Using the national sanitation policy, the municipality has introduced sanitation bylaws to support the development of in-house toilets (WEDCb 2015):

- Sanitation Bylaw 5 provides that fecal disposal at the compound level is required and refers to the banning of bucket toilets/latrines.

- Nuisance Bylaw 4 makes it an offense if sanitation facilities cause a nuisance through bad maintenance and accumulated excreta.
- House Owner and Occupier Bylaw 7 (1, 2013) makes it an offense to construct a house without a toilet or latrine. It also prohibits households from emptying sanitation systems in an inappropriate way and disposing their contents into drains.

Except for the banning of the bucket latrine, which has largely been phased out, many of the bylaws put in place have not been effectively enforced by the KMA.

This is not an uncommon challenge and is seen across different municipalities and district assemblies in Ghana, including Accra. Nevertheless, the KMA has been reported to be preparing new sanitation bylaws for existing houses since 2015.

The only known household sanitation project the KMA is currently undertaking is the compound sanitation strategy referred to as Sanitation Service Delivery (SSD). It is supported by WSUP as part of a United States Agency for International Development (USAID)-funded project, implemented in partnership with Population Services International (PSI) and PATH, and also funded by BMGF.

In addition, the KMA and WSUP have other partnerships to strengthen the following: public toilet services, fecal sludge management at the centralized treatment facilities, public financing for sanitation (through collected revenue), and the capacity and quality of vacuum tanker operators' services.

The challenges in the current policy and institutional environment are mainly due to a lack of clear performance indicators, targets, and responsibilities to enforce current bylaws. There are no clear incentives for sanitation authorities to change the status quo. However, there is an opportunity within the sector to potentially move forward with the formation of the new Ministry of Sanitation and Water Resources.

Legal and Policy Environment and Impact on CBS Services

After several legal attempts, bucket toilets have been banned nationally for their clear environmental and health risks (both for users and collectors) due to their poor design and poor servicing. It is unclear which sanitation category CBS services, such as the one offered by Clean Team, would be classified under during a Ghana census. If CBS is not introduced as a separate category, and depending on the directives or training provided to

enumerators, CBS toilets may be classified as “bucket” or “other” toilets. A “composting toilets” category exists in the DHS Ghana survey but not in the census (GSS 2012).

As of May 2017, CBS was neither recognized nor rejected by the Ministry of Sanitation and Water Resources. At the moment, the Clean Team CBS service addresses at least two of the main objectives stipulated in the sanitation policy by EHSD: stopping open defecation and encouraging in-house toilets through sustainable solutions.

The KMA has been supporting Clean Team through the allocation of land (transfer and disposal sites), issuing an authorization to operate, and providing an in-kind subsidy for the cost of treatment. In January 2018, the KMA recognized that Clean Team services were compliant with local sanitation bylaws.

Notes

- 1 Index Mundi data portal. “Ghana Demographics Profile 2018.” Last updated January 20, 2018. http://www.indexmundi.com/ghana/demographics_profile.html.
- 2 Compound housing is a multifamily housing arrangement where households often rent one or two rooms out of a 10- to 30-room house (one or two stories). Such housing arrangements have led to the shared management of specific areas of the compound house, such as the courtyard or bathroom. Arrangements to maintain and clean these semiprivate areas are often discussed among the women of each household occupying the compound. Cleaning is, for instance, often done on a daily or weekly basis with each household taking a turn.
- 3 Poverty line is ₵1,314 (US\$304) per person per year.
- 4 These are located in Manhyia, Asawase, Old Tafo, Oforikrom, and Asokwa submetros.
- 5 Similar to electricity bills, water bills are shared among house occupiers according to rules established within each house between landlord and tenants (often based on the number of household members).

References

- Addai, E. 2009. “Discourage the Use of Public Toilets.” (blog). <http://www.ghanaweb.com/GhanaHomePage/blogs/blog.article.php?blog=1856&ID=100002859>.
- Amoako, C., and D. Korboe. 2011. “Historical Development, Population Growth, and Present Structure in Kumasi.” In *Future of the Tree: Towards Growth and Development of Kumasi*, edited by Kwasi Kwafu Adarkwa. pp. 35-55. Ghana: University Printing Press, KNUST.

