SYNTHESIS REPORT

Improve Urban and Small Towns Sanitation Services Delivery in Ethiopia:

Messages and Lessons from Cities, Towns and the National Policy Dialogue

Chris Heymans, Gulilat Birhane, Eyob Defere and Kathy Eales

May 2017

WORLD BANK GROUP

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Executive Summary

Ethiopia is one of the least urbanized countries in the world, but is now urbanizing rapidly. If managed well, urbanization can be an important catalyst to promote growth, create jobs, and help the country achieve middle-income country status by 2025. But better management of urban liquid and solid waste streams must become an integral part of the country's renaissance as Ethiopia's economy undergoes structural transformation and diversifies.

Despite some progress, Ethiopia's towns and cities are struggling to provide the housing, infrastructure, and services needed to achieve its development goals; sanitation services lag far behind advances in other sectors. Solid waste collection services are reaching barely half the population, landfill sites are run as open dumpsites, and waste is dumped in open areas on a large scale, endangering public health. Only Addis Ababa has a sewerage system, and its network serves just 10 percent of the capital's population. Nationally, 97 percent of urban residents rely on on-site sanitation, predominantly dry pit latrines, and there is extensive sharing of toilets. Downstream services to support safe management of fecal sludge removed from pits and cesspools are very inadequate, and just a handful of towns have sludge treatment facilities of any kind. Developing sewerage systems as the default across urban Ethiopia is not feasible in the near future, because most of the country's towns and cities are water stressed, and require extensive increases in supply and access just to meet demand for safe drinking water.

The core message from this report is that it is crucial to look beyond infrastructure development to the kind of service improvements required, and to strengthen the institutional framework needed to drive and achieve incremental change. This means building a common understanding of what is needed, where the gaps lie, and how to close them. The tasks and functions of different role-players will need to be defined very clearly and agreed to, and supported with realistic operating budgets and staffing structures. These messages are pertinent at a time when urban sanitation improvement figures increasingly on Ethiopia's national transformation agenda, as expressed in the new Integrated Urban Sanitation and Hygiene Strategy (IUSHS) by the key line ministries with a sanitation role.

This report provides an overview of World Bank Technical Assistance at the request of the Government of Ethiopia to support improved urban sanitation services delivery. It aims to close the gap between high level strategy and local service improvement planning, through assembling baseline data on the state of sanitation services and infrastructure in 10 towns and cities selected by government, and offering a structured planning framework for tackling comprehensive improvements, town by town. The planning proposals are not definitive or detailed, but aim to guide and support infrastructure investment, and highlight the need to build the institutional capacity to plan, drive, and coordinate sanitation improvements to address the many challenges on the ground. The findings have also contributed during the design of the new World Bank–financed Second Urban Water and Sanitation Services program, and other World Bank operational engagements in urban development and service improvements

Additional reading from this work include the Government of Ethiopia's IUSHS, and five other 'Just in Time' thematic papers developed to stimulate discussion among decision makers. The detailed assessment reports and strategic improvement plans have been disseminated to the respective towns, and may be obtained from their local government offices.

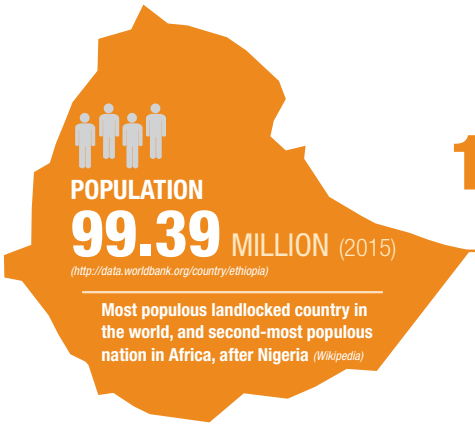
Acronyms and Abbreviations

AARA	Addis Ababa Revenue Agency
AAWSA	Addis Ababa Water and Sewerage Authority
CSA	Central Statistical Agency
GoE	Government of Ethiopia
HH	Household
IUSHS	Integrated Urban Sanitation and Hygiene Strategy
km	Kilometer
l/c/d	Liters per capita per day
MDG	Millennium Development Goal
MoC	Ministry of Construction
MoH	Ministry of Health
MoUDH	Ministry of Urban Development and Housing
MoWIE	Ministry of Water, Irrigation and Electricity
NGO	Nongovernmental organization
SDG	Sustainable Development Goal
SME	Small and Medium Enterprise
SNNPR	Southern Nations, Nationalities, and People's Region
SWM	Solid waste management
TA	Technical Assistance
VIP	Ventilated improved pit
WSSE	Water and Sewerage Enterprise

I. Introduction and Brief Overview

Ethiopia is one of the least urbanized countries in the world, but is now urbanizing rapidly. Its infrastructure and services, particularly for water and sanitation, are under pressure as people move towards new opportunities in the cities and towns. This report provides an overview of messages and lessons from a recently completed World Bank Technical Assistance (TA) at the request of the Government of Ethiopia (GoE) to support improved urban sanitation services delivery.

Complementing the drafting of a national Integrated Urban Sanitation and Hygiene Strategy (IUSHS), the Technical Assistance aimed to help close the gap between high level strategy and local service improvement planning, through assembling baseline data on the state of sanitation services and infrastructure in 10 towns and cities selected by government, and offering a structured framework for tackling comprehensive improvements, town by town. A technical assistance team worked closely with town- and city-level role-players to identify intervention priorities, map service options, and develop broad cost estimates, with an indication of possible funding sources for the different components of the plan. The proposals highlight the need to build the institutional capacity to plan, drive, and coordinate sanitation improvements to address neglect over many years. It has also impacted on the evolving World Bank investment portfolio in Ethiopia, and very notably so in the design of Second Urban Water and Sanitation Services program, the UWSS-II.



19.5% **Estimated percentage of Ethiopia's population that is urban (2015)** *(http://data.worldbank.org/country/ethiopia)*

70% **Estimated percentage of urban Ethiopia's population that live in slums.**

25.7%

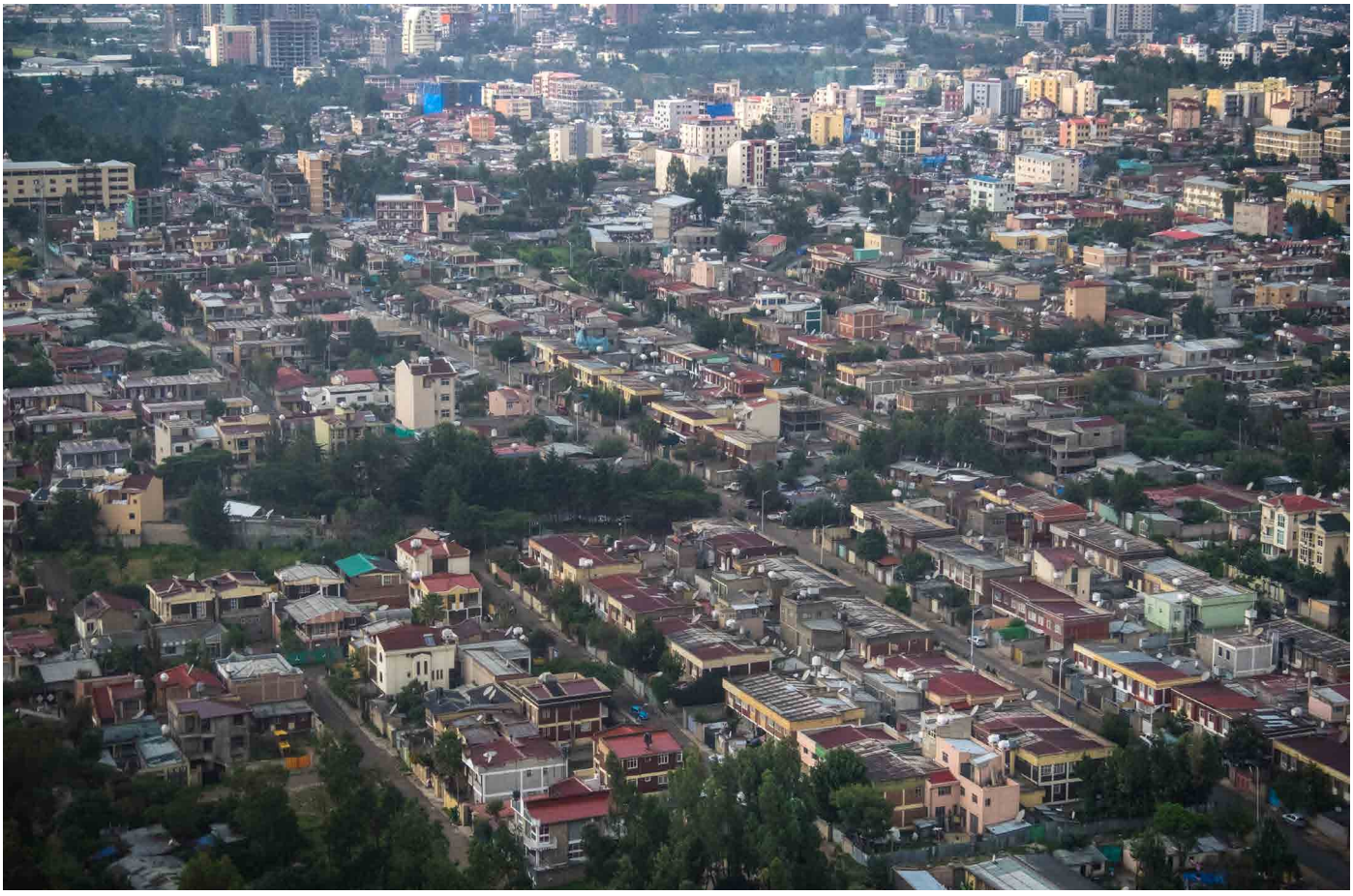
Estimated percentage of Ethiopia's urban population that lives on the equivalent of USD 1.24 per day or less, i.e. the national poverty line.

II. The Context

Rapidly Urbanizing Ethiopia

Ethiopia is a large, diverse country with a population of over 99 million people, and one of the least urbanized in the world. It is now urbanizing rapidly. Ethiopia's Central Statistical Agency (CSA) projections suggest the urban population will triple from 15.2 million in 2012 to 42.3 million in 2037. The World Bank projects an even faster rate of urbanization, which would mean that by 2030, there could be 40 million urban dwellers, equivalent to 30 percent of the population *(World Bank Group/Cities Alliance, 2015).* Among the 10 towns this TA focused on, Welkite reported the highest annual population growth rate, 11.36 percent, and Adama the lowest at 5.74 percent.

While urbanization is a challenge, it can also be an important catalyst to promote growth, create jobs, and help the country achieve middle-income country status by 2025. This requires putting in place policies, institutions, and investments to equip and manage towns and cities as attractive places to live and work, with adequate housing and infrastructure, and comprehensive poverty eradication. Currently, 25.7 percent of Ethiopia's urban population lives on the equivalent of US$1.24 per day or less, that is, the national poverty line. This percentage is far higher than Ethiopia's peers, and unusually, is almost as high as the rural poverty rate *(World Bank, 2016b)*.



Addis Ababa possesses a diverse mix of housing and settlement types. *(Photo Credit: Kathy Eales).*

Median urban incomes are very low. Building urban centers that offer work opportunities, housing, and a mix of affordable services that address diverse needs to enable poorer households to share in prosperity is vital. Despite some progress, Ethiopia's towns and cities are struggling to provide the housing, infrastructure, and services needed to achieve its development goals. Over 70 percent of the urban population lives in slums (or mixed settlements, as they are known in Ethiopia), and sanitation services lag far behind other sectors, while solid waste is dumped in open areas on a large scale, endangering public health. Collection services barely reach half the population.

Only Addis Ababa has a sewerage system, and its network serves just 10 percent of the capital's population. Nationally, 97 percent of urban residents rely on on-site sanitation (toilets and latrines not connected to a sewer system) and over 80 percent of the urban population relies on dry pit latrines *(CSA, 2016)*. Open defecation is widespread. There is extensive sharing of toilets, and very inadequate downstream services to support safe management of fecal sludge removed from pits and cesspools when they fill. Open dumping of sludge is widespread. At best there are 50 towns nationally with vacuum tankers, and just a handful have sludge treatment facilities of any kind. Developing sewerage systems extensively as the default across urban Ethiopia is not feasible in the near future because, beyond affordability constraints, most the country's towns and cities are water stressed, and require extensive increases in supply and access just to meet demand for safe drinking water at a time when Ethiopia's water resources are under pressure to meet the needs of its fast-growing population and economy, and mitigate vulnerability to climate change.

Inadequate basic services raise the risk of infectious disease. The CSA's 2016 Demographic and Health Survey and Welfare Monitoring Survey data show that it is the poorest who are the most vulnerable to sanitation related illnesses, as demonstrated in the 2015–2016 outbreak of Acute Watery Diarrhea and cholera in Addis Ababa *(UNICEF, 2016)*. Typhoid, diarrhea and helminthiasis infections (intestinal worms) and other health problems associated with poor sanitation feature prominently among the top 10 causes of illness at town level, often entrenching a cycle of poverty and disease in slums, slowing equitable development, and making cities less attractive places to work, live and invest in.

This context requires that the scope of "urban sanitation" is carefully considered. The work under this TA has highlighted the relevance of urban sanitation services with respect to safe management of liquid and solid waste streams, to safeguard health and hygiene, protect water resources, and build resilience in the face of climate change. Service deficiencies in one area have knock-on effects on others—for example, poor solid waste management (SWM) and unsafe disposal of human wastes impact on water pollution; and uncollected solid waste, often contaminated with human wastes, contributes to blocked drainage channels and flooding. Improved access to water supplies increases the volumes of wastewater produced, and safe drainage of household greywater is a neglected area in most of urban Ethiopia. Rapid urban settlement growth gives new urgency to integrating sanitation in urban planning and town management, so that over and above healthy user behavior or infrastructure investment, safe management requires a chain of sanitation services that are linked. Mapping the functioning of this service chain helps to identify gaps and priorities, and to clarify the roles and functions of the different role-players at all levels of government.

This approach is relevant to the new Sustainable Development Goals (SDGs), which shift the sanitation sector's goal posts significantly beyond toilet coverage, aiming for safe management of human wastes across the whole service chain. What the Millennium Development Goals (MDGs) regarded as *improved* sanitation is now considered just *basic* sanitation if there is no proper management of waste beyond the toilet *(UNICEF and WHO, 2015)*. *Adequate* sanitation must now address the full service chain, across all urban and rural settlement types. Tackling the SDGs requires a far-reaching change beyond an emphasis on increased toilet coverage and adopting practices that enhance their health and hygiene, to a recognition of the broader **systems** that support or undermine safe management across the full service chain. Households remain the primary agents of change, but tackling safe management of wastes beyond containment requires far greater engagement by public authorities,

primarily by local government, with significant implications for the quantum of funds required to achieve the improvements Ethiopia needs. A realignment of sector activities and resources is needed to achieve progress against the new performance indicators against which Ethiopia will be measured.