- Awortwi, N. 2006. "Technology and Institutional Arrangements in the Delivery of Public Sanitation and Solid Waste Services in Ghanaian Cities." *International Journal of Technology Management and Sustainable Development* 5, no. 3: 221–39.
- Caplan, K. 2010. "Quick Stakeholder/Context Analysis of Public Toilets in Kumasi, Ghana: Initial recommendations for WSUP" Unpublished Report, Building Partnership for Development in Water & Sanitation (BPD): London, UK.
- Douglas, I., K. Alam, M. Maghenda, Y. McDonnell, L. McLean, and J. Campbell. 2008. "Unjust Waters: Climate Change, Flooding, and the Urban Poor in Africa." *Environment and Urbanization* 20, no. 1: 187–205.
- GSS (Ghana Statistical Service). 2012. *2010 Population & Housing Census, Summary Report of Final Results*. Accra, Ghana: Ghana Statistical Service.
- . 2015. *Ghana Poverty Mapping Report*. Accra, Ghana: Ghana Statistical Service.
- Maoulidi, M. 2010. "A Water and Sanitation Needs Assessment for Kumasi, Ghana." MCI Social Sector Working Paper Series No. 16.
- Mazeau, A. P., N. Wellington, S. Drabble, F. Asante, and D. Awantugo. 2014. "Bringing Toilets Back to Kumasi's Compound Houses: Landlord and Tenant Behaviors and Motivators." 37th WEDC International Conference, Hanoi, Vietnam.
- Mubarik, A. 2017. "Making Ghana Clean: Minister Mulls Setting up a National Sanitation Authority." *Pulse GH*. May 13. <http://www.pulse.com.gh/news/making-ghana-clean-minister-mulls-setting-up-a-national-sanitation-authority-id6671750.html>.
- Oppong, B. K. 2011. "Environmental Hazards in Ghanaian Cities: The Incidence of Annual Floods along the Aboabo River in the Kumasi Metropolitan Area (KMA) of the Ashanti Region of Ghana." Kwame Nkrumah University of Science and Technology Dissertation Data Base: 95.
- Salifu, L. 2008. "Clean Towns: Progress and Prospects of Strategic Sanitation Planning in Ghana." Vers. presentation from the 2008 World Water Week in Stockholm.
- "Southern Journey: Kumasi, Ashanti." 2008. *BBC World Service*. http://www.bbc.co.uk/worldservice/africa/2008/11/081126_ghana08_kumasi.shtml.
- UD Studio III. 2012. "2012 – Comparative Informalities: Akorem-Adukrom-Sawaba, Kumasi, Ghana." <http://msaudcolumbia.org/spring/2012/2012/05/asawasi>. Last updated May 22, 2012.
- UN-Habitat. 2011. "Ghana, Housing Profile." Nairobi, Kenya: United Nations Human Settlements Programme.
- WaterAid. 2016. "A Tale of Clean Cities: Insights for Planning Urban Sanitation from Kumasi, Ghana." Kumasi case study report, prepared for WaterAid by Partnerships in Practice for WaterAid.
- WEDC (Water, Engineering and Development Centre). 2015a. "SFD Promotion Initiative, Kumasi-Ghana." Final report, produced by Claire Furlong and Water, Engineering and Developing Centre.
- . 2015b. "National Sanitation Policy in Ghana. A Case for Improved Co-ordination?" Water, Engineering and Development Centre. [http://wedc.lboro.ac.uk/docs/research/WEJEH/Briefing_Note_Ghana_-_National_sanitation_policy_in_Ghana_\(pdf\).pdf](http://wedc.lboro.ac.uk/docs/research/WEJEH/Briefing_Note_Ghana_-_National_sanitation_policy_in_Ghana_(pdf).pdf).
- World Bank. 2004. "Implementation Completion Report: Urban Environmental Sanitation Project." <http://documents.worldbank.org/curated/en/911901468771357088/pdf/29368.pdf>.
- . 2017. "Implementation Completion and Results Report: Urban Water Project." <http://documents.worldbank.org/curated/en/754801484077117837/pdf/ICR00003112-12212016.pdf>.
- WSP (Water and Sanitation Program). 2011. "Water Supply and Sanitation in Ghana: Turning Finance into Services for 2015 and Beyond." An ANCOW Country Status Overview. <http://documents.worldbank.org/curated/en/438411468281086437/pdf/7241000REPLACE0x00PUBLIC00CSO0Ghana.pdf>.
- WSUP (Water & Sanitation for the Urban Poor). 2016. "Improving the Quality of Public Toilets in Kumasi." Practical Note 27.

CHAPTER 2 • OVERVIEW OF EXISTING CBS SERVICE PROVISION

Background: Brief History of the CBS Provider

Water & Sanitation for the Urban Poor (WSUP), in partnership with IDEO and Unilever, established Clean Team as a social enterprise registered in Ghana with the intention of occupying a sanitation niche, filling a market gap, and developing a new sanitation business.

In 2011, the project was at the proof-of-concept stage, using a log-cabin toilet from Sweden. About 60 households signed up for the service. After six years, Clean Team started using urine-diverting, container-based toilets with dry cover material and was attending to more than 1,200 customers.

There are four designated service areas, including Ashtown, Oforikrom, Sawaba, and Tafo (as seen in figure 1.1), and anyone within this area can sign up to be a Clean Team customer. The exact size of the service area is not known, but it is estimated to be approximately 44 square kilometers (sq. km) (total Kumasi area is 254 sq. km) with a population of 450,000.

Clean Team delivers a single service of rental and regular servicing of in-house portable toilets, but this does not include the processing and reuse of the excreta. Twice a week, collectors take the feces and transport it via small motorized transport (tuk tuk) to a transfer facility 1 to 2 kilometers away. Then it is moved to a centralized processing facility at the outskirts of Kumasi more than 10 kilometers away, where the containers are emptied, cleaned, and prepared with the cover material to be redeployed to customers. The feces is disposed of at the municipal waste treatment facility, where it is dried and sent to a landfill. Urine is not collected (as Clean Team has not yet found a reuse for urine that will financially justify its collection), and it is usually disposed of in open drains.

To ensure customer satisfaction, the sales team is led by a sales manager with five account managers and seven sales agents. The account managers are responsible for collecting fees and supporting customers in the service area. A mobile money payment system connected to a mobile operations and services system (MOSS) was introduced in May 2017 to replace door-to-door payment collection and reduce missed pickups by collectors. Clean Team is focusing on investing in these systems, reducing the frequency of pickups, and densifying customers to improve profitability.

Overview of Services Provided

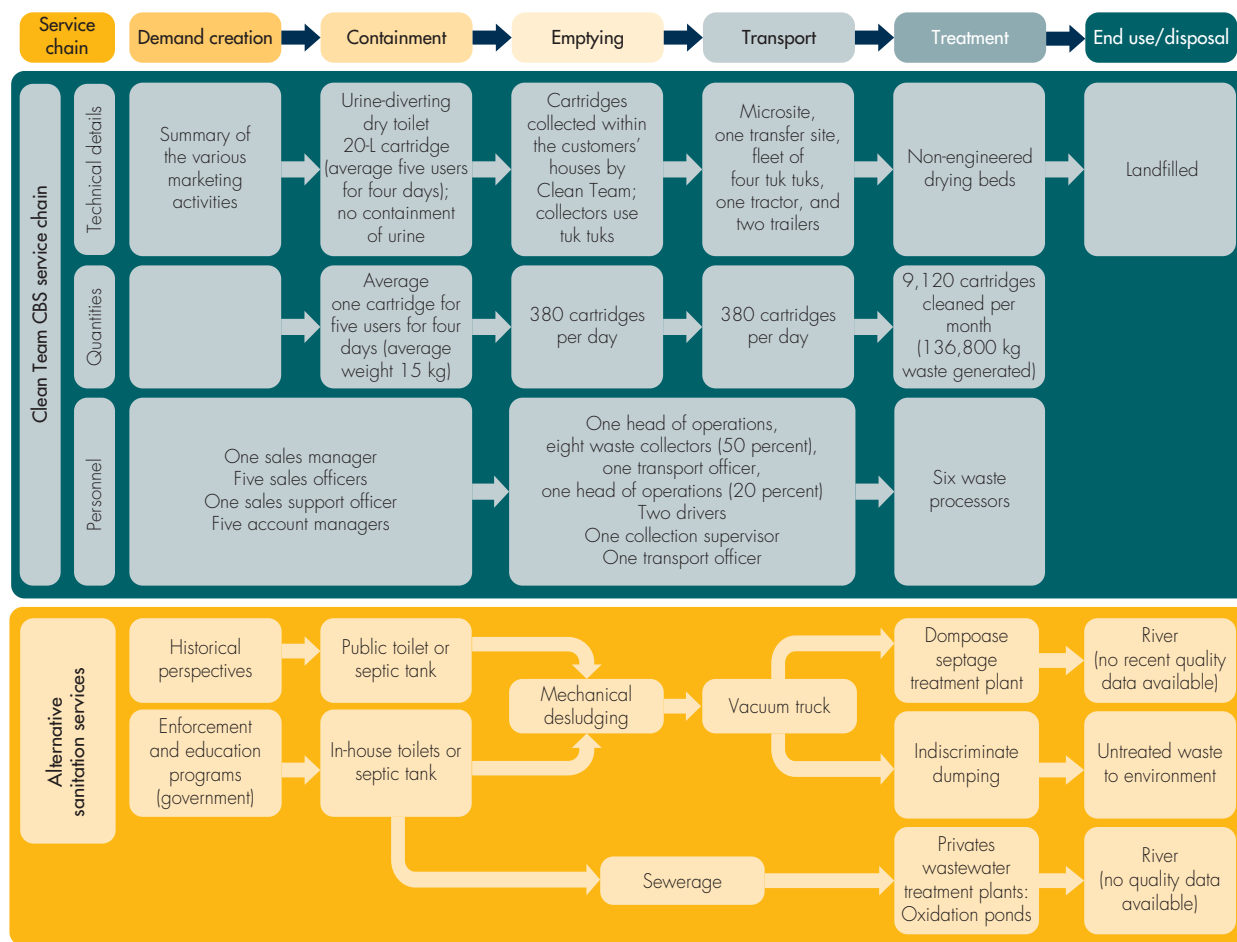
This section presents main activities and challenges encountered along the sanitation service chain. Figure 2.1 summarizes key elements with a focus on container-based sanitation (CBS) operations.

Demand Creation

Sales activities and promotions are delivered by a team of five sales agents and one supervisor. Three key approaches are used:

- **Door-to-door sales:** Sales agents are assigned geographical sectors they are most familiar with, and they visit around 30 compound houses per day and as many of the households within them as possible. Clean Team is actively seeking to develop a denser customer base and is, therefore, focusing sales efforts within its existing service areas.
- **Sales events:** Since March 2017, the sales team has organized sales events outside mosques on Fridays. Religious leaders are informed of the visits and may

Figure 2.1 • Sanitation Service Chain for Sanitation Options in Kumasi (as of May 2017)



inform worshippers at the end of prayers. Each of the identified mosques is visited several times within a period of a few months. This reflects the fact that the vast majority of Clean Team customers are Muslim.

- **Community events:** Once a month, a community event showcasing the service is organized within a targeted neighborhood for several hours with the participation of the entire sales team.¹

According to a Clean Team sales manager, the dynamic of local power may vary in each community, which is why support from influential community leaders, whether political, traditional, or religious, is crucial. Even so, the decision to subscribe to the service is often made by the husband, spouse, mother, or, more commonly, landlord. Thus, there

is also the need to following up several times with customers to reach those with decision-making power.

Sales efforts are supported by brochures and flyers with a focus on two main messages: The first emphasizes the challenges of day-to-day defecation, including waiting times and lack of cleanliness of public toilets, as well as the unhygienic and unpleasant use of plastic bags for defecation. The second highlights the potential economic gain of using a Clean Team toilet compared to a public toilet, which is what a majority of potential customers are using.

Sales incentives are available for both Clean Team sales agents and customers themselves. The former receive a

commission for each toilet sold, and the latter receive a referral bonus (in the form of credit on their mobile money account) of C5 (US\$1.15).

Containment

The toilet used by Clean Team was designed specifically for the business. It is a urine diversion toilet, currently manufactured in China solely for Clean Team. With shipping, importation, and customs fees, the toilet costs US\$92 when it lands in Kumasi. As mentioned, though the toilet was initially chemical-based (that is, a liquid odor suppressant), 99 percent of customers now use dry toilets with sawdust. Clean Team is experimenting with additives to further suppress odors and allow for less frequent collections.

The service areas are divided among five account managers, who are responsible for collecting payments and for increasing subscriptions to the mobile payment service (since it was introduced in April 2017) and training customers how to use it. MOSS integrates mobile payments with customer relationship management (CRM) and geolocalized customer data. To encourage uptake of the new payment system, customers who subscribe pay a monthly fee of C38 (US\$8.80), compared to C43 (US\$9.95) for those making payments to account managers directly. Customers paying through mobile can pay in as many installments as they wish, as long as payment for a particular month is made in advance.

Account managers are also responsible for ensuring the quality of the service, so they direct any challenges or complaints they receive (directly or by phone) to the operations team to address. And together with sales agents, they are responsible for locating new customers (recording their location by GPS), preparing contracts with new customers, and supervising the installation of toilets. The team is also involved with uninstalling toilets as a result of delays in payment (beyond 30 days) or at a customer's request (for example, customer is moving to a nonserviced area).

Emptying/Collection

In each of the four service areas, a pair of collectors drives through communities using a motorized tuk tuk and walks to customers' households to access the toilet, seal and remove the full cartridge, and replace it with a clean one containing new organic cover material (sawdust).

With the objective of increasing gross margins (see Clean Team Customer Growth), and following recommendations of the Ernst & Young (EY)–WSUP report, Clean Team reduced the number of weekly collections in early 2017 from three to two times per week, with the objective of moving to once per week by the end of 2017.

Following the introduction of mobile money (April 2017), a MOSS was custom-developed for Clean Team to ensure real-time updates of customers' payments, as well as feces collection operations. Collectors use handheld scanners to scan identification codes on the toilets, enabling them to quickly identify any missed pickups.