Government is Gearing up to Address Urban Sanitation

Urban sanitation improvement is increasingly on Ethiopia's national transformation agenda. The Second Growth and Transformation Plan (GTP II) for 2015/16 to 2019/20 flags sanitation improvement as a key component of urban development, and commits Ethiopia to increasing improved sanitation coverage and reducing open defecation.

The Ministry of Health's (MoH) urban health extension program is engaging residents in town-level health awareness programs, including sanitation and hygiene promotion. The Ministry of Urban Development and Housing (MoUDH) is emphasizing better SWM in the pursuit of urban infrastructure, services, and systems to achieve national growth and transformation targets and as part of what its strategy calls as indicator of Ethiopia's renaissance. The One WASH National Program consolidates donor efforts under the leadership of the Ministry of Water, Irrigation and Electricity (MoWIE), and is the main instrument for increasing access to water supply and sanitation services. It is driving urban sanitation improvement through health extension programs and infrastructure investments in public toilets and sludge drying beds, and is gearing up to support large scale investment in wastewater and fecal sludge management infrastructure. A new World Bank supported Second Urban Water and Sanitation Services program (UWSS-II) will support investments in sanitation and water, together with substantial institutional strengthening.

In April 2017, the key federal ministries with a role in urban sanitation endorsed a new IUSHS developed collaboratively with key stakeholders, including the World Bank. The strategy outlines a range of measures to expand access to services and drive more integrated programs across ministries and sectors. It flags the need to increase safe reuse of wastewater and achieve safe management of the waste streams from the new industries that Ethiopia is developing to achieve structural transformation of the economy. Expanding conventional sewerage networks is part of the strategy, but the IUSHS recognizes that the scale and urgency of the sanitation challenges require a range of inclusive, citywide affordable service options, not only sewerage extensions.

Achieving the bold targets of the IUSHS—100 percent Open Defecation Free (ODF) and 100 percent improved sanitation—requires a step change in approach at every level of government. Greater coordination and integration is needed across the different sector ministries, and urban planners and city authorities need to tackle sanitation improvement head on as a core part of their city management mandate. A core town-level challenge is limited awareness among local leaders and officials of the scope of urban sanitation, or how to go about service improvements in a context where sewerage offers at best a partial solution. Limited town-level sanitation data make planning and prioritization difficult. The assessments of the state of sanitation in 10 towns provide an evidence base for practical improvement planning, in line with the IUSHS.

BOX 1: KEY GOALS OF THE 2016 INTEGRATED URBAN SANITATION AND HYGIENE STRATEGY

- Bring sustained behavioral change for better hygienic practices, installation of facilities, and delivery and uptake of sanitation services by 2025.
- Ensure open defecation free cities and towns by 2020 from the current average of 6 percent to 0 percent open defecation.
- Ensure 100 percent of households in any given town or city have access to improved latrines or toilets by 2025.
- Increase the fecal sludge management systems capable of safely removing, treating, and recycling fecal matter to 70 percent coverage by 2025, with interim targets of 30 percent by 2020.
- Install 1,000 decentralized wastewater treatment systems capable of treating liquid and fecal matter to a standard that can be directly and safely used in the immediate environment or, following further conditioning, in localized facilities by 2025. Interim target of 200 by 2020.
- Reduce, recycle or reuse 50 percent of all solid waste generated in medium and large towns and cities by 2025. Interim target of 20 percent by 2020.
- Dispose of 100 percent of the remaining solid waste in controlled tipping and sanitary landfill sites that fully comply with 2014 Guidelines by 2030 (interim target of 50 percent by 2025).
- Ensure safe disposal of 100 percent health care waste from all health care facilities by 2025. Interim target of 95 percent by 2020.
- Enforce safe treatment, reuse or disposal of industrial liquid and solid wastes to ensure ecosystem, agricultural, and human protection from all industries by 2035, with an interim target of 30 percent of all industries by 2025.
- Strengthen sector performance through formation of a coordination body that will be managed and financed so as to direct capacity building efforts towards participating individual or clustered municipalities, utilities, and contractors. Such coordination body to be fully established by 2020, with an interim coordination mechanism by 2016.
- Leverage and increase effective utilization of resources for accelerated and cost-effective implementation of the IUSHS.
- Establish an effective and reliable monitoring system and sanitation database by 2016.

III. Assessing Sanitation across 10 Towns and Cities

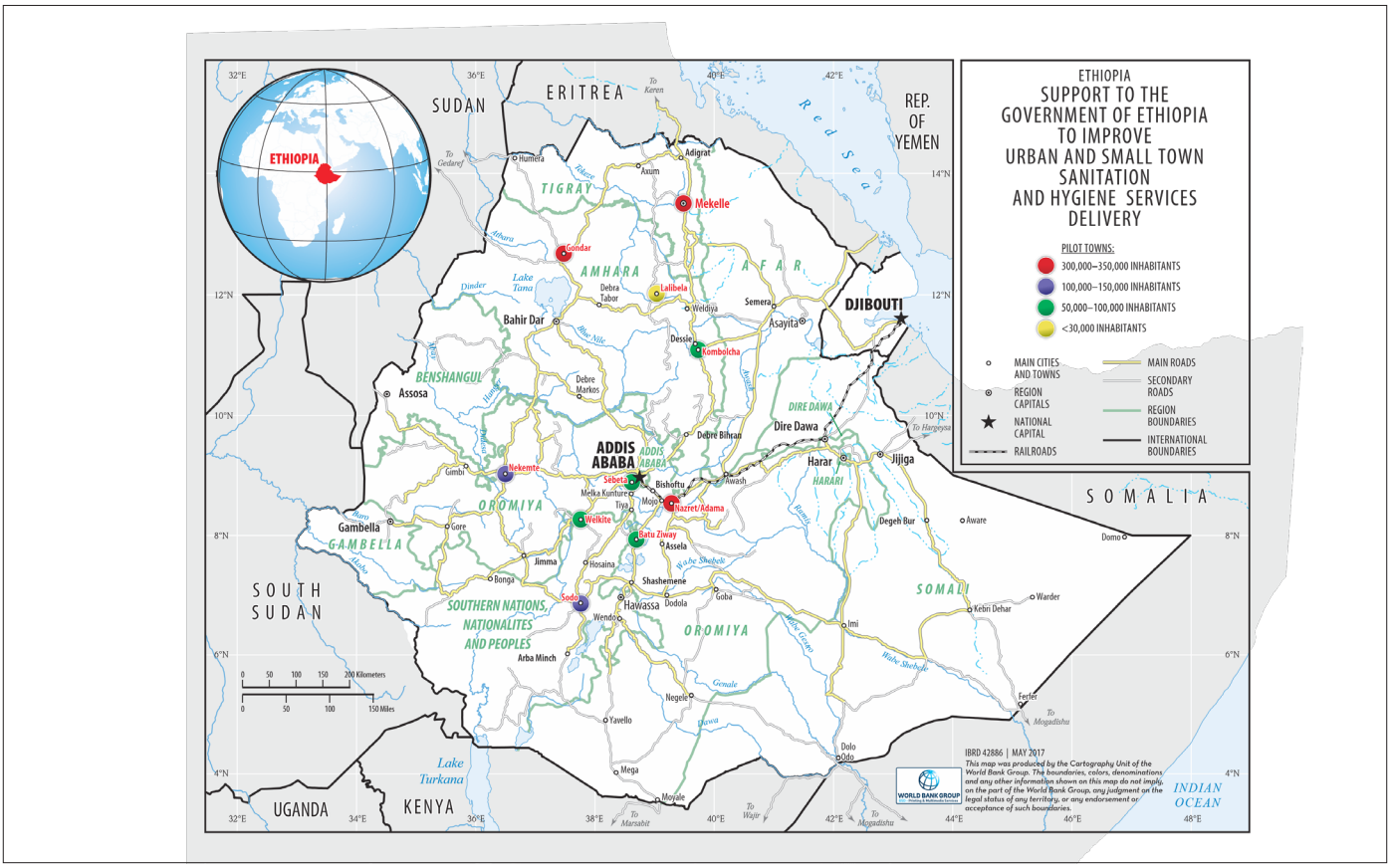
Methodology

The GoE and the regions of Oromia, Amhara, Tigray, and Southern Nations, Nationalities, and People's Region (SNNPR), selected 10 very diverse towns for the TA to assess sanitation challenges and improvement options in different settings and across different population sizes.

The MoUDH categorizes Ethiopian towns into one of five clusters, based on population size, revenue generation, and other criteria. Three secondary cities, Adama, and Gondar fall in the second cluster; Wolaita Sodo, Kombolcha, Nekemte are in the third cluster; and the smaller towns of Sebeta, Batu, Welkite and Lalibela are in the fourth. Heritage tourism features prominently in Lalibela and Gondar; industrial parks exist or are being developed in Adama, Kombolcha; and seven of the 10 have higher education institutions. The pace of urban population growth varies from region to region. The two towns from SNNPR, Wolaita and Welkite, show the fastest growth, with their populations nearly doubling between 2007 and 2016. Water, sanitation and SWM services vary widely from town to town, as Table 1 reveals.

A team of international and local consultants carried out sanitation situation assessments and developed improvement plans for each town. The assessments used household surveys, focus groups and key informant discussions, transect walks and site visits, and an extensive review of relevant documents to assemble baseline data on service delivery systems for liquid and solid waste in each of the 10 towns.

FIGURE 1: TEN TOWNS COVERED IN STUDY



In each town, about 400 households were surveyed, using a credible statistical method to determine the sample size. *Kebeles* (the smallest administrative unit in Ethiopia, equivalent to a ward) were clustered by predominant settlement type (slum, formal, informal or mixed settlement), and then selected, using a probability proportional to size (PPS) method. About 50 households were sampled per *kebele* through systematic random sampling. The number of women-headed households surveyed was slightly higher (30 percent–35 percent per town) than the national urban average (25 percent). A structured questionnaire helped explore general household characteristics and a range of sanitation, solid waste, and water facilities and services themes.

A two-stage sampling procedure was followed to build list of sample households to be interviewed. At the beginning the *kebeles* were clustered by settlement pattern: that is, Slum, Formal, Informal or Mixed. Depending on their number in each category, primary samples (*kebeles*) were selected using the PPS method. Using a systematic random sample selection procedure, 50–51 households were sampled per *kebele*.

The assessments triangulated demand and supply side data on different components of the sanitation service chain, across containment, collection or emptying, transportation, treatment, and disposal. It investigated technical, institutional, legal, financial, and cultural barriers to improvements along the service chain, including attitudes influencing sanitation choices and behavior. Findings from each town were captured in a detailed assessment report, which provided baseline data for an integrated service improvement plan to assist each town to address its sanitation challenges systematically.

The plans showed the need to develop institutional systems to drive service improvements, and propose a mix of service options and delivery systems and a stepped incremental approach. A model was developed to assess capital and recurrent funding requirements under different population growth scenarios, and possible funding sources were identified for implementation over the short, medium, and long term. Extensive consultations and collaboration took place with federal ministries, regional bureaus, and town level institutions, especially local governments and water service agencies.

Key Findings: Solid Waste Management

In urban Ethiopia, municipal officials mainly associate 'sanitation' with solid waste collection, as solid waste is highly visible, and on many local political agendas. Municipal sanitation services focus mainly on street sweeping and refuse collection, but what happens beyond primary collection is poorly managed and regulated. SWM is poorly resourced: understaffed and without

TABLE 1: WATER, SANITATION, AND SOLID WASTE MANAGEMENT SERVICES IN 10 TOWNS

Town	Total Population	No of Households	Sample size	5% of the HH	Adjusted Sample size	With 5% Reserve
Mekelle	323,700	64,740	382	3,237	**382**	401
Lalibela	12,080	2,416	332	121	**292**	306
Kombolcha	91,831	18,366	376	918	**376**	395
Gondar	323,875	64,775	382	3,239	**382**	401
Adama	323,999	64,800	382	3,240	**382**	401
Nekemte	110,640	22,128	378	1,106	**378**	397
Sebeta	72,582	14,516	374	726	**374**	393
Batu	64,203	12,841	373	642	**373**	392
W/Sodo	145,092	29,018	379	1,451	**379**	398
Welkite	55,097	11,019	371	551	**371**	390

specialist management; there are too few vehicles and very little revenue income. It is managed mostly by a small team in the municipal Sanitation and Greening Office (or similar name), sometimes alongside abattoir management. Waste collection by Small and Medium Enterprises (SMEs) is coordinated at *kebele* level, but not actively managed by municipalities.

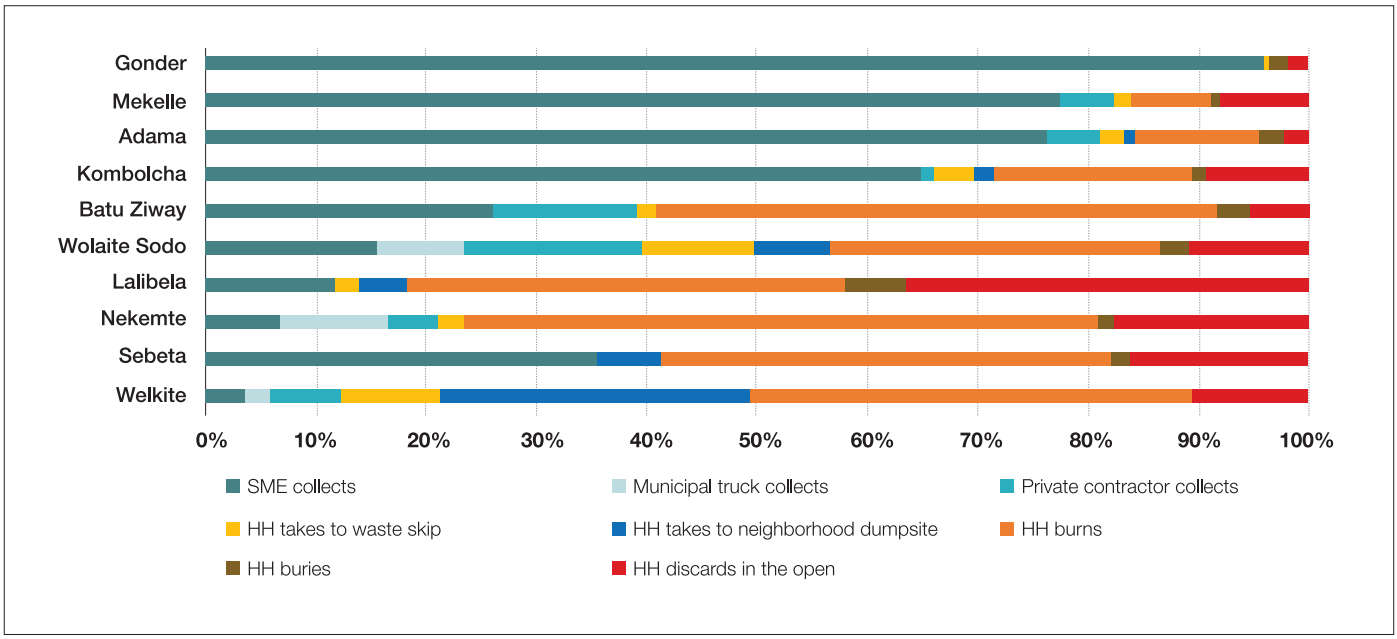
Most towns focus their solid waste services on primary collection, mainly done door-to-door by SMEs using hand-carts or donkeys. Seven of the 10 towns engage private sector providers in primary collection to some extent as well, as shown in Figure 2. Secondary collection from pick-up points, waste skips, and transfer stations is where the service starts to break down, because there are too few vehicles available to collect and transport the waste to the disposal site, and collected wastes spread, littering the neighborhood and attracting scavengers. Across the towns surveyed, formal waste collection services are reaching about half the households surveyed, with the remainder burning their waste (29 percent), or disposing of it in public places (17 percent). Forty-two percent of household members surveyed said they were not happy with the solid waste services they receive, with dissatisfaction levels higher in slums, mixed, and informal settlements. These settlements often have a higher population density, and need more frequent collections or additional workers. Based on calculations from a range of sources, it appears that just half—51 percent—of waste generated overall across the 10 towns reaches the disposal site. The figure ranges from 80 percent in Gondar to 5 percent in Lalibela.

Containment, collection, and transport

Primary collection

Most of the households surveyed collect and store their waste in grain bags—*madiberia*—before putting it out for collection or making their own arrangements for disposal. Collection services are limited in the smaller towns, and burning by households is the most common disposal option in Nekemte (57 percent), Batu (51 percent), Sebeta (42 percent), and Welkite and Lalibela (40 percent). Burning plastics give off toxins and the acrid smoke contributes to respiratory infections, especially in children. In Lalibela, 37 percent said they discard their waste in the open.

FIGURE 2: HOUSEHOLDS' SOLID WASTE MANAGEMENT PRACTICES



The household surveys and focus group discussions paint a mixed picture of solid waste collection services. Parts of most towns are well serviced and fairly clean; elsewhere, informants described their towns as 'very dirty', as solid waste services seemingly reach less than half of people surveyed. Residents of dense settlements, especially slums, complained in particular that collection and additional waste skips are not regular. Officials and focus group participants said that many households dump their wastes to avoid having to pay a collection fee, even though the collection fees are not onerous, at Birr 10 to 30 per month. Enforcement officers seldom impose penalties on individuals for open dumping.

SMEs are the backbone of primary solid waste collection, although their service coverage varies considerably from town to town. Most municipalities do not charge customers for solid waste services, and leave it to SMEs to collect cash directly from the people they serve. As there is no formal proclamation requiring users to pay the SME, fee collection can be difficult—in some towns 50 percent or less *(Schleicher et al., 2015; Beyene et al., 2015).* SMEs derive much of their income from serving hotels, which pay on average Birr 80–300 per month. Box 2 provides a sense of the challenges that affect SMEs.

BOX 2: FOR MOST SMES, SOLID WASTE COLLECTION IS HARD, POORLY PAID WORK

Over the past decade, government has promoted the use of Small and Medium Enterprises (SMEs) to collect solid waste collection, because it is labor intensive with high job creation potential. But SMEs providing these services said they were dissatisfied, and fewer SMEs are still willing to undertake this work. They said they were poorly paid and exposed to many health and safety risks, with little income to show once they had paid their costs. Some SMEs have withdrawn their services, leaving parts of some towns unserved. The median service fee that SMEs were able to charge households was Birr 15 per month, and service collection tariffs have not been reviewed for a long time.

Service frequencies vary significantly. In the center of towns, there is collection usually several times a week to remove the volumes generated by shops, hotels and markets. In residential areas, the norm is once or twice a week. In Lalibela there are not even hand-carts for solid waste collection, and SMEs carry the waste by hand, in bags. Elsewhere, the SMEs use mainly hand-carts and donkeys to transport solid waste to a collection point or waste skip, from where the municipality or contractor collects it and transports it to a transfer station or, more commonly, directly to the waste disposal site. Transfer stations are not necessary in small towns, as overall distances are relatively short and traffic congestion is not a problem.

Street sweepers do a considerable amount of primary collection of waste dumped in the street. Informants said that there is extensive contamination of solid waste with human feces, from open defecation in the streets and disposal of plastic bags containing human wastes. Dumping of medical waste is allegedly common around some medical centers.

Secondary collection

Gondar offers by far the most extensive primary collection service, with 96 percent coverage, but even Gondar suffers from one of the biggest bottlenecks in SWM: inadequate secondary collection. In every town, officials said there were too few vehicles to ensure that collected waste is transported quickly to the disposal site. In smaller towns, such as Welkite, the municipality uses a tractor and trailer to collect waste before trucking it to the waste site. In larger towns and cities, the municipality uses a combination of its own vehicles and private contractors to convey the collected waste to the disposal site. Municipal officials complained that their vehicles are old and prone to break downs, and that funding shortfalls result in long delays getting vehicles repaired, compounding delays in secondary collection. Box 3 discusses challenges in Nekemte.

96% **The estimated percentage coverage for the primary collection service offered in Gondar, which is by far the most extensive.**

BOX 3: NEKEMTE, LIKE MOST TOWNS, NEEDS A COMPREHENSIVE TURNAROUND IN SANITATION MANAGEMENT

Nekemte town, with a population of about 110,000 in 2015, is one of the larger urban centers in Ethiopia, and is located about 330 km west of Addis Ababa. It is the capital of East Welega zone in Oromia regional state, and plays an important role in economic and administrative activities for the surrounding cities and urban centers.

Nekemte is typical of most towns, and requires rapid intervention and dedicated resources for sanitation improvement. There is scheduled water rationing in the town, and daily consumption per capita is estimated to be about 29 liters. Sanitation services in the town require significant improvement across a range of areas.

The town generates about 58,128 m^3 of solid waste a year, but only about 35 percent reaches the disposal site. Solid waste management is the responsibility of the Beautification and Greenery team that is organized under municipal services. Fecal sludge desludging services are provided by the municipality as well as private vacuum truck operators. The sludge disposal site is fenced but people and animals can be seen walking about the site freely. The solid waste site is poorly managed. Shortly before the assessment team visited the town, 10 cows had died after eating old oil that had been dumped at the open dump area. The area is environmentally sensitive, with extensive forests and water courses. Adama, Wolaita Sodo, Welkite, and Batu face similar challenges that require quick action.

To turn around poor management, Nekemte's sanitation improvement plan has recommended a comprehensive intervention to strengthen institutional arrangements, develop infrastructure, and improve service provision across the service chain. The plan is aligned with the Second Growth and Transformation Plan and Sustainable Development Goal targets.

Solid waste treatment and reuse

All 10 towns have dumpsites, not landfills, and most are unfenced, with people and animals walking freely through them. There is very little covering or compaction being done. Five of the towns have adjacent open dumpsites for fecal waste, and the waste streams mix. All towns need these issues to be addressed as part of wider urban and housing plans, strategies and actions (see Box 4).

Mekelle and Kombolcha have recently developed landfill sites, but these have deteriorated into dumpsites because of inadequate management and funding. There is some limited compaction and backfilling at the site to stabilize the waste heaps and limit methane discharge, but everywhere else waste is simply dumped. None are treating the leachate, and polluted run-off from the dumpsites can be seen draining to local water courses.

Officials in several towns said they would prefer to have the water and sewerage utility take responsibility for managing both liquid and solid waste as they had no management capacity; alternatively, solid waste could be managed through a management contract. The dearth of management capacity at disposal sites is evident in the lack of earthmoving equipment at the landfill site in nine out of the 10 towns. Equipment had been bought to support covering and compacting of waste in Gondar and Kombolcha but was either not used, or not maintained, and so the equipment was taken over by the Roads Authority.

BOX 4: URBAN SANITATION IN THE WIDER CONTEXT OF URBAN SETTLEMENT AND HOUSING

In 2015, Ethiopia's urban slum population was estimated to be 74 percent of the total urban population *(UN MDG Indicators, 2015)*—one of the highest proportions of slum dwellers of any country *(World Bank Databank, 2016)*. The reason for this high figure lies in a combination of mainly historical factors: largely unplanned urban settlement during the Imperial era under Emperor Haile Selassie; nationalization of much urban housing during the era of the Derg Marxist government from 1975–1991, with very limited new housing development; and accelerating urban settlement from the 1990s at a rate far faster than formal housing development, with growing informal settlement *(Alemayehu, 2008)*.

Management of low value housing that was nationalized by the Derg was transferred to *kebele* administrations as rental stock, and rents were reduced substantially. With limited rental income, *kebele* administrations lacked the means to invest in maintenance or improvements of these houses, mainly constructed from *chika* (wood and mud). Some of the worst sanitation conditions today are found in inner-city slums in run-down *kebele* housing that is still occupied by long-standing tenants. As urban settlement began to accelerate from the 1990s, demand for low cost rental accommodation surged. The 2007 national census showed that private rental accommodation was by far the biggest segment of the housing market *(CSA, 2007)*. Much of it takes the form of multiple dwellings built within increasingly congested compounds. For landlords, there is often a trade-off between building another toilet—or any toilet—and building another rentable dwelling, and a range of statistics show that in most towns, half the population or more relies on a shared toilet. In addition, there are illegally extended houses often constructed temporarily with wood and mud or steel structures. Most of these houses are rented to migrants and low income daily laborers. Often, they do not have latrines or basic sanitation facilities.

The government is driving a large public housing program, with multistory condominium complexes offering a range of options to promote home ownership. The scale of need is vast, and the supply of new housing lags far behind demand. By the end of the GTP II period in 2020, the government aims to build an additional 600,000 condominium units, up from the 157,000 built by 2015. But even this ambitious program leaves a large remaining housing gap, and there are growing concerns about how affordable this new housing is for low income households.

Condominium housing presents very different sanitation challenges to those found in most other residential areas, and the government regards waterborne sanitation with centralized or decentralized treatment as the most appropriate option for these dense vertical settlements. But in every town there are large run-down areas needing urgent sanitation improvement, but where upgrading is unlikely for many years. In a context of very limited public funding for basic services, town administrations face difficult trade-offs in raising funds to support sanitation improvements in established settlements, and external support for infrastructure development will be essential.

Mixed settlements in Addis Ababa. *(Photo Credit: Kathy Eales).*

There are no formal source segregation schemes in any of the towns, and all waste streams are mixed together, including vegetable wastes from fresh produce markets. Kombolcha's municipality employs eight laborers to recover plastics and metal from the waste site, but in all other towns the waste picking is informal.

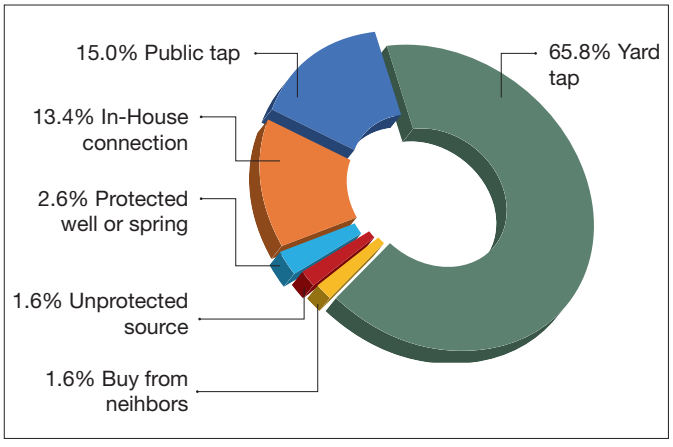
Key findings: Liquid Waste Management

Water and wastewater

Ethiopia's policy framework for wastewater management envisages sewerage as the norm in urban areas, and assigns responsibility to town and city-based water and sewerage enterprises (WSSEs) to manage sewer networks and wastewater treatment facilities. Beyond Addis Ababa, no WSSE has any sewer networks to manage, and their role in urban sanitation is currently limited. This will soon change, as government gears up to develop sewer networks in a number of secondary cities.

Water connections on the premises have increased by nearly 20 percent over the past decade to 63 percent in 2016 *(CSA, 2007 and 2016)* and reliance on public taps has diminished markedly. With more convenient access comes higher consumption, however, which is outpacing source development and network upgrading in most towns. There is growing evidence of water stress at town, with intermittent water supplies and scheduled rationing. Across the 10 towns, 40 percent of households with flush or pour flush toilets said that seasonal water shortages affected the functioning of their toilets, with the problem most marked in Mekelle.

FIGURE 3: SOURCES OF WATER, SUMMARIZED ACROSS 10 TOWNS



Urban Ethiopia currently has insufficient water supplies to support comprehensive sewerage services, and too few in-house water connections in most areas to make sewerage sanitation necessary or feasible. Only Adama, Batu, and Kombolcha reported water consumption levels above 30 l/c/d. Nonetheless, the volumes of used water being discharged require management attention. Household infrastructure for greywater management is very rudimentary, and there is extensive mixing of used water with fecal and solid wastes. Town officials in several towns believe their most urgent sanitation challenge is wastewater drainage.

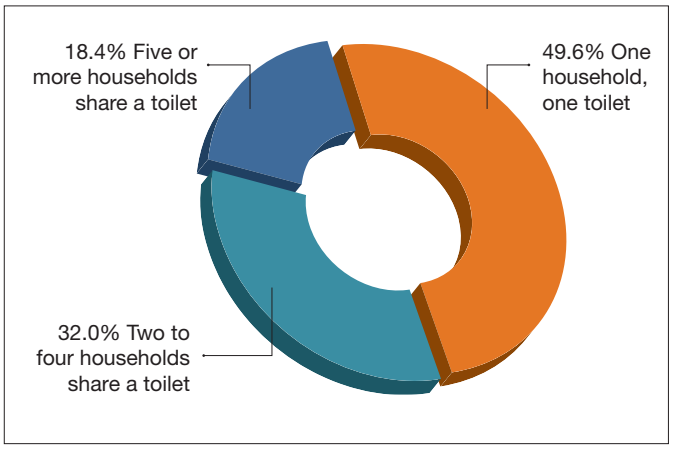
Across Ethiopia's towns and cities, nonsewerage sanitation is still regarded as essentially an individual or household responsibility, and managing fecal sludge and used water for the public good receives little attention. While urban health extension teams work with households door to door, public spending on liquid waste management has been concentrated largely on building public toilets in most towns. There is now growing federal commitment to invest in wastewater management infrastructure, but the 10 town assessments indicate a range of funding needs for liquid waste management and sanitation improvement, with a strong component of recurrent, not just capital, spending.

Containment

Outside of Addis Ababa, where 10 percent of the population is connected to a sewer network, Ethiopia's urban residents rely exclusively on on-site sanitation, mainly shared dry pit latrines. Data from a representative sample of households across the 10 towns show that three-quarters (75 percent) of all households were using a dry toilet, and more than half (57 percent) used a dry toilet shared by several families. Most people use an outside toilet, and the top-structures are built predominantly from *chika* (wood and mud) or concrete blocks, with a corrugated iron roof.

Across the 10 towns, tenants were more likely to use shared facilities than owner-occupiers, but 45 percent of people living in a home they owned used a shared toilet. The most common reasons given by people who did not have their own toilet was that there was no space to build one

FIGURE 4: SHARED TOILETS



(43 percent), or that their landlord had not provided one (41 percent). Relatively few said that the cost of building a toilet was the constraint. In this context where so many households use a shared latrine, asking what proportion of households do not have a toilet (to establish lack of access) can result in ambiguous responses. Figure 5 shows the type of toilet that survey respondents said they used, irrespective of whether it was their own toilet, a shared toilet, a neighbor's or a communal facility.