Transport

In each service area, a team of two collects cartridges from customers' houses and transports them to microsites using a tuk tuk. Microsites (often located on the pavement of main streets) are areas where cartridges are stored for approximately one or two hours before being moved by truck to a centrally located transfer site called Ashtown. The cartridges are then transferred to a tractor-and-trailer system, where clean cartridges (with new cover material) are replaced with used ones. The Ashtown transfer site helps distribute collection teams and cartridges across the four service areas.

The tractor-and-trailer system transports the used cartridges to the disposal site of Dompoase, where they are emptied and cleaned. The facility, owned by the Kumasi Metropolitan Assembly (KMA), provides solid and liquid waste (fecal sludge) management services delivered

through a private operator. The solid waste is disposed of at an engineered landfill, with informal waste pickers contributing to recycling, and the fecal sludge is treated in waste stabilization ponds (for which treatment performance could not be assessed). There are no formal operations for processing the fecal sludge into alternative byproducts. Clean Team has secured an agreement with the KMA for an in-kind contribution to the CBS service through access to part of Dompouse and for allowing disposal of the feces at subsidized rates (that is, the KMA charges only for renting equipment to move the sludge to the landfill rather than for the full cost of disposal).

To undertake the transport operation six days per week, four tuk tuks, two trailers, four teams of two feces collectors, one tractor, two drivers, and one collection supervisor are required. At the end of each day, materials, uniforms, and vehicles are washed at the transfer site, and equipment is maintained when necessary. The average number of cartridges processed in May 2017 was 380 per day.

Treatment

As previously mentioned, Dompouse was constructed in 2004 under the World Bank-financed Ghana Urban Environmental Sanitation Project. It is owned by the KMA and includes an engineered landfill for solid waste disposal and a septage treatment facility (Water, Engineering and Development Centre (WEDC) 2015),² both managed by a private operator. The site is located approximately 10 kilometers (30 minutes, depending on traffic) from the Ashtown transfer site. Clean Team was provided with space to construct a facility to empty and clean cartridges and prepare the cover material. The sawdust is a waste product found abundantly in and around Kumasi's large number of sawmills. A company is paid to collect the sawdust and deliver it in large sacks to Clean Team's site at Dompouse, where it is repacked into smaller bags for each customer. Trials

are currently underway to mix fragrance and neem powder³ in different quantities to improve the quality of the sawdust, reduce odors, and improve the customer experience.

Clean Team has six processors at Dompouse, alternating between the different tasks: emptying and washing cartridges, preparing covering material, and transporting the feces by tuk tuk to the drying beds. The team is capable of managing as many as 500 cartridges per day.

The content of the cartridges (feces and sawdust) is transported to and disposed of at the "drying beds" site (Tilley et al. 2008),⁴ located approximately 500 meters from the Clean Team facility, adjacent to the waste stabilization ponds, where it dries naturally. The treatment process is currently not monitored, though Clean Team, supported by WSUP and the World Health Organization (WHO), has worked on preparing and implementing Sanitation Safety Plans (SSPs).⁵ Once dried, the material is transported and disposed of at the nearby engineered landfill. With the anticipated increase in customer numbers and volume of feces to be processed, waste-to-resource options need to be considered as space for natural drying is limited.

According to Clean Team, waste-to-resource is not undertaken for several reasons: First, bringing a reuse product to market would be challenging unless the full business case and market assessment is made for treatment of byproducts. However, during the course of 2017, WSUP commissioned a study to build the case for investment in appropriate waste-to-resource solutions for all fecal waste produced in Kumasi, including Clean Team feces. Second, Clean Team wants to strategically focus on what it believes is the core part of the CBS business: delivering services (that is, collection and transport) to customers. Third, it considers treatment to be the KMA's responsibility, though this was not formalized in a contract as of May 2017.

Legal and Policy Environment and Impact on CBS Services

According to the Environmental Health and Sanitation Directorate (EHSD), CBS services have never been clearly discussed at the national level. EHSD has no clear position toward the technology and the service, given that a request by the KMA to establish CBS as an acceptable sanitation option has never been made.

As of May 2017, EHSD had no known standard procedures or risk assessment processes, such as SSPs, for evaluating a service like Clean Team's. By contrast, some new toilet technologies, such as Biofilcom or DURAPLAST®, have requested that their technology be assessed by a national technology framework managed by the EHSD in collaboration with the Ghana Standards Authority. When new technologies pass the framework successfully, this nonmandatory test validates a product and allows its promotion in official documents.

Although not explicitly disallowed, CBS is not explicitly encouraged either. There is some level of hesitation or resistance by the Waste Management Department (WMD) to adopt such an innovative service. The director of the WMD of the Accra Municipal Assembly, previously occupying the same function in Kumasi, raised the concern that the CBS service has no margin for error: Missed collections will discourage customers and jeopardize the whole system.

In Ghana, CBS is sometimes seen by authorities and sector stakeholders as an improved revival of bucket toilets. The director of the WMD of the Accra Municipal Assembly views CBS as a glorified bucket toilet and thinks that it remains a transitional solution that could be adopted by certain segments of society in some neighborhoods while they wait for new and long-term technical solutions. The transition time is described as five to 10 years. Nevertheless, he added that CBS is a good solution in flood-prone areas where traditional containment systems, such as septic tanks, would

flood and, as such, are not safe or effective. He said that WMD would not support CBS solutions in Accra due to the Greater Accra Metropolitan Area (GAMA) project with the World Bank, which encourages households to construct in-house toilets. Although the project has not been able to perform as expected (see Urban Context of Kumasi), the director thought that introducing CBS could further negatively impact its performance.

The director of the WMD in Kumasi, as of May 2017, expressed fewer concerns than his predecessor, expressing his satisfaction toward the design and service. However, he stressed the importance of high-quality management. No studies had been done on the impact of CBS on the implementation of the Compound Sanitation Strategy in Kumasi, though it is thought to be minimal compared to other barriers. Overall, municipal authorities perceive that long-term technical solutions are sewerage networks, but these currently exist only in Accra.

Notes

- 1 Such event was not observed during the fieldwork.
- 2 Six anaerobic ponds in two parallel streams of three each that connect to one facultative pond, which is followed by two maturation (aerobic) ponds.
- 3 Neem or nintree: A plant-based powder with fungicidal properties.
- 4 Drying beds, planted or unplanted, is a technology that, “when loaded with fecal sludge, allows the fecal sludge to dry by evaporation. The bottom of the drying bed is lined with perforated pipes that drain away the leachate. In Dompouse, the sludge is let to dry on dedicated space but without drainage system and with limited maintenance and operation” (Tilley et al. 2008).
- 5 SSPs were developed by WHO to ensure safe reuse of wastewater and are gradually being applied to new sectors, such as CBS.

References

- Tilley, E., C. Lüthi, A. Morel, C. Zurbrügg, and R. Schertenleib. 2008. “Compendium of Sanitation Systems and Technologies.” Swiss Federal Institute of Aquatic Science and Technology (Eawag), Dübendorf, Switzerland.
- WEDC (Water, Engineering and Development Centre). 2015. “SFD Promotion Initiative, Kumasi-Ghana.” Final report, produced by Claire Furlong and Water, Engineering and Developing Centre.

CHAPTER 3 • CBS SERVICE PERFORMANCE

This section examines customers’ progression, as well as the factors affecting it, and customers’ perceptions concerning the service.

Clean Team Customer Growth

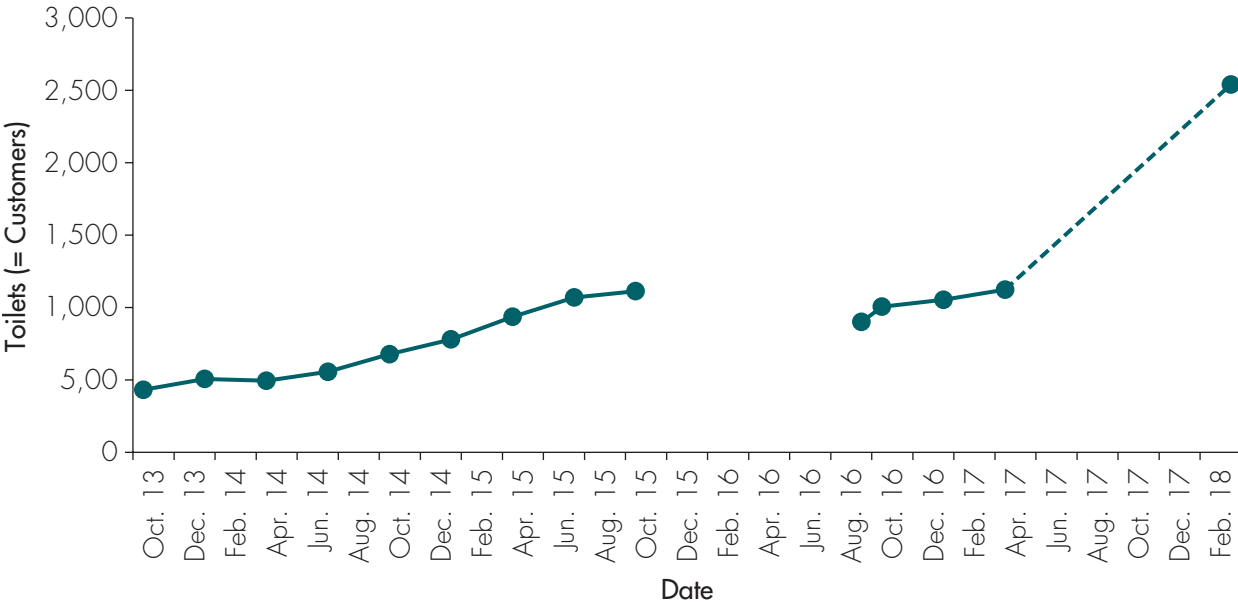
As stated in Chapter 2, when the Clean Team project was at the proof-of-concept stage in 2011, about 60 households were signed up for the service. There was reasonably slow but steady growth until a plateau was reached between October 2015 and April 2017, when there were approximately 1,110 customers. This number subsequently picked up, reaching 1,500 by December 2017.

However, the data regarding the number of customers prior to September 2016 is unreliable, according

to the management team, because there were multiple databases that did not connect in a structured way.¹ To address monitoring challenges, Clean Team decided to consolidate and restructure the various databases. In September 2016, following a 100 percent field audit of customers, Clean Team determined, with reasonable accuracy, that the number of active (that is, fee-paying) toilets deployed was 890.

During the second semester of 2016, Clean Team management reported that a deliberate suppression of sales was in force until February 2017. One reason for this was a willingness from the management team and its funders to focus on improving the efficiency of the operating model before embarking on further growth. Figure 3.1 provides an account of the number of customers through April 2018.

Figure 3.1 • Evolution of Clean Team Toilets Serviced in Kumasi (as of April 2018)



Source: Adapted from data provided by Clean Team.
 Note: No data was provided between October 2015 and October 2016. Data for April 2018 was provided, but there were no monthly figures between April 2017 and April 2018, which is why the progression is represented as a dotted line.

Assessing the Value of Clean Team's Services to Customers

This analysis shows that container-based sanitation (CBS) services provided by Clean Team offer a sound alternative to other forms of sanitation in areas where space requirements and difficult access create challenges for these alternatives.”

Quality and Reliability of Services

From a customer perspective and during observed commercial events, the public found the external design appealing and easy to interact with. Similarities to or memories of bucket toilets were not reported. The toilet is presented as a portable toilet with a cartridge (and excludes the word *bucket*).

Those who previously subscribed to the “wet” chemical toilets stated a preference for the dry service. The wet service was perceived to have several drawbacks, including foul odors after a few days of use, the risk of backsplash, as well as “seeing other people’s feces” (Greenland et al. 2016). Fourteen of the 15 customers interviewed were using a dry service with sawdust. Only one customer interviewed preferred the wet service as he had reported the presence of maggots with the use of sawdust. Of the approximately 1,100 customers receiving the service as of April 2017, only 28 expressed a preference to continue using the wet service.