Summarized across the 10 towns, one in four households uses a flush or pour-flush toilet, although town by town there are significant variances. In Welkite, just 4 percent of respondents said they used a flush or pour flush toilet, compared to 68 percent in Gondar. On balance, there is a steady upward trend in the use of flush and pour flush sanitation facilities relative to 2007 Census figures, related to significant growth in the number of yard and house connections for piped water. Households with a flush toilet generally described their containment system as a septic tank, but mostly these are simply a receiving chamber, and better described as a cesspool or leach pit. A worrying finding was that 16 percent of condominium residents surveyed were using dry pit latrines because their indoor flush toilets were dysfunctional. This was not confined to just one town, but was noted in Batu, Gondar, Nekemte, and Sebeta. The problems were related to poor quality plumbing installations, badly constructed or undersized septic tanks, and low water pressure.

"Improved sanitation" facilities do not offer consistent protection against disease. The GoE defines 'improved sanitation' very widely, and includes all facilities that have a floor slab, along with flush or pour flush facilities, ventilated improved pit (VIP) latrines and composting toilets. Using this measure, and including shared improved latrines, 74 percent of surveyed facilities are "improved". Such categorization of toilets as improved purely on the basis of the type of structure is not always a reliable indicator of whether they indeed ensure hygienic

FIGURE 5: TYPES OF TOILETS, BY TOWN

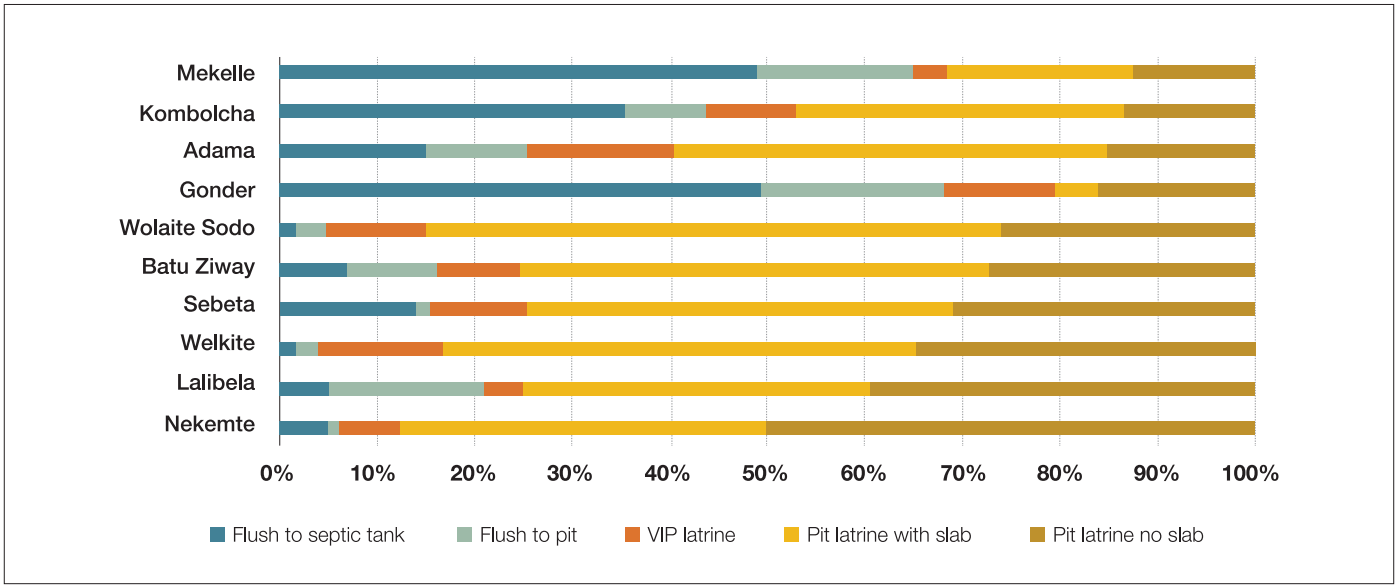
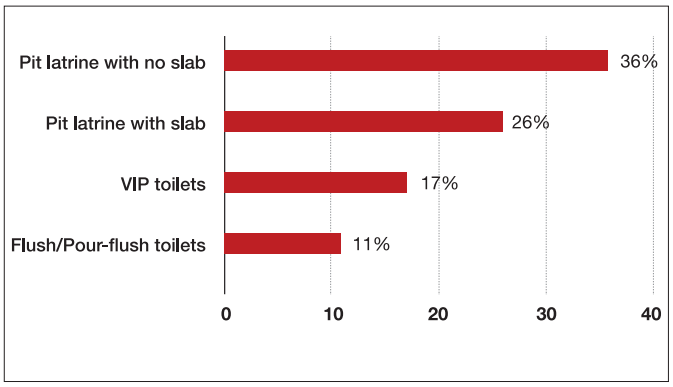


FIGURE 6: TOILETS WHERE SLUDGE WAS OBSERVED FLOWING OUTSIDE THE FACILITY (IN PERCENTAGE)



separation of human excreta from human contact and from carriers of disease. Based on direct observation by trained survey enumerators, a significant number of facilities categorized as improved offer little protection against disease. The slabs of 27 percent of improved toilets were fouled with feces, and sludge was flowing outside the toilet in 20 percent of those categorized as improved.

Open defecation is generally far higher than survey data on access to toilets suggest. The extent of open defecation is often assumed to match the number of people without access to a latrine, but the evidence suggests a more complex dynamic, and behavior cannot simply be inferred from the presence or absence of toilets. Open defecation is likely where there are inadequate public facilities to serve travelers, visitors, and migrant laborers, and none of these groups are likely to feature in surveys tracking household toilet coverage. Equally, a person may have access to a toilet, but may choose not to use it for various reasons. Focus group participants said open defecation was practiced widely, to an extent far greater than toilet coverage statistics would suggest. They included both local residents and visitors, and highlighted the need for more public facilities to serve daily laborers, especially around construction sites.

In Lalibela, a significant 18 percent of survey respondents said that they practiced open defecation because they had no toilet. One reason is that entire communities have been relocated to new settlements to protect the heritage

New housing in Lalibela—without toilets. *(Photo credit: Chris Heymans).*

sites around the town's historic stone-carved churches. The new settlements have improved roads, electricity and water supplies, but no toilets. In some parts of the town over 60 percent of households do not have a toilet of their own, and it is common for five households to share a single toilet. Focus group participants in Lalibela said the prevalence of open defecation is substantially higher than 18 percent, also because of inadequate public toilets to serve the large number of visitors to the town.

A far greater number of communal and public facilities is needed. Extensive open defecation and sharing of toilets indicates the need for greater public investment in additional communal and public facilities. Communal

BOX 5: WHY DO SO FEW WOMEN USE PUBLIC TOILETS?

Building public toilets is recognized widely in Ethiopia as necessary to avoid open urination and open defecation, but it is mainly men who use them. This is not surprising when public facilities do not have separate sections for men and women. A 2014 survey in 28 towns and cities found that 46 percent of public latrines and 78 percent of public showers had unsegregated facilities *(JSI/SEUHP, 2015)*. But even where public toilets have separate facilities for men and women, very few women are using them, and so men are using the women's sections too. This further discourages use by women, and contributes to discomfort, distress, and ongoing open defecation.

Why do many women not use public toilets? The available information suggests some feel uncomfortable or embarrassed to walk to a toilet through a group of men standing at the entrance. Others have concerns around personal safety because of the location or poor lighting, or dislike using smelly or unclean facilities, or the toilets lack facilities for disposing of menstrual hygiene products. In others there is no privacy where doors are broken or missing. This leaves women unserved.

What can be done to make public and communal toilets more user-friendly for women and girls? A different approach to planning, siting, design, and management of public toilets could help to ensure they meet women's needs as well men's. Options could include better lighting and ventilation, access control with a woman caretaker at the entrance, and women-only facilities.

More broadly, the issue highlights the critical importance of considering gender when identifying service gaps and planning improvements, to ensure that the needs of all users are met. Schools' sanitation is receiving growing attention in Ethiopia, in part because inadequate school toilets contribute to adolescent girls missing school periodically or dropping out altogether *(Tamiru, 2015)*. This compromises the government's gender equity and poverty reduction goals.

Involving women and girls in the planning, design, siting, and management of facilities has been shown to increase the likelihood that the facilities will be used as intended, and meet their needs *(WSSCC, 2006)*. This requires a willingness on the part of municipal service agencies to take women's distinct needs seriously, to ask different questions, and to be open to modifying plans, designs, and management options in the light of new information.

An attractive public toilet run well by an SME in Mekelle. *(Photo credit: Kathy Eales).*

and public toilets serve different needs. Communal toilets are used and managed by people who know each other, and are open 24/7. Public toilets serve public spaces around markets, bus ranks, heritage sites, and elsewhere. They are usually locked at night and so they do not meet the needs of local residents after hours, while women face notable difficulties using them safely (see Box 5). Over and above more public toilets, additional communal toilets are needed to address the lack of space on many plots to build additional toilets and the reluctance of many landlords to provide adequate facilities.

Beyond construction, better management systems are needed for communal and public facilities. Local authorities are handing over a growing number of public facilities to SMEs to run, and some are operating them very well. But this assessment corroborated the findings of an extensive 2014 national survey of public and communal facilities by John Snow, Inc. (JSI), which implemented the USAID-Strengthening Ethiopia's Urban Health Program (SEUHP) (JSI/SEUHP), which found that the majority are in poor condition and badly managed. The public latrine visited by the team at Batu's public transport terminus, for example, has been closed for a long time due to poor management and maintenance.

Handing over facilities to SMEs has had mixed results. SMEs can offer good management, but modest income from user payments is often insufficient to cover staff costs, let alone fund maintenance and a safe emptying service.

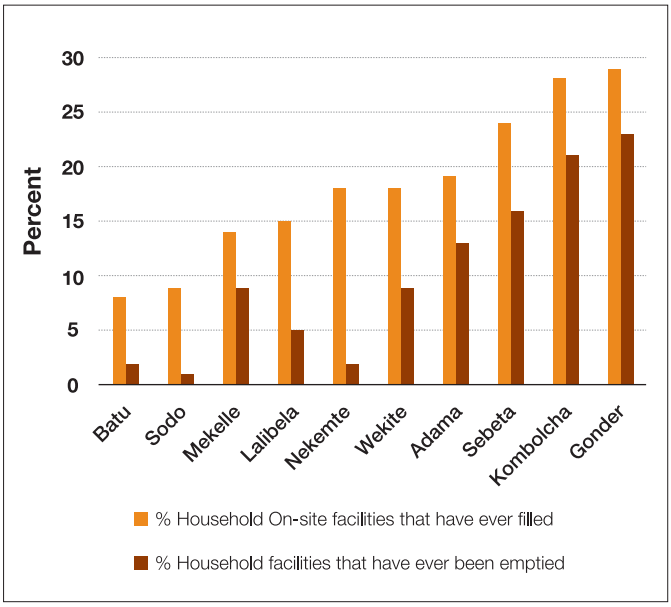
Emptying and removal

Emptying services are essential to keep facilities usable and prevent households reverting to open defecation. What happens when the latrine pit or septic tank is full and there is no space to build another? Providing emptying services that are safe and affordable is essential to keep existing toilet systems functional and pleasant to use, as well as to ensure that wastes are removed and managed safely without further hazards. Where toilets cannot be emptied safely and become unusable, households may revert to open defecation, or unsafe emptying methods.

Households have traditionally closed and covered over a full latrine pit and built a new one, but as densities increase and the number of dwellings grows, there is less space to construct a replacement pit, and a growing need is emerging for safe and affordable pit emptying services. More than half (58 percent) of households with latrine pits have used emptying services, compared with 42 percent who said they had covered over full pits. In every town surveyed, more sludge is being generated and requires periodic removal than the available formal service providers have

An overflowing pit latrine, Welkite. *(Photo credit: Kathy Eales).*

FIGURE 7: HOUSEHOLD FACILITIES THAT HAVE BEEN FILLED/ EMPTIED



the capacity or resources to remove. Anecdotal and other evidence suggests a significant volume is being discharged illegally directly into local drainage channels, and hotels were cited frequently as examples.

Additional vacuum tankers are needed, but not all potential customers can afford their tariffs. Equally, vacuum tankers cannot reach all households because of limited road access, steep slopes, and the length of hose required to reach some sites. Vacuum tankers are often an inappropriate technology to remove dense sludge from pit latrines, especially when it contains a lot of solid waste.

Household surveys indicate that about one in five urban household septic tanks and latrine pits has ever filled, and about one in 10 has ever been emptied. In line with the predominance of dry pit latrines, the type of household toilet that is emptied most commonly is a dry pit latrine with a slab and some degree of pit lining, and 11 percent of that type of toilet has been emptied. Of the towns surveyed, Gondar has the highest proportion of household facilities that have filled up (29 percent), and emptied (23 percent). Mekelle also has a high proportion of 'wet' toilets, yet has a lower incidence of reported filling and emptying - even though many household septic tanks were seen to be seeping septage.

Vacuum tanker services serve mainly nonresidential customers, and a wider range of emptying services is needed to serve households. Vacuum tanker services are available in all 10 of the towns surveyed and, in seven, there is at least one publicly-run service provided by the municipality or, in Gondar, by the water utility. Publicly-run services tends to be cheaper but less responsive than those provided by the private sector, and to be unavailable for longer when repairs are needed. In Gondar, private operators reported less than 10 percent down-time as against the 50 percent down-time reported by the utility's tanker operators.

In small towns, customers rely on a municipal tanker service, where this is available, or they hire a vacuum tanker from a neighboring town. Hiring a tanker from another town raises the cost substantially, and puts the service out of reach of most households. Privately operated vacuum tankers are generally not found in small towns, as there is usually not enough demand to make emptying commercially viable.

Commercial vacuum tanker operators said that most of their business was with commercial and institutional users, such as hotels, hospitals, universities, and government buildings, with pour flush and flush toilet systems. Where there is no private operator, municipal vacuum tankers service mainly commercial and institutional users, not households. Survey focus group findings indicate that municipal operators are perceived to be slow to respond to household service requests, with delays often lasting several months. These delays are particularly problematic where pits and septic tanks are already full. Those able to afford the higher cost of a private operator generally opted for paying the higher tariff for quicker service. Box 6 offers insights into the profile of such operators.

Municipal vacuum tanker tariffs are generally subsidized by the local authority and are substantially lower than those of commercial service providers. Private vacuum tanker services generally start at about Birr 400 per tanker load, irrespective of the volume removed, and can rise to well over Birr 1,000, with tariffs far higher for nondomestic customers. Municipalities generally charge from Birr 300 to 600 for households, and from Birr 400 to 800 for institutional and commercial customers. In Addis Ababa, the price difference between the water utility's tanker tariff and commercial service providers is even bigger, although households in all towns said they found even subsidized tariffs unaffordable. Just 3 percent of households who had had their latrine pits or cesspools emptied said they had paid an emptier who used manual emptying methods, although evidence from beyond the 10 towns assessment suggests the incidence could be far higher *(Hywas/BMGF, 2011; Kasse (CSA and MoH), 2014)*.