Many of the customers interviewed criticized the decision to move from three to two collections per week. Half pointed out that after three days, maggots can develop, the amount of sawdust becomes insufficient, and sometimes ants are found in the sawdust, which then requires chemical treatment. Clean Team staff think that the maggot and odor development is likely related to poor management, as such presence was prevalent in households with more than five users per

cartridge (which is above the recommended number) and in households that did not regularly wash and disinfect their toilets. Clean Team service does not include regular cleaning of the toilet, as that is the customer’s responsibility. Customers receive an explanation on how to use and maintain the toilet, but there are no systematic hygiene promotion sessions or in-house visits to ensure proper uptake.

Although the level of cleanliness of the toilet is not included in the key performance indicators (KPIs), observation during cartridge collection shows that some are not regularly cleaned (two out of 15 toilets were flooded with urine).

Clean Team KPIs do include the number of collections missed. Between November 2015 and April 2016, that number remained relatively low, with a peak of 0.8 percent for March and 0.2 percent in April. Missing a collection can occur inadvertently in isolated cases or because a collector did not show up at the last moment. Pairing collectors (that is, having two along the same route) has reduced the number of missed collections because each knows the other’s customer locations and can support any temporary collectors to ensure nothing is missed. Missed pickups are remedied as soon as customers report them.

Cost to Service Users

The cost of Clean Team services to users has been set at a price point that is attractive compared to other sanitation alternatives for service users. During the initial trial period in 2011, the monthly service fee was set at ₵15 per month, which then increased to ₵35 at the full launch of the service in 2013, and is now ₵38 (US\$8.80) per month for customers using mobile payment (or ₵43—US\$9.95—for those paying manually). These costs are slightly lower than of using a public toilet for a family of five – see Clean Team vs. public toilets below.

A number of people who expressed interest in the Clean Team service during the marketing events are not able to subscribe for the following reasons:

- They live outside the four service areas.
- There is insufficient space to install the toilet.
- The ultimate decision maker² does not support the subscription.
- They cannot afford regularly paying a one-time installment of the monthly fee (but the introduction of small mobile payments should help overcome this).

People with non-shared in-house toilets are not interested in Clean Team services.

Clean Team Services vs. Available Alternatives in the Service Area

Convenience appears to be the primary reason customers prefer Clean Team services to others in the area, but hygiene and comfort also play a role.

Clean Team vs. Public Toilets

The majority of Clean Team's customers previously used public toilets. Some of the customers interviewed stated that convenience and hygiene and potential health gains were the predominant drivers for switching to Clean Team, as well as the lack of comfort associated with public toilets. Maybe unsurprisingly, customers did not highlight the supposed financial savings when compared to using a public toilet. Several noticed that the Clean Team service cost had increased since they joined, and a majority hoped that service costs would decrease in the near future.

The cost of public toilets in the Clean Team service area is between 20 pesewas to 50 pesewas per visit (US\$0.05 to US\$0.12). The average is likely to be 30 pesewas to 40 pesewas (US\$0.07 to US\$0.09). Considering a family

of five with one use per person per day,³ the monthly cost of using a public toilet for one household would be between C45 and C60 (US\$10.42 and US\$13.89).

Clean Team vs. In-House Toilets

In one of the old tenement neighborhoods (Asawase), some Clean Team users had bucket toilets until the servicing of these toilets was effectively banned (around 2015. Photo 3.1 shows a block with wooden-covered access holes shared among four families. The buckets were used in the house and accessed by night-soil collectors from the outside. Now three of those four households receive a Clean Team service. In this area where bucket toilets were common, some rooms are now used to house Clean Team toilets, some have been converted into shower rooms, and others have been changed into

Photo 3.1 • Block Shared by Families That Previously Used Bucket Toilets



Source: Clean Team.

Table 3.1 • Qualitative Comparison of CBS and Alternatives

	Safety of sanitation service chain					Potential reach
	Containment	Emptying	Transport	Treatment	Disposal/reuse	
Clean Team CBS	CBS	In sealed containers		Septage TP (partially functional)	Landfill	Extensive
Household Latrines	Lined pit	Vacuum tanker		Septage TP (partially functional)	Landfill	Medium/extensive—reaches most areas

Note: Green = safe; yellow = partially safe. Sewer-based alternatives are not mentioned as these solutions would not be implementable in the near- to medium-term. CBS = container-based sanitation; TP = treatment plant.

Note on potential reach: Potential to provide defined sanitation service to all households in specific targeted geographical area.

toilets with septic tanks or a lined pit for pour-flush toilets.

One family in the process of moving from a Clean Team service to a pour-flush toilet explained that they were one of the first Clean Team customers in the area and were happy to move away from the public toilet for convenience and comfort reasons. Having had the opportunity to experience an in-house toilet, and having seen the increase in the cost of the Clean Team service, she decided to invest in a pour-flush toilet. She started constructing the facility together with neighbors and is doing so in phases/installments, paying a range of different suppliers. She is unsure what the full capital cost of investing in the toilet is, or the future cost and frequency of desludging, and has not received external assistance in to make such calculations.

According to Water & Sanitation for the Urban Poor (WSUP), who is supporting the Kumasi Metropolitan Authority (KMA) in implementing a strategy to install a “toilet in every compound,” the cost of installing a household toilet facility can range between C1,500 and C2,500 (US\$350 and US\$580). However, a technical solution approved under the strategy typically costs between C2,000 and C5,000 (US\$460 and US\$1,160). Desludging costs are estimated to be between C250

and C350 per desludging event (US\$60 and US\$80). Depending on the size of the pit/septic tank and the number of users, desludging frequency may be between two to 10 years, suggesting an annual cost ranging between C30 and C175 (US\$7.50 and US\$40.50).

Table 3.1 compares the safety of the Clean Team’s CBS service with the alternatives at each point in the sanitation chain, as well as their potential reach—that is, how well they can penetrate the informal settlements.

Notes

- 1 The analysis of all KPIs under a representative period is, therefore, not possible.
- 2 The decision maker could be the spouse and/or, more often, the landlord. Some landlords do not want their tenants to have a portable toilet, fearing negative consequences, such as odor, which may disturb other tenants. Improvements in the technology and an increase in the number of customers may give legitimacy to the product, reducing the landlords’ reluctance.
- 3 Depending on the public toilet and age of children, children may use toilets for free or at a lower price.

Reference

Greenland, K., J. de-Witt Huberts, R. Wright, L. Hawkes, C. Ekor, and A. Biran. 2016. “A Cross-sectional Survey to Assess Household Sanitation Practices Associated with Uptake of ‘Clean Team’ Serviced Home Toilets in Kumasi, Ghana.” *Environment and Urbanization* 28, no. 2: 583–98.

CHAPTER 4 • FINANCIAL PERFORMANCE

This section presents an analysis of the financial performance of the Clean Team business model. A key difference from other case studies is that no original work was conducted for this financial analysis. Clean Team had just completed an in-depth financial analysis with the support of Ernst & Young (EY) and in collaboration with Water & Sanitation for the Urban Poor (WSUP) as of May 2017, so it did not want to duplicate efforts. Therefore, the content of this section is primarily based on the EY report, which was conducted to advise Clean Team on pathways toward achieving financial sustainability and reducing dependency on external funders.

Current Costs and Financing Sources

To recover costs, Clean Team employs a combination of service fees and external subsidies. Clean Team recovered only 20 percent of its total costs through its customers in fiscal year (FY) 2016–17 (that is, equivalent to an 80 percent subsidy) but was looking to increase this cost recovery ratio to 60 percent by FY 2017–18 (that is, 40 percent subsidy). Clean Team was also aiming to suspend subsidizing its operational costs, both direct and indirect, by October 2018 (that is, break even earnings before interest, taxes, depreciation, and amortization [EBITDA]) through a combination of increased customer charges and efficiency gains.

The two main types of external subsidies Clean Team currently uses are external grant funding from philanthropic donors and public subsidies from the local government. Until now, there has been a heavy dependency on the former.

The vast majority of funds provided to Clean Team so far has been through grants from foundations and bilateral donors. Clean Team has received several rounds of

grant funding to cover startup costs, research and development costs, capital expenditure (infrastructure and equipment), and operational losses from the Department for International Development (DFID), Bill & Melinda Gates Foundation (BMGF), and Stone Family Foundation (SFF).

Public subsidies so far have been received only in-kind, through the provision of land (that is, transfer stations and treatment facility) and services (for example, disposal of Clean Team feces at subsidized rates). By May 2017, Clean Team was seeking further public subsidies through tax relief, as it has applied for a value-added tax (VAT) exemption (of 17.5 percent). The EY–WSUP report articulated a vision of moving toward public subsidies in the form of cash transfers per customer served. The report, for instance, suggests a type of public–private partnership (PPP) contract that could help secure subsidies for the cost of the toilet and/or service.

Improving the Efficiency of Its Operations

Clean Team has worked with its funders and external advisers to analyze and improve the efficiency of its business model, reduce costs, and expand its customer base. Based on the analysis contained in the EY–WSUP report (2017), the following cost drivers are discussed in this section:

- Payment collection
- Collection frequency
- Densification
- Customer churn
- Waste-to-resource
- Cost of toilets

In addition, Clean Team has implemented a revised service fee structure. Where data is available, the impact they have on the business is assessed through the lens of the key financial performance indicators used by Clean Team: gross margin,¹ EBITDA,² and net margin.³

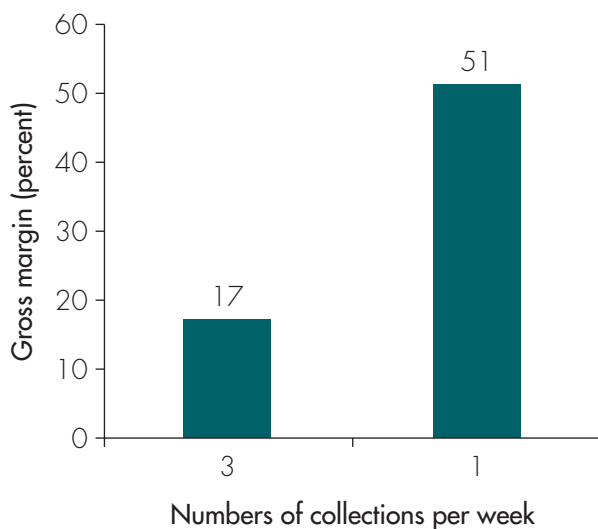
Payment Collection

According to the EY-WSUP analysis on Clean Team, a move from direct payment by account managers to mobile money could improve gross margin by 26 percent. As Clean Team had recently launched mobile money at the time of the field visit, it was not yet possible to confirm the actual impact of such a switch as projected based on financial modeling.

Collection Frequency

The EY-WSUP analysis suggested a significant impact of collection frequency on the gross margin of the business—a once-per-week frequency of collection led to a gross margin of 51 percent compared to a three time-per-week frequency with a margin of 17 percent

Figure 4.1 • Relations between Numbers of Collection Per Week and Gross Margins



(see figure 4.1). As mentioned previously, Clean Team's collection frequency has decreased from three to two times per week, with a goal of achieving a collection of once per week by December 2017. The once-per-week frequency assumes the move from a wet to a dry (using sawdust) service for all Clean Team customers.

Densification

Although densification⁴ is considered to be a main driver for reducing costs for Clean Team, the financial impact of it was not reported in the EY-WSUP analysis. WSUP reported plans to increase the densification of Clean Team customers by introducing a customer density key performance indicator (KPI), targeting new neighborhoods within the existing service areas and revisiting customers who had previously left the service.

Customer Churn

WSUP reported that in 2016 Clean Team lost as many customers as it had gained in the previous four years due to a high customer churn rate. Although the EY-WSUP report did not evaluate the cost this had on the business, it did suggest that a satisfied customer is “imperative” for the business. In March 2015, WSUP reported churn at Clean Team to be at 3 percent per month, mainly due to customer dissatisfaction with missed pickups and the resulting unwanted odors. By March 2017, this was reduced to less than 1 percent, with a plan to further reduce it to 0.5 percent by March 2018.

Waste-to-Resource

As mentioned, Clean Team has purposefully and strategically chosen not to invest in “closing the loop” and incorporating a waste-to-treatment operation into the business model. Instead, it has depended on the municipality managing the waste post-disposal. The EY-WSUP report clarifies that in the context of Kumasi, it is not yet

known whether sales from converting waste-to-resource can cover the cost of processing/treatment. To better understand this, a strong understanding of the market for different byproducts would be necessary, which is why WSUP supported an assessment of the business case for different solutions.