There is an urgent need for safe emptying services for facilities that vacuum tankers cannot service, at prices affordable for most people. Local authorities may need to support safe and affordable local emptying by contracting SMEs or other service providers, and subsidizing part of their operating costs. This topic is addressed in more detail in the *Ethiopia Urban Sanitation Series* Just in Time paper on safer sludge removal.

BOX 6: PROFILE OF A COMMERCIAL VACUUM TANKER PROVIDER

In Batu, a single private operator has been providing desludging services since 2014. Prior to that, customers had to request services from operators based 100 km. away in Adama, and often had to wait two weeks or more for service.

Overall 90 percent of his customers are nonresidential, mainly hotels, industries, universities, and government buildings. Servicing a hotel generally requires two to three trips. He services three or four customers in Batu each week, but 70 percent of his work is outside of the town. He is busiest during the rainy season.

He charges Birr 1,000 (about US$44) per trip, irrespective of whether the tank is full or not, and with no concessions for residential customers. He charges up to Birr 1,600 (US$70) to service customers in Shashemene, more than 100 km. away. His business is unusually lucrative, because his biggest customer is a Batu-based large commercial flower farm that has to conform with stringent environmental management measures to retain its export contracts. That enterprise alone contracts him for 100 trips a year.

He entered the business using a bank loan to import a second-hand truck from Dubai, with a new vacuum pump and a huge 14 m^3 tank, which cost him Birr 1.7 million (US$74,500). Including equipment and insurance, his outlay was Birr 1,900,000 (US$83,000).

Sludge and wastewater treatment, reuse and disposal

Effective treatment of wastewater and sludge is rare in all 10 towns. Kombolcha is the exception, with good infrastructure—two waste stabilization ponds and sludge drying beds—and good operational management by the WSSE. It is the only town assessed where the WSSE is active in sludge treatment.

Mekelle and Gondar have sludge drying beds, but poorly managed and with low treatment efficiency. Lalibela's new fecal sludge treatment facility receives very little sludge because of the poor condition of the access road. In Batu, sludge is discharged into a large pond, with no means of draining it. In the remaining towns, sludge is discharged directly onto open ground. In most towns, the sludge discharge site is next to the solid waste dumpsite, and the waste streams mix, contributing to extensive and severe pollution of the surrounding area. There is little evidence of safe reuse of sludge.

Industrial Wastewater Management

The GoE's Growth and Development Plans emphasize accelerated development of the industrial sector, and a growing number of industrial zones are being developed to attract local and foreign direct investment. New industrial sites are being developed in Adama, Mekelle, and Kombolcha, and four industrial parks are being developed in Addis Ababa. The envisaged industries include food and agro-processing, textiles and apparel, and, in Adama, vehicle assembly too. Each produces waste streams and pollutants that require special management.

Ethiopia has comprehensive legislation to safeguard environmental protection, notably the 2002 Environmental Pollution Control Proclamation and the 2008 Prevention of Industrial Pollution Regulation, but the federal ministry of Environmental, Forestry and Climate Change and Regional Environmental Protection Agencies have limited capacity to manage and regulate the environmental threats posed by the fast growing industrial sector, and there is little systematic monitoring and inspection. Coordination between the industrial, water, and other sectors is currently too weak to manage the impacts of the envisaged developments. The capacity of city-level Environmental Protection Offices is even more constrained. They are tasked with enforcing standards, but need appropriate guidelines, standards, and enforcement measures. Town and city leaders currently give very little attention to managing and mitigating potential pollution impacts of existing and new industries.

A private operator discharges sludge at Kotebe works. *(Photo Credit: Kathy Eales).*

Strong regulation and enforcement is needed to ensure that pollution streams are managed effectively and do not impose a burden on local and downstream communities and the environment. Management of industrial waste streams is a highly specialized field, and enforcement of existing proclamations requires specialist personnel with the authority to command compliance. The assessment team observed direct discharge of industrial wastes into open fields and rivers in Kombolcha, Gondar, and elsewhere. A number of recent studies have documented shortcomings in pollution control in the tannery, food processing, and textiles sectors, and the impacts of direct discharge of untreated wastes into local rivers. High organic loading imbalances the aquatic ecosystems required to cleanse rivers and lakes, and polluted irrigation water impacts crop production and livestock health, and contaminates soils with toxic heavy metals *(Zinabu, Yazew and Haile, 2010; Getahun & Selassie, 2013; Mehari, Gebremedhin and Ayele, 2015; Gebre, Demissie, Mengesha and Segni, 2016)*. Pretreatment of wastes is necessary prior to discharge into municipal treatment systems, and full treatment is needed before discharge directly into water courses.

Overall Assessment of the State of Sanitation in the 10 Towns

Assessment findings from each town can be mapped across the service chains for fecal sludge and SWM to identify vulnerabilities and priorities for intervention. The approach is illustrated with a fecal flow diagram for Batu. Green arrows show safe management, while red arrows show where waste is polluting the environment.

The diagram shows that in Batu, 85 percent of household fecal sludge is not managed safely. The biggest source of fecal pollution is not open defecation but poorly managed on-site facilities that are abandoned unclosed when full, or discharged directly into drains, or emptied unsafely and the contents abandoned. Very low volumes of fecal sludge are being emptied using vacuum tankers, with no treatment of sludge at the open disposal site.

FIGURE 8: HOUSEHOLD FECAL FLOW DIAGRAM FOR BATU ZIWAY

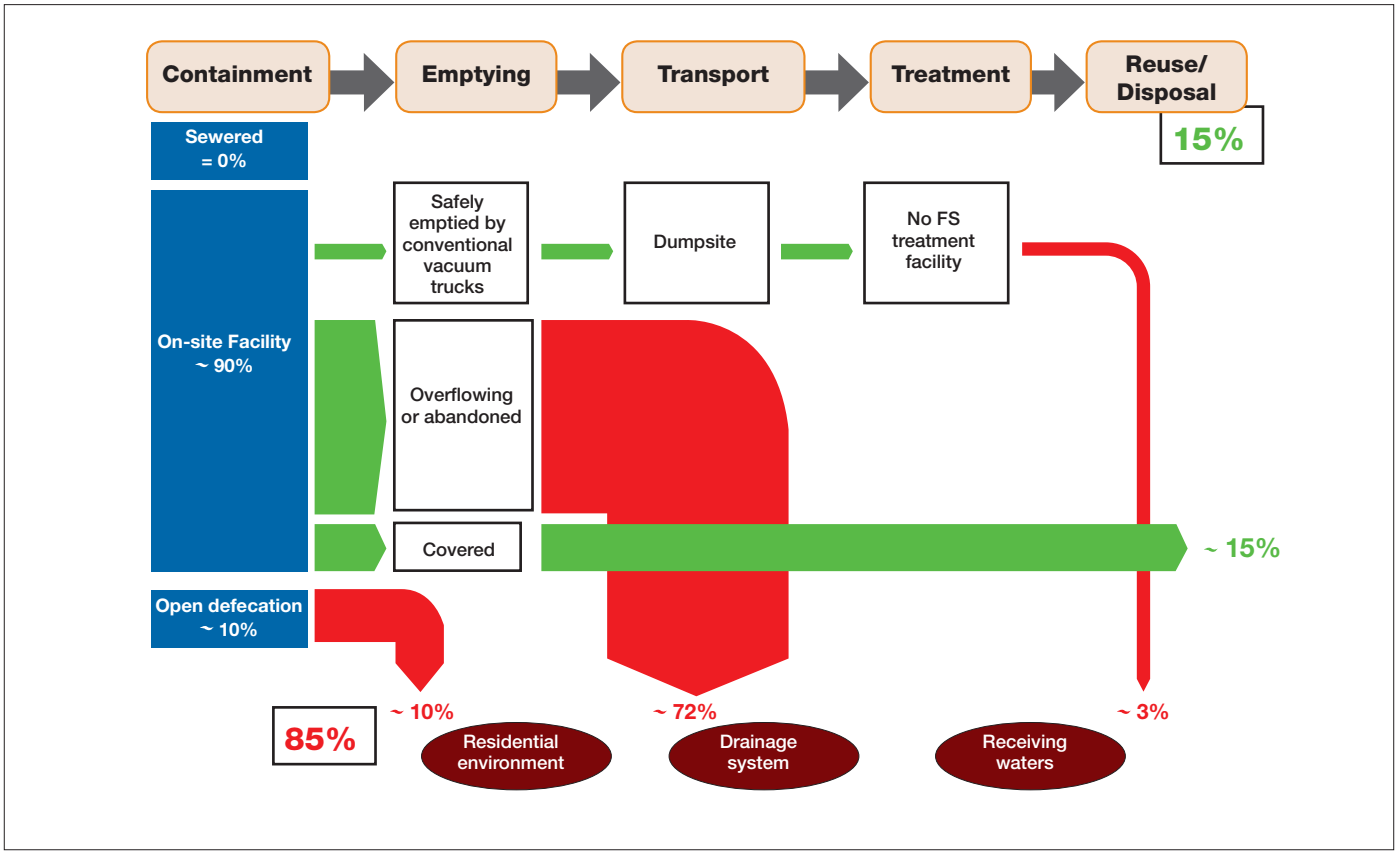
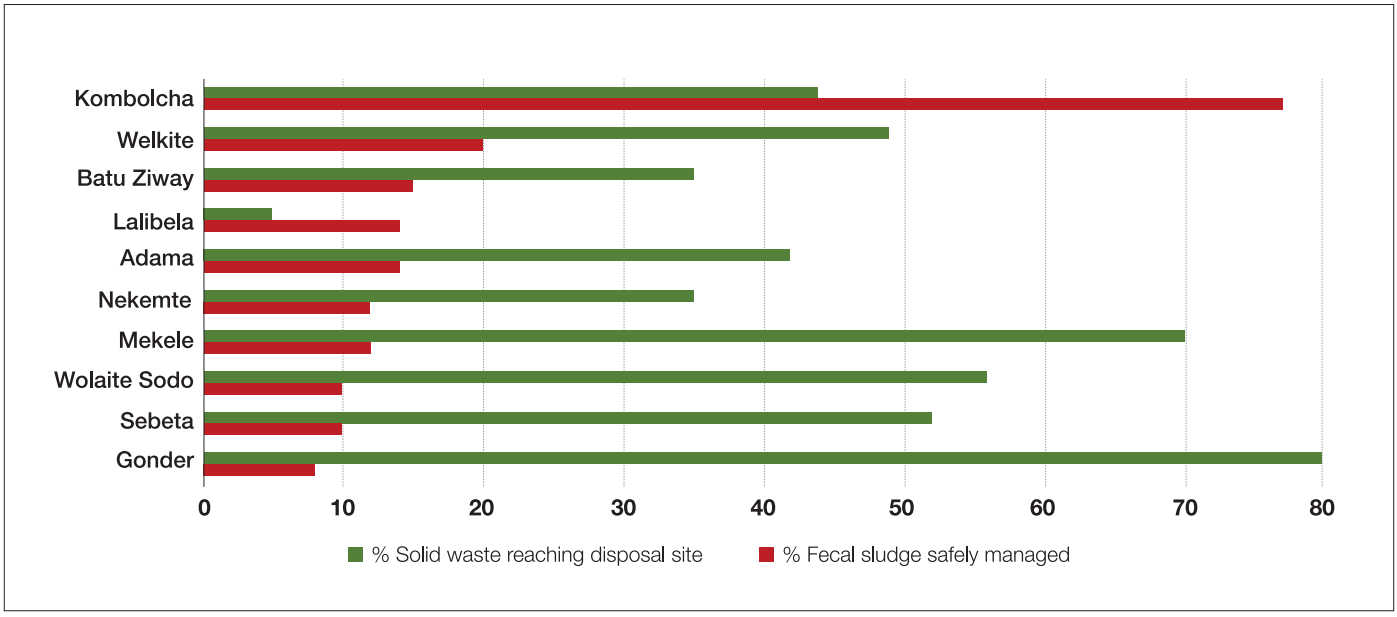


FIGURE 9: THE EXTENT OF SAFE FECAL MANAGEMENT PER TOWN, AND THE PERCENTAGE OF SOLID WASTE BEING GENERATED THAT REACHES THE TOWN'S DISPOSAL SITE



Institutional and Legal Framework for Sanitation

Ethiopia does not have a stand-alone sanitation policy, but sanitation development strategies are captured in the health, environment, water, and urban development sector policies. The institutional fragmentation of urban sanitation has compromised a shared understanding of the scope of urban sanitation, and there is no common agreed problem statement, no consensus on priorities, and unclear mandates in addressing waste management demands.

In 2017 the key ministries endorsed a cross-sector IUSHS, with the aim pulling together the relevant strands of different sector policy documents, clarify the big picture, enhance greater organizational synergy, and refine the mandates of the different ministries. However, with several institutions involved in urban sanitation service delivery from federal to town level, this process will continue as the respective institutions come to terms with evolving urban sanitation challenges. Fact is that the roles of multiple institutions are still evolving at all levels. At federal level, the MoUDH, MoH, MoWIE, and Ministry of Environment, Forestry and Climate Change are the key institutions involved in urban sanitation policy setting, strategy formulation, and developing national guidelines. At regional level, several bureaus are involved in capacity building, funding, and monitoring of urban sanitation activities, resembling the institutional arrangements at federal level, typically with an office responsible for sanitation, beautification, and greenery in the regional Urban Development Bureau. Some Regional Water Bureaus are now interested sewerage systems, especially for the MoWIE's proposed wastewater interventions in six cities earmarked for sewerage. Liquid waste management is also supported by the Regional Health Bureau, focusing mainly on promoting hygiene and sanitation at household level. There are overlaps in the regulatory roles of the agencies responsible for Health, Culture and Tourism, Water and for Environment and monitoring and enforcement capacity is generally weak.

TABLE 3: SUMMARY DATA FOR TEN TOWNS

		Oromia				Amhara			SNNPR		Tigray
		Adama	Batu	Sebeta	Nekemte	Gonder	Kombolcha	Lalibela	Welaita Sodo	Welkite	Mekelle
Context	Regional capital	Yes	No	No	No	No	No	No	No	No	Yes
	Zonal center	Yes	No	No	Yes	Yes	No	No	Yes	Yes	Yes
	Population (2015)	323,999	64,200	72,600	110,640	323,900	91,800	27,155	145,100	55,100	323,700
	Population change from 2007	46%	47%	47%	47%	56%	56%	56%	91%	91%	50%
	Tourist center	No	No	No	No	Yes	No	Yes	No	No	No
	University	Yes	No	No	Yes	Yes	Yes	No	Yes	Yes	Yes
	Industrial park	Yes	No	Yes	Yes	No	Yes	No	Yes	No	Yes
Water supply	Daily per capita consumption l/c/d	37	50	29	28	28	33	22	10	26	26
	In-house connection	14%	7%	14%	5%	24%	37%	17%	2%	2%	27%
Latrine facilities	Access to improved sanitation (pour/flush, VIP, including shared	40%	25%	26%	12%	44%	53%	25%	15%	17%	68%
	Households using shared toilets	51%	53%	48%	60%	39%	49%	42%	54%	51%	46%
	Dry toilets	74%	84%	85%	94%	52%	56%	88%	95%	96%	35%
	Pit latrines with no slab	15%	27%	31%	50%	11%	13%	33%	26%	35%	12%
	No toilet facility	7%	10%	8%	5%	7%	5%	7%	5%	5%	4%
	Public toilets	25	3	20	19	9	24	26	8	9	24
Greywater	Percent to environment and drainage	70%	76%	62%	100%	53%	49%	64%	70%	44%	46%
Liquid waste: Desludging and transport of fecal sludge	Municipal vacuum tankers	0	0	1	1		1	1	0	1	2
	Water utility vacuum tankers	0	0	0	0	2	0	0	0	0	0
	Privately operated vacuum tankers	15	1	0	1	3	3	0	1	0	24
Sludge treatment and disposal	Sludge drying bed					Yes	Yes	Yes			Yes
	Open dumping site	Yes	Yes	Yes	Yes				Yes	Yes	

		Oromia				Amhara			SNNPR		Tigray
		Adama	Batu	Sebeta	Nekemte	Gonder	Kombolcha	Lalibela	Welaita Sodo	Welkite	Mekelle
Solid waste: Volume generated and collected	Amount generated per annum in m^3	288,000	23,874	129,750	58,128	235,346	77,850	23,959	66,432	29,272	369,601
	Percent collected	84%	59%	59%	43%	96%	73%	18%	80%	60%	96%
	Percent reaching the disposal site	42%	35%	52%	35%	80%	44%	5%	56%	49%	70%
Primary collection	Households served by SMEs	76%	39%	13%	24%	96%	66%	12%	20%	12%	82%
	HHs which carry their waste to collection point	3%	20%	28%	19%	0%	6%	6%	57%	48%	9%
	Households served by private developers	5%	0%	0%	0%	0%	1%	0%	3%	0%	5%
Secondary collection and transport	Undertaken by SME	Yes	Yes	Yes	Yes	Yes				Yes	Yes
	Undertaken by private contractor	Yes		Yes	Yes	Yes	Yes		Yes		
	Undertaken by municipality	Yes	Yes				Yes	Yes	Yes	Yes	Yes
Disposal site	Sanitary landfill							Yes			
	Dumping site		Yes	Yes	Yes	Yes	Yes				Yes
	Open field	Yes						Yes	Yes	Yes	

Provision of urban sanitation services is undertaken at town level. The key institution at the town level is the municipality which is responsible for the provision of waste management services. In some towns water utilities are in charge of liquid waste management but in the overwhelming majority (over 95 percent) of towns, the municipality remains the key institution. Box 7 provides more perspective on the institutional arrangements and related challenges at town level.

Sanitation Funding

Funding provision for urban sanitation is very limited and sufficient only for very rudimentary service provision. Inadequate funding reflects the low priority given to sanitation improvement—and the absence of workable strategies or financial plans to achieve a turnaround.

Local authorities rely heavily for funding on block grants transferred from regional government, and most of that income is spent on salaries. Funding for sanitation capital projects is sourced mainly from federal development initiatives, such as the Urban Local Government Development Program that is funded by federal government loans, or local projects funded directly by donor partners. To date, there has been relatively little capital investment beyond landfill developments in Mekelle and Gondar, and limited fecal sludge treatment facilities in Gondar, Mekelle, Kombolcha, and Lalibela, and the operational performance of that infrastructure is severely constrained by inadequate provision for operating and maintenance costs.

Town administrations collect very little revenue from sanitation beyond a nominal sanitation tax charged as part of an annual property tax. The amounts collected are small, and are not necessarily ring-fenced for sanitation alone. The amount allocated to Mekelle's sanitation activities from this source in 2016 was not enough to cover the annual operational and maintenance cost of the city's two vacuum tankers that are used primarily to empty public facilities, and funding allocated to waste management from general revenue was under Birr 2 million (US$87,500). Service users pay service providers directly for desludging services, and in most towns and cities, SMEs collect user payments for primary collection directly.

In each town, the municipal Sanitation Office lacks a line item in the city budget for SWM and street sweeping, and funding is allocated from general revenue, sometimes ad hoc. Sanitation staff were not able to quantify their costs. Service improvements will be difficult without a far-reaching review of current budget allocations, sanitation taxes and tariffs, and staffing. Significantly greater recurrent funding is required. Decisions over local tariff levels, organizational structures, and staffing are taken at regional government level.

BOX 7: INSTITUTIONAL ARRANGEMENTS FOR URBAN SANITATION IN TOWNS

The institutional arrangements for urban sanitation vary slightly from region to region. Typically, the town administration is responsible for coordination, supervision, and control of the organizations involved in urban sanitation. The municipality is responsible for planning, developing, and service provision of solid and liquid waste management and operating the disposal sites. The municipal infrastructure department is responsible for the development of roads and drainage, and the Health Office is primarily responsible for community awareness through the health extension program and enforcement of public health regulations. The Environment Protection Office is mandated to regulate waste management but its capacity and resources are limited and its focus is primarily on industrial and large institutions. The Regulation Enforcement Unit is responsible for enforcing regulations, through staff deployed in *kebeles*, but paid and administered by the municipality. The Micro and Small Enterprises Development Agency is responsible for recruiting, training, organizing, and deploying primarily unemployed youth and women in labor intensive works, including solid waste primary collection and public latrine construction.

Kebeles are a vital part of urban administration, as they are supposed to mobilize residents around town and regional programs, link them with municipal service structures, and help enforce sanitation regulations, with recourse to support from the enforcement agencies for environmental health and environmental protection.

Town-level institutions involved in urban sanitation face a number of challenges, starting with the absence of effective coordination. The most vivid exception is Welkite town, where there is a sanitation committee, which was organized as a result of WaterAid's involvement in the town. Other challenges include weak capacity both in operations and project management, although Mekelle and Gondar have better project management capacity, developed through the World Bank-funded water supply development programs in the towns. Furthermore, there is weak oversight and regulation of private sector service providers, and limited enforcement of waste management regulations in the town.

The institutional fragmentation and weak capacity is reflected in low responsiveness to service needs, inefficient service delivery, and low priority given to sanitation when allocating and utilizing resources.

Concluding Comments

In summary, a range of factors contribute to the current poor state of urban sanitation. They include rapid urban growth in a context of widespread poverty; a lack of space to build toilets in congested settlements; a high proportion of tenants with little incentive to invest in improvements on someone's else's land; demand for low cost accommodation that requires preparedness to tolerate inadequate shared sanitation; limited pressure on political leaders to attend to sanitation service gaps; little enforcement of the public health and solid waste proclamations that exist because of little leadership and too few staff; fragmented awareness of the state and scope of sanitation in town and city administrations, compounded by a lack of coordination and collaboration across basic services management portfolios; a high turnover in staff and city mayors, which undermines continuity and long-term commitment; incomplete decentralization, with regional governments retaining decision making authority over staffing, organizational structures, and tariffs levels; inadequate local government funding for most recurrent costs beyond salaries, and an almost total reliance on external sources for capital funds; low priority given to improving urban sanitation management, and weak incentives to attract and grow the sanitation professionals that Ethiopia's cities need; and so on.

The net result is that town and administrations have lacked a clear vision of how to tackle sanitation improvement in contexts where comprehensive sewerage is not possible, and where a lack of funding constrains most choices. This is why comprehensive Sanitation Improvement Plans for each of the 10 towns form an important step forward.

IV. Planning Sanitation Improvement

The Sanitation Improvement Plans aim to provide the administration of each town with a viable comprehensive plan to address its urban waste management challenges over the next 13 years. The plans address both liquid and SWM, and emphasize the need to strengthen the institutional framework to drive sanitation improvement across the whole city. The scope of activities is wide, with approaches adapted for different contexts—large cities, industrializing medium-sized towns, small towns—with different options for different housing and settlements types across formal and informal areas across the urban core and periphery. With relatively limited resources, the team has developed a model that can be adapted for use in other towns by adjusting key parameters.

The assessment plan developed for each town provided the baseline data source. The team worked with town officials through a series of meetings and workshops to map scenarios, identify possible service improvement options and make recommendations. The overall approach was to develop a methodology that could be used in a context of very limited data and town plans, and that could be implemented in a context of limited capacity. The plan was guided by a set of principles agreed by town-level role-players (outlined below), and assumptions about population growth rates and future water availability. This informed projections of future population, future water consumption and wastewater generation, and solid waste volumes.

Two key assumptions were made about water supplies in the context of planning sewerage. The first was that the town would be able to secure funds to address growing water demand and mitigate current water stresses. Additional water supplies would then enable a growth in the number of households with in-house connections. The second assumption was that residential sewer connections are only necessary and feasible where a household has an in-house water connection. Where household members fetch water from a tap in the yard or beyond, volumes consumed are likely to be insufficient to warrant a sewer connection or avoid sedimentation and blockages in the sewer line. Similar assumptions apply to the linkage between housing type, water supply (in-house tap, yard tap, public tap) and feasible sanitation options, as indicated in Table 3.

TABLE 3: TYPE OF NEIGHBORHOOD WITH POSSIBLE RECOMMENDED TECHNOLOGY OPTIONS

Type of Neighborhood	Recommended technology
Low-cost accommodation	• Pit latrines (public and communal) that can be emptied • Septic tanks with soakaways • Improved emptying services • Container based systems • Small and medium enterprises/community-managed public and communal latrines
• *Kebele* & rented houses	
• Compound housing	
• Informal dwellings	
Condominiums	Central or Decentralized waste water treatment
Conventional housing	Septic tank with soakaways, sewerage if near by
High- density developments	
• High rise	Conventional or condominial sewerage
• City Center areas	Centralized sewerage and treatment
Industrial developments	Customized systems

The plan then identified the range of activities to be undertaken across the service chains for liquid and SWM, and the infrastructure and technology options most likely to deliver the service outcomes required. For example, in small towns with very limited solid waste collection services, the priority is to improve service coverage by SMEs using hand-carts. In larger towns with higher service coverage already, the emphasis is on greater mechanization to achieve efficiency improvements. The approach is incremental and mixed, rather than focused on a single solution, and aims to help cities and towns to evolve affordable and manageable sanitation systems, and the capacity to manage them.

Centralized sewer systems are proposed to serve parts of Mekelle, Adama, and Gondar, with decentralized waste treatment and simplified sewers proposed across all towns where feasible and where the context warrants it.

The required investment to implement the proposed improvements were calculated using current market prices and construction costs. The scale of investment varies from town to town in line with the size of the town and proposed activities. Figure 10 shows the range of investment required per town.

BOX 8: KEY PRINCIPLES TO GUIDE URBAN SANITATION IMPROVEMENT IN ETHIOPIA

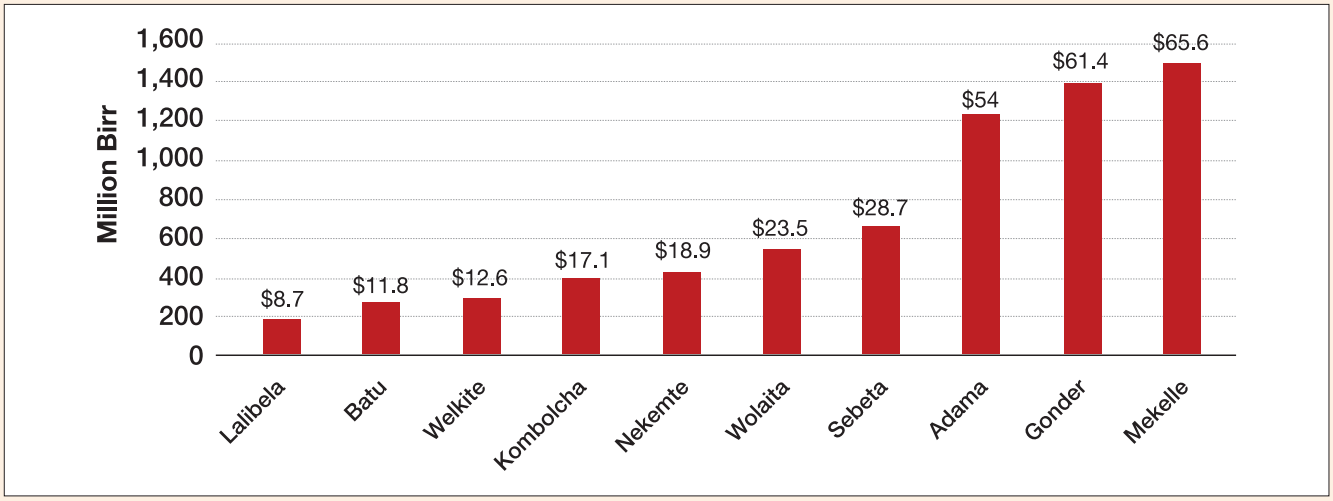
Put people and their needs at the centre

Successful sanitation improvement means acknowledging the range of service needs that exist across diverse settlement types and different terrain, and between categories of users, whether by area, culture and beliefs, gender or age, or disability. A one-size-fits-all approach to service provision at town, regional or federal approach is not feasible, as every town is different, and local challenges and priorities vary markedly, as well as by groupings, such as gender and other social differentiations. Service options should be aligned with the implementation and management capacity of the town, and the willingness and ability of residents to pay for the options on offer, and the needs of particular groups of users. Low connection rates to Addis Ababa's expanding sewer network are a strong reminder of the importance of engaging with the intended users when planning service improvements.

Equity and inclusivity.

The improvement plans aim to address the needs of all residents and all settlements across the town, rather than privileging certain areas and neglecting the rest. Planning for improvements in slums and informal

FIGURE 10: REQUIRED INVESTMENT (MILLION BIRR AND MILLION US$)



settlements is frequently deferred on the assumption that these areas will be upgraded soon. The reality is that the scale of slum settlement will take many years to address, and there are improvement options that can be implemented in the short term—notably more frequent solid waste collection services, and more public and communal toilets, supported by a wider range of emptying options at prices even poorer households can afford. This has resonance for responding to particular groups too, such as women who are not always able to use public facilities safely, or have to use facilities that have not been designed with their gender specific needs in mind. The same applies to disabled people who require specific types of facilities, often not incorporated in design. Apart from usage, these groups are mostly excluded or underrepresented in decision-making and consultative structures and processes. The issues of exclusion are far-reaching, and therefore demand far-reaching and wide redress.

Address sanitation across the full service chain, in line with the Sustainable Development Goals.

Safe management of on-site sanitation does not stop with the household, particularly in dense settlements. Town administrations have a duty to safeguard public and environmental health, through ensuring that services are available that offer safe management of wastes across the service chain, from collection all the way through to safe disposal.

Adopt a stepped approach that begins with the fundamentals.