Cost of Toilets

The EY-WSUP report puts significant emphasis on the impact of the cost of a toilet on the business model. The proposed target landed cost is between US\$40 and US\$50, with a life span of five years—the current landed cost of a Clean Team toilet is US\$92. Although the capital cost of the toilet is not crucial to achieving the target gross margin of 50 percent, it does become relevant once the business starts to work toward a positive EBITDA (projected by October 2018) and then a positive net margin (projected beyond March 2019). To achieve such cost reductions, Clean Team is looking into redesigning the toilet to decrease costs while maintaining life span or increasing the effectiveness of the toilet by lowering collection frequencies.

Service Fees

In April 2017, Clean Team started the process of implementing a revised service fee structure, increasing the fee by 8.5 percent (for mobile money subscribers) and 23 percent (for direct payment subscribers). Although the impact this has had on the gross margin and other financial indicators was not reported, a significant churn in customers has not been reported, suggesting a level of tolerance by customers for the increased service fee and potentially additional increases if they are gradually introduced and communicated. The EY-WSUP report suggested the need for achieving a price range between US\$8 to US\$9 per household per month, but this is heavily dependent on customers' willingness and ability to pay for the service. The EY-WSUP reported a rapidly decreasing

willingness to pay more than US\$5 from low-income customers.

Plans to Achieve Economies of Scale through Expansion

As of April 2017, when the initial research was conducted, Clean Team had approximately 1,100 households as customers. Clean Team's plan at the time was to reach 5,000 customers by March 2019 and 10,000 customers within five years. WSUP believed this would be achievable because there had not yet been a strong sales push and the focus had been on achieving a positive gross margin. These estimates reflect efforts to restructure the collection and transport process together with the new market strategy and densification efforts, focusing on promising geographical areas. There were no plans at that stage to expand to other cities, either in Ghana or beyond. Instead, the team was more interested in sharing learnings from Clean Team to inform similar investments in other countries.

Notes

- 1 Gross margin is defined as the difference between revenue and direct costs (mainly transport, disposal, and payment collection) divided by the total revenue. As identified by the EY-WSUP report, the proposed target gross margin for a household container-based sanitation (CBS) business to be viable is 50 percent.
- 2 EBITDA is a measure of a business's operating performance (including both direct and indirect costs). In the case of Clean Team, the major cost that EBITDA excludes is depreciation of its assets, particularly its toilets. Indirect costs include, for instance, management overheads.
- 3 Net margin is the percentage of revenue remaining after all operating expenses (direct and indirect) and after taxes and depreciation have been deducted from a company's total revenue.
- 4 *Densification* is increasing the number of customers within the specified geographic service areas.

Reference

EY (Ernst & Young) and WSUP (Water & Sanitation for the Urban Poor). 2017. "Why Wait for Sewers? Advancing Container-based Sanitation Businesses as a Viable Answer to the Global Sanitation Crisis." London, UK.

CHAPTER 5 • KEY LESSONS

Despite offering better quality and a more affordable service than most of the available public toilets in the area (as compared on a monthly basis), the number of customers using the Clean Team service remains limited. Shared housing arrangements, lack of space, limited affordability for the poorest, and absence of explicit position of institutions toward container-based sanitation (CBS) were identified as key limitations.

Neighborhoods where Clean Team intervenes share several commonalities: prevalence of shared housing, often with more than eight households sharing a house and the facilities (courtyard, kitchen, and bathroom); few houses with toilets facilities; and relatively high number of public toilets.

In Kumasi and Ghana, the social and legal environment relating to the CBS approach is unclear. From the perspective of national authorities, the technology lies in a gray zone between the banned bucket toilets, “composting toilets,” and “other toilets.” The weak

mandates and lack of accountability for achieving results on access to sanitation seems to result in a focus on an idealistic—and potentially unrealistic—vision of a water closet and septic tank in every household. In fact, local governments in Kumasi and other cities in Ghana, are encouraging the uptake of the “one house, one toilet” policy.

At the same time, these cities have also invested massively in improving public toilets, even in residential areas. Thus, some officials perceive CBS to be a transitional solution that may interfere with in-house toilet support programs. This, along with lack of urgency and pressure to deliver toilets in every house, seems to hinder the provision of full support for and strong partnerships with CBS providers.

Going forward, Clean Team could benefit from a clearer policy environment, which would allow it to increase its scale of operations on a more cost-efficient business model.

APPENDIX A • PEOPLE INTERVIEWED

Institution	Position	Name
World Bank Ghana	Water, sanitation, and hygiene (WASH) advisers	Emmanuel Nkrumah
Sanitation/Environmental Health and Sanitation Directorate (EHSD)	Program Officer	Kweku Quensah
Kumasi Metropolitan Assembly (KMA)	Waste Management Department director	John Gorkeh-Miah
KMA	EHSD director	Don Awantungo
Greater Accra Metropolitan Area (GAMA)	Waste Management Department director	Anthony Mensah
Water & Sanitation for the Urban Poor (WSUP)	Head of sanitation	Georges Mikhael
WSUP Ghana	Social business lead	Faustina Ashante
Public toilets	Owner	Name not available
Sewerage network	Operator	Name not available
Manual emptier	Drivers	Names not available
Clean Team	Chief executive officer	Peter Townsley
Clean Team	Head of operations	Abigail Aruna
Clean Team	Sales manager	Eric Yeboah
Clean Team	Finance officer	Name not available
Clean Team	Account manager, Asawase	Janet Harrison
Clean Team	Account manager, Adukrom	Lovia Boakye
Clean Team	Account manager, Sabon Zongo	Beatrice Agyemang
Clean Team	Account manager, Tafo	Name not available
Clean Team	Sales officer	Names not available
Clean Team	Collector, Asawase	Alidjah
Aygiya community	Traditional leader	Name not available
Aygiya community	Traditional leader	Name not available

Interviews were also organized with 14 customers from Asawase and Tafo and five noncustomers from Oforikrom and Asawase.

APPENDIX B • CLEAN TEAM ORGANOGRAM