Relatively few Ethiopian cities have the skills and systems required to absorb significant capital funding, and only Addis Ababa has experience in sewerage development and wastewater treatment. Sanitation improvements should be implemented in phases, aligned with progressive development of local capacities to support more integrated urban development planning, increased staffing in key agencies, and revised budget allocations and revenue collection strategies. The priorities are to improve solid waste collection, reduce open defecation through improving latrine access, upgrade household toilets and latrines, and develop comprehensive fecal sludge management services to end unsafe emptying and open dumping. With collaborative local action strategies and effective public engagement, tangible service improvements can be achieved in these areas far sooner than those that depend on large infrastructure developments.

Provide services, not just infrastructure.

Infrastructure development is necessary but not sufficient to achieve service improvements. Beyond capital investments, effective services depend on adequate ongoing funding for day-to-day operations and maintenance across the service chain. They also need management strategies, clear performance targets, appropriately skilled staff, plant and vehicles, and feedback on performance from those using the services.

Lead from the top.

Sanitation is multifaceted, and improved services require collaboration across many fronts, long-term. Achieving the changes required takes long-term commitment and consistent leadership from the top, even as individual leaders come and go. Such leadership is needed, and has to be structured and assigned at national level first, where it is important that the respective ministries are directed in a common direction while performing their respective roles, for example, in housing, urban planning, health, and infrastructure development. There is no model lead agency, and this is an institutional decision for the Government of Ethiopia to make. If the option is for a coordinative arrangement, it remains critical to be clear who drives the overall direction. Whichever agency takes that role, it has to be equipped—either technically or by temperament and insight—to appreciate and sensitively, but assertively, drive coordination across infrastructure planning and investment, policy and institutional reform, and behavior change. At local level too, the Office of the Mayor has the decisive role to play in driving change locally, in giving sanitation the budget support it requires, while

ensuring that every core function, department, and local agency plays its part and is held to account. Affirming and supporting the work of individual sanitation champions is vital.

Drive change from the household level upwards.

The benefits of service investments can only be realized when household members and other stakeholder groupings are mobilized to practice good waste management and hygiene, and are alert to the benefits of paying a little more in return for better services. Each cluster of service improvement activities requires public engagement and targeted communication strategies, kebele by kebele and, through Health Extension workers, house by house. Achieving change will require a mix of incentives, including funding support for private and communal facilities to help poorer households access better sanitation, and sanctions for those who dodge payment or practice anti-social behaviors like open defecation or open dumping.

Integrate with other municipal services.

Good urban sanitation plans recognize the links between sanitation and other municipal services, and foreground the requirements for good liquid and solid waste management when planning settlement upgrading and new housing developments, and drawing up town budgets. Upgraded water supplies will result in increased wastewater flows, and adequate drainage is essential both for stormwater flows and greywater. Regular street sweeping and solid waste collection is needed to keep drainage channels open and avoid blockages which increase the risk of flooding and pollution.

Engage the private sector.

There is a significant role for the private sector in closing service gaps in sanitation, and helping local administrations extend their reach and their capacity: through supporting supply chains and construction for home sanitation improvements; providing waste removal and transportation services for liquid and solid waste; providing expertise for managing treatment works and landfill sites, potentially through delegated management contract; driving implementation of reuse and recycling opportunities; and through a wide range of consultancy services.

The private sector is not a panacea. Even in the private sector there is currently very limited capacity to support liquid and solid waste treatment and service improvement planning. The potential for private investment in sector infrastructure beyond collection and transport is very limited. And purely commercial approaches to pit and septic tank emptying are not affordable to all who need desludging services. Some provision for support to low income households is needed to offer alternatives to unsafe emptying and disposal service.

Allocate resources to performance monitoring and regulation.

Ethiopia has good legislation and proclamations to guide sanitation and waste management and enforce compliance. Translating these into good practices and effective services at the town level requires clarity on the precise responsibilities of the different agencies within the town and regional administration, with resources for implementation, and commitment from town and regional leaders to hold role-players to account.

A one-size-fits-all approach does not work for improving urban sanitation

Every town has a unique character and challenges—a function of its social and economic history, topography, water supply, and so on—and within a town there are significant differences in settlement densities, house types, incomes, and service levels. One illustration of these differences is the range of on-site system types revealed by the household surveys, and how the proportion of each varies from town to town.

Despite the uniqueness of every town, there is a common list of core requirements, tasks, and functions that must be addressed in every town, which the sanitation improvement plans seek to address, as outlined below.

Solid waste

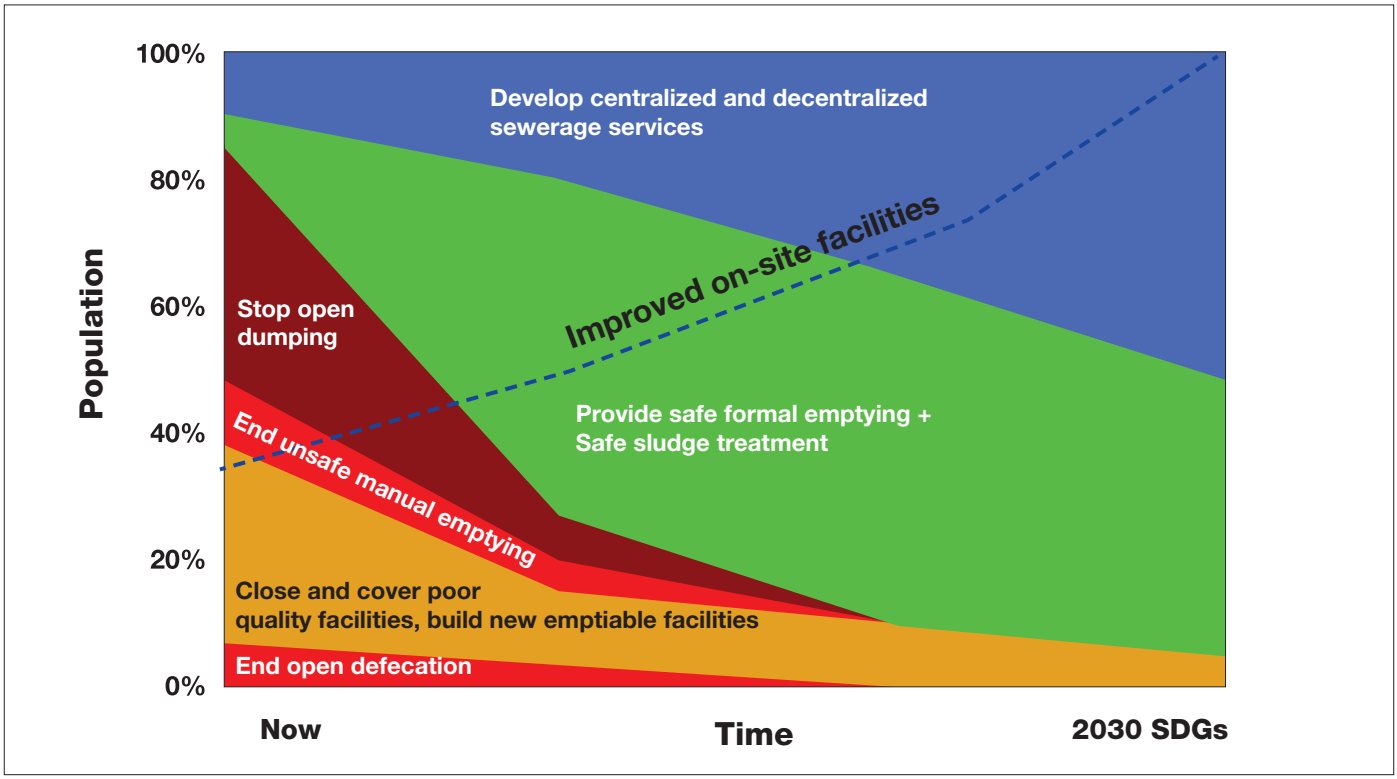
- **Promote sorting and reduction of waste at source** to contain the growth in waste volumes.
- **Expand coverage by collection services**, through offering SMEs better payment and working conditions, and contracting additional private service providers as required.
- **Achieve greater collection efficiencies,** through more mechanized transportation for primary collection in large cities.
- **Improve off-site storage** with more waste skips and street bins.
- **Strengthen secondary collection** with more skip loaders and trucks, and better fleet management.
- **Move decisively towards safe landfill management,** through upgrading open dumpsites, controlling access and managing leachates and gas emissions.

Liquid waste

- **Pursue multiple strategies to reduce open defecation**, through expanding toilet access for tenants and in dense housing areas and public areas.
- **Improve the quality of private, shared, and public toilets**, with improved designs, better construction, and effective management throughout their full life-cycle.
- **Strengthen fecal sludge management**, through a focus on expanding service options for emptying dry pits, formalizing and regulating emptying services, and developing sludge treatment facilities, including co-treatment with sewage where relevant.
- **Develop sewer networks with centralized and decentralized treatment**, in specific areas where there is immediate demand and where topography permits.

Appendixes 1A and 1B summarize the generic challenges in liquid and solid waste identified across the 10 towns, and the core responses proposed to address them. The key shift is in orientation—from an emphasis on technology and infrastructure, to provision of services in all areas, including slums and informal settlements, which are

FIGURE 11: ACHIEVING INCREMENTAL IMPROVEMENT OVER TIME WITH A MIX OF SERVICE OPTIONS



affordable and support a better quality of life for everyone. Achieving this shift over time requires a long-term vision, with a commitment to allocating the resources required and steadily building the systems and capability to meet evolving service needs.

For **urban authorities**, the core steps to achieve this include:

- **Assess the state of** sanitation across all settlements types and areas within towns.
- **Build agreement on what the priority challenges and service gaps are.** Building infrastructure is not necessarily the priority.
- **Formulate workable strategies for systematic incremental improvements** across the service chains for liquid and SWM. Give priority to stopping open defecation and open sludge dumping, and improving solid waste collection and transport to controlled disposal sites.
- **Clarify roles and accountabilities and strengthen communication and coordination systems** across the different sections of the town administration, particularly the Office of the Mayor, Finance and Economic Cooperation, Municipality, Health, WSSE, EPO, and Housing.
- **Increase funding for sanitation from regional and federal transfers, tariffs, and local taxes.** Funding is needed most urgently to support improved operational management of waste disposal sites, with additional staff, additional vehicles, and the funds to operate and maintain them.
- **Strengthen institutional capacity to drive and manage sanitation improvements.** WSSEs need a dedicated unit and skilled professionals for wastewater and fecal sludge management; the municipal Sanitation and Beautification/Cleansing Office needs additional capacity with expertise in landfill management, and representation in subcity or *kebele* structures. Dedicated sanitation specialists are needed within town-level Health Offices to support the work of health extension and community development workers, and provide specialist input on the design and construction of residential and other facilities. The Environment Protection Office needs additional staff dedicated to strengthen enforcement of liquid and solid waste proclamations.
  Ideally, dedicated units for driving sanitation and SWM services should be created that report directly to the City Manager or City Mayor. These units should be provided with the appropriate staff, budget, and supporting resources.
- **Integrate sanitation into urban development planning.** Mobilize land to support service improvements, with sites for communal and public toilets, landfills, treatment sites and transfer stations, right-of-way easements for sewerage and drainage networks, and so on. Accelerate planning approvals to support rapid improvement of household facilities. Ensure access roads to treatment works and landfill sites to support large vehicles. Develop drainage networks in tandem with water networks. Identify improvement options for slum settlements are unlikely within the next decade.

In every town, the plan emphasizes the need to clarify the roles and mandates of the different role-players responsible for liquid and SWM, and strengthen coordination between them in line with broader town and city management frameworks.

The evidence points to the need for a dedicated unit for SWM in the town, within the municipal Sanitation and Beautification Office or reporting directly to the town or city manager, with the specialist professionals and resources required to drive service improvements from collection through to landfill management. Equally, raising the proportion of household, communal, and institutional facilities that can be categorized as 'improved' (what the SDGs now designate as 'basic') will require dedicated support beyond the activities of health extension workers to guide decisions around options, construction approaches and management, and ensure compliance with revised building standards. Each town needs a coordination mechanism to align the activities of the different urban sanitation role-players within and beyond the town administration, whether by strengthening existing structures or expanding WASH structures to include SWM.

Clearly, though, institutional strengthening is critical to ensure that the necessary services can be developed and sustained. The case study on institutions in Addis Ababa done in the course of the work shows the significance of these issues in Ethiopia's largest city—similar issues exist, even though in different permutations, in all urban centers. Box 9 highlights key points from that Just-In-Time report.

BOX 9: INSTITUTIONAL ARRANGEMENTS FOR URBAN SANITATION IN ADDIS ABABA

A detailed sanitation assessment and plan was not developed for Addis Ababa, but a distinct analysis was done of the city's institutional arrangements and issues around sanitation and waste management. Not dissimilar to other urban centers, but due to the scale and broader institutional complexity of city governance in Addis Ababa, the issues manifest in some ways differently from other cities and towns. It provides a narrative on spatial and institutional fragmentation, underresourced services, and a lack of strategy to improve services, especially on how to confront the reality that over 80 percent of the population relies on on-site sanitation. This requires a citywide effort to build a shared understanding and institutional strengthening to deal with the city's services gaps and challenges.

Addis Ababa has three layers of administration—city, subcity and *woreda*—to serve a population of about 3.4 million people. The key urban sanitation institutions and their responsibilities at city level are the following:

- Addis Ababa Water and Sewerage Authority (AAWSA): All wastewater management in the city.
- The Integrated Solid Waste Management Agency: Overall management of collection, transportation, and disposal of waste from households and nonresidential customers, and cleaning of roads, streets, and drainage channels across the city.
- The City Health Bureau: Through the urban health extension program, promote environmental health and sanitation awareness; and regulate the sanitation practices and public health impacts of public facilities such as hotels, restaurants, schools, and markets.
- The Environment Protection Bureau: Enforce federal environmental policies and regulations to ensure that the waste management practices of households, businesses, and industries have no negative impacts on the environment.
- Addis Ababa City Regulation Enforcement Agency: Enforce all federal and city regulations, including liquid and solid waste management (SWM), in the city.
- The Construction Industry Development and Regulatory Authority and the Building Permit and Control Authority: Regulate building construction, including new household facilities.

The city-level institutions involved in urban sanitation perform a combination of planning, strategic, regulatory, and implementation roles, while the subcities and *woredas* have a more operational focus—subcities in organizing SMEs involved in waste management services; providing land for transfer stations, waste skip sites and public latrines; and coordinating enforcement of national and city regulations, such as environmental protection and SWM. *Woredas* are the lowest administrative organs of the city, and represent the city bureaus and execute day-to-day responsibilities on their behalf, as well as doing monitoring and regulatory enforcement is also carried out at the woreda level. Street sweepers are employed by the agency at *woreda* level.

Formally, there is operational coordination between the Addis Ababa Water and Sewerage Authority (AAWSA), Addis Ababa Revenue Agency (AARA), Integrated Solid Waste Management Agency, and the Solid Waste Reuse and Disposal Project Office. However, programmatic coherence and joint planning are not strong, as the different authorities plan their activities separately, with no coordinated planning between the housing development agency, road authority, SWM agency, and the AAWSA.

The municipality contracts SMEs to collect solid waste from households and transport it to waste skip points, using hand push carts or carrying waste away manually. Secondary collection is by public and private operators, using a combined fleet of 159 trucks and 19 compactors, with two transfer stations. Over 90 percent of investment was made on sanitary landfill, a new waste-to-energy facility, and transfer stations, while investment in equipment for primary and secondary collection is insignificant. The city collects service fees through a surcharge on the water tariff. Capital investments are funded primarily by the government, and focus mainly on infrastructure at the end of the service chain, not primarily and secondary collection.

Addis Ababa residents rely predominantly on on-site sanitation, mainly dry pit latrines, and a majority use shared facilities. In recent years, the AAWSA has built hundreds of public toilets, which are managed mainly by SMEs under the supervision of subcities and *woredas*. With sewerage serving only 10 percent of the population, and even new multistorey condominium housing complexes served mainly by on-site or decentralized treatment systems, the AAWSA has now adopted decentralized treatment as a long-term strategy, and is exploring delegated management options to address the need for specialized management capacity. For pit emptying and transportation, the AAWSA uses its own 104 vacuum trucks, and licenses a fleet of 58 private vacuum truck operators. The overall efficiency of the AAWSA's vacuum truck services is poor. According to one weekly AAWSA report, dated May 2016, the utility was able to respond to only 32 percent of the 3,210 service requests that week, in part because just 38 percent of its fleet was functional at the time. There are three fecal sludge transfer stations and one injection point to reduce the travel distances of the smaller trucks to the city's two sludge drying beds, located on the eastern and southern periphery of the city in Kotebe and Kaliti, respectively. A major infrastructure development program is under way to expand the treatment capacity of Kaliti works and extend sewerage systems to potentially a third of the city's population. The emphasis of the program to date has been on construction, with little emphasis on promoting or supporting connections by users.

The AAWSA levies a charge for the initial sewer connection, but beyond that, users pay no monthly sewer charge, and sewerage and treatment costs are subsidized by water users and transfers from the city administration. The water tariff is subeconomic. The AAWSA offers no special concessions for low income households, and subsidizes desludging services for all its customers. The cost recovery system by the AAWSA for both urban sanitation and water services is poor and poses risks for the financial viability of the utility and the sustainability of the services it provides.

The regulatory framework for waste management is poorly defined, with gaps and overlaps. The main regulatory body for urban sanitation is the Environment Protection Agency, but it has limited capacity to regulate waste management throughout the city and focuses mainly on industries and commercial enterprises. The Regulation Enforcement Agency has a mandate for enforcing federal and city regulations and, through its *woreda* office, monitors waste management practices and enforces regulations fairly effectively, but it has capacity constraints and has limited presence at subcity and *woreda* levels.

Institutional arrangements for sanitation and waste management are fragmented spatially and between sectors, and services are underresourced. Establishment of a citywide sanitation coordination task force could help to build a shared understanding of the city's services gaps and challenges, and strengthen collaboration and communication across the different complementary service agencies.

V. The Way Forward

Along with increasing urban populations and rising living standards comes increasing waste generation. Better management of urban liquid and solid waste streams must become an integral part of the country's renaissance as Ethiopia's economy undergoes structural transformation and diversifies. Globally, most towns and cities are finding it difficult to cope with their current sanitation challenges, and even harder to plan and prepare for future growth. Past approaches are not adequate for the challenges of higher growth and density.

This program of TA has highlighted important gaps in urban management around urban waste management in Ethiopia. Solid waste collection services lag far behind the waste volumes being generated, disposal sites are poorly unmanaged and unsafe, and opportunities for resource recovery and job creation are being lost. Over 95 percent of Ethiopia's urban residents rely on on-site sanitation, yet provision of safe downstream services for fecal sludge management is a severely neglected area of public management. Brisk industrial development presents new waste management challenges that the country's environmental protection agencies are not equipped to address. Growing evidence of climate change calls for greater resilience in the face of environmental shocks such as drought, and a greater emphasis on safeguarding Ethiopia's water sources from pollution.

To date, decisive action to strengthen waste management has largely been deferred and crowded off the development agenda by a wide range of other pressing needs. There is now growing acknowledgement at the town, regional, and federal levels that sanitation improvement and taking charge of urban waste management is both urgent and important. Increased funding for urban sanitation infrastructure and institutional development is being made available through the Urban Local Government Development Project and other programs.

There can be no question that improving urban sanitation will require significant infrastructure investment. But infrastructure alone will change very little if the processes and resources needed to transform infrastructure into service improvement are not addressed too. As the Addis Ababa case study shows, strengthening the institutional framework is needed to drive and achieve incremental change. This means building a common understanding of what is needed, where the gaps lie, and how to close them. The tasks and functions of different role-players will need to be defined very clearly and agreed, and supported with realistic operating budgets and staffing structures. This theme informs the recommendations below very pertinently.

Recommendations

Arising from the town assessment and improvement planning work summarized in this synthesis report, a number of recommendations stand out as most urgent. Table 5 provides a short synopsis of key areas to address, and which institutions should be responsible.

Raise the profile of sanitation in urban management: Sanitation improvement requires firm leadership and policy, and has to be institutionalized in urban government structures to maintain continuity. Improvements to urban sanitation are constrained by low political support, inadequate funding, and marginalization in urban management. In all towns assessed, operating funds to support SWM are inadequate—each should review its funding provisions, and explore introducing tariffs ring-fenced for SWM. Requiring local and regional government to report specifically on sanitation spending may help improve resource allocations.

Develop citywide sanitation improvement strategies: Investments in sewerage are likely to benefit only a segment of the overall urban population. Ethiopia's cities need an integrated portfolio of sanitation service options to ensure all areas and residents benefit from a sanitation improvement strategy. An inclusive approach to achieving better management of waste streams requires a stepped, phased approach to overall sanitation improvement, using a range of interventions and service options that

address the range of housing and settlement needs within integrated urban development management.

Adopt the sanitation service chain as an analytical tool and strategic planning guide: On-site sanitation will remain the predominant option for liquid waste management in most towns for some time. Mapping each component of the service chain is necessary to assess the state of available facilities and services, understand the process linkages between them, and identify priorities and roles for intervention. Equally, mapping the different elements along the solid waste service chain can flag opportunities to address vulnerabilities around secondary transport and safe waste disposal. In every town, each component of the chain requires a clear strategy to drive improvements, strengthen linkages with other components of the sanitation chain, and maximize job creation opportunities.

Further clarify the mandates of the local institutions in liquid and SWM: Role clarification is essential in each town to minimize overlaps and close gaps. What is the sanitation role of the water and sewerage enterprise, beyond wastewater management, and where should responsibility lie for fecal sludge treatment and oversight of desludging services? Where can residents and institutions, commerce and industry get guidance on sanitation upgrading and liquid waste management options? What are the respective roles of the Environment Protection Office, Urban Enforcement Office, and *kebele* structures in strengthening compliance with proclamations relevant to sanitation? These issues must be debated and resolved at town and regional levels.

Improve organizational structures and staffing for urban sanitation improvement: Responsibility for service provision has been decentralized to town and city administrations, but the prerogative for setting tariffs and determining organizational structures and staffing still lies with regional government. SWM requires a dedicated unit within the municipal Sanitation and Beautification Office, or one that reports directly to the town or city manager, with the specialist professionals and resources required to drive service improvements from collection through to landfill management. Equally, raising the proportion of household, communal, and institutional facilities that can be categorized as 'improved' (what the SDGs now designate as 'basic') requires dedicated support beyond the activities of health extension workers to guide decisions around options, construction approaches and management and ensure compliance with revised building standards. In doing so, being sensitive to differentiated needs—such as those of women who often find it daunting to use public facilities—is crucial. Greater gender sensitivity is not the only social inclusion issue, but it is very critical if the constraints on reaching all residents are to be addressed.

Build institutional capacity to drive and deliver improvements: Upskilling and professionalizing the urban sanitation sector is vital to strengthen planning, management, and regulation, and to build the competencies required for effective urban waste management services. Comprehensive training initiatives are needed to address strategic and operational management gaps and build the competencies required to develop citywide sanitation improvement strategies, plan sanitation investments, manage large-scale projects, and operate new technologies. Attention must be given to funding organizational restructuring and operating resourcing to offer attractive career opportunities to attract and retain the skilled sanitation professionals that Ethiopia's towns and cities need.

Facilitate and support the development of private sector involvement in designing, building, and rehabilitating water and sanitation schemes. There already is potential for a significant market for WASH products and services, including household water treatment, on-site sanitation products, and fecal sludge management. To make this work, though, requires clearer regulatory frameworks and mechanisms, skills development at service delivery levels, greater availability of financial services, and addressing land tenure insecurity. In addition, questions still remain over whether economic conditions are such that financially sustainable private sector involvement in the construction and operation is feasible. As Box 10 shows, however, there is potential for cascading to involve the private sector to a greater and more effective extent.

BOX 10: WHAT ROLE FOR THE PRIVATE SECTOR IN URBAN SANITATION?

Ethiopia's rapid urban growth demands innovations on a large scale in the supply and management of infrastructure and associated services. Meeting this demand will require the involvement of multiple actors, including partnerships between the public and private sectors, and with Small and Medium Enterprises (SMEs). Non-state actors are already involved, and the GTP II emphasizes building domestic private sector capacity. A prominent example of private sector potential covered under the TA is that of vacuum trucks, which offer opportunities since sewerage systems will take long to reach the required capacity. Another is private sector innovation and efficiency improvements in the management of treatment plants and maximizing the economic value of treated waste and recycled water. The proposed Sanitation Improvement Plans developed under this TA identify possible areas for private sector investment and services delivery:

(i) Mainly private sector activities: There is a role for the private sector in the design of containment, transfer stations, treatment plants, and reuse, and in the construction of infrastructure facilities, but the more immediate cascade point is solid waste management (SWM), as currently private providers (especially SMEs) find the market for SWM services more attractive than for liquid waste management. In all towns this has to be better systematized, and improved regulatory practices will build confidence that private sector role-players will be treated fairly, and service standards protected.

(ii) Public-private partnerships (PPPs): There are also areas where the private sector could engage with the public sector in partnerships. This needs to be progressively developed and improved to reduce the burden on public resources and increase the efficiency of service delivery. Local governments and water utilities would need enhanced capacity to engage in such partnerships with confidence, and be able to hold private providers to account.

(iii) SMEs mostly are less formally structured businesses, operating on a smaller scale than formal companies, and they typically have less capital available. The emergence of SMEs has been incentivized by local governments in some cases, often as part of employment creation initiatives. The management of public and community latrine facilities has been a notable example, often leading a multipurpose facility supplementary to the latrines themselves, such as kiosks. In this way, it has been possible to link improvement of the quality of services to the livelihood of the small service providers.

TABLE 4: PRIVATE SECTOR OPPORTUNITIES ALONG THE SERVICE CHAIN

	Containment		Emptying / Primary Collection		Transfer		Transport		Treatment		Re-Use	
	SWM	LWM	SWM	LWM	SWM	LWM	SWM	LWM	SWM	LWM	SWM	LWM
Design	PS	PS			PS	PS			PS	PS	PS	PS
Investment	HH	HH	SME/ PS	SME / PS	Public	Public	PS	PS	Public	Public	PS	PS
Construction		SME/ Artisan	SME / PS	SME / PS	PS	PS			PS	PS	PS	PS
Service Provision / O&M	HH	SME/ Artisan	SME / PS	PS	PS	PS	PS	PS	PPP	PPP	PS	PS

SWM: Solid Waste management **LWM:** Liquid Waste Management **SP:** Private Sector Provider

SME: Small / Medium Enterprise **PPP:** Public Private Partnership

Strengthen regulation of sanitation services along the service chain: This should start with a comprehensive review of existing byelaws and proclamations, and their applicability to on-site systems and fecal sludge management systems, and revise building specifications to guide the construction and inspection of new accessible and emptiable facilities. Fast-tracked building approvals would support sanitation improvements at the household level, building momentum for change, while regulation of desludging service providers should improve health and safety, and penalize indiscriminate discharge and dumping of wastes.

Strengthen institutional coordination among sanitation role-players at all levels: Urban sanitation requires collaboration across several strategic and operational drivers of urban development management. Transforming the elements of the sanitation service chain—containment, emptying or collection, transport, treatment, disposal or reuse—into service improvements requires attention to the linkages between them, and the process drivers that make them work. Towns need coordination mechanisms to align the activities of different urban sanitation role-players within and beyond the town administration, strengthening existing structures or expanding WASH structures to include SWM. Better coordination of liquid waste, solid waste and drainage, rooted in urban services and infrastructure development, would help to reduce flooding, improve public health, strengthen environmental protection, and enhance the appearance of Ethiopia's urban centers.

TABLE 5: THE WAY FORWARD: CHALLENGES, INTERVENTIONS, AND RESPONSIBILITIES

No.	Key Challenges	Proposed Interventions	Responsible Bodies
1	Lack of space on-plot to construct a latrine	Introduce innovative technologies such as container-based sanitation. Also review and enforce building codes to ensure adequate space is set aside for latrine construction	MoWIE/MoC/ municipality
2	Inadequate provision of latrines for tenants by property-owners	Stronger enforcement of building codes and property owners' obligation to build a latrine and ensure tenants have access. Support this though targeted sanitation improvement campaigns that acknowledge that tenants are unlikely to build a toilet themselves, but that focus on behavior	MoC, Enforcement Office
3	Limited enforcement of proclamations safeguarding public and environmental health and building regulations	Strengthen regulations, including clarifying key ones to address, and reprioritize resource allocations to strengthen enforcement capacity. Also build political support for enforcement of sanitation related proclamations	Environment, Health and Enforcement Office
4	Limited institutional capacity to drive sanitation improvement in WSSEs, municipalities, regional and federal government	Build political support to give sanitation higher priority in budgeting and staffing; clarify responsibilities of different role-players; introduce systematic capacity development across government to tackle sanitation challenges across the full service chain	MoWIE/MoUDH, universities, financiers
5	High staff turnover	Review current organizational structures and remuneration packages to attract and retain the skills required and offer sanitation professionals a more attractive career path	MoH, MOWIE, MoUDH, municipalities
6	Lack of a system to choose and apply appropriate, affordable technology options	Promote adoption of appropriate affordable technologies, but emphasize strengthening service delivery systems rather than focusing only on technologies	Federal ministries with regions and towns, NGOs, financiers

7	Inadequate funding for capital investment, operational expenditure, and social mobilization	Develop sanitation development plan, and obtain higher commitment by government and donors to implement	Federal ministries, towns, financiers NGOs
8	Overlapping mandates and weak institutional coordination	Continue refining the roles and capacity of relevant institutions, and improve institutional coordination at all levels, including the urban development and water, health and environment sectors	WASH steering committee, MoH, MoWIE, MoUDH
9	Low profile/priority for urban sanitation, and the importance of good liquid and solid waste management not acknowledged	Concerted campaign to elevate the profile of sanitation, liquid and solid waste management in urban development planning and management Consolidate, and where needed strengthen, urban sanitation programs in line with the new national strategy, while adapting and improving the latter as and when required	Sector institutions and key ministries, regional bureaus, mayors

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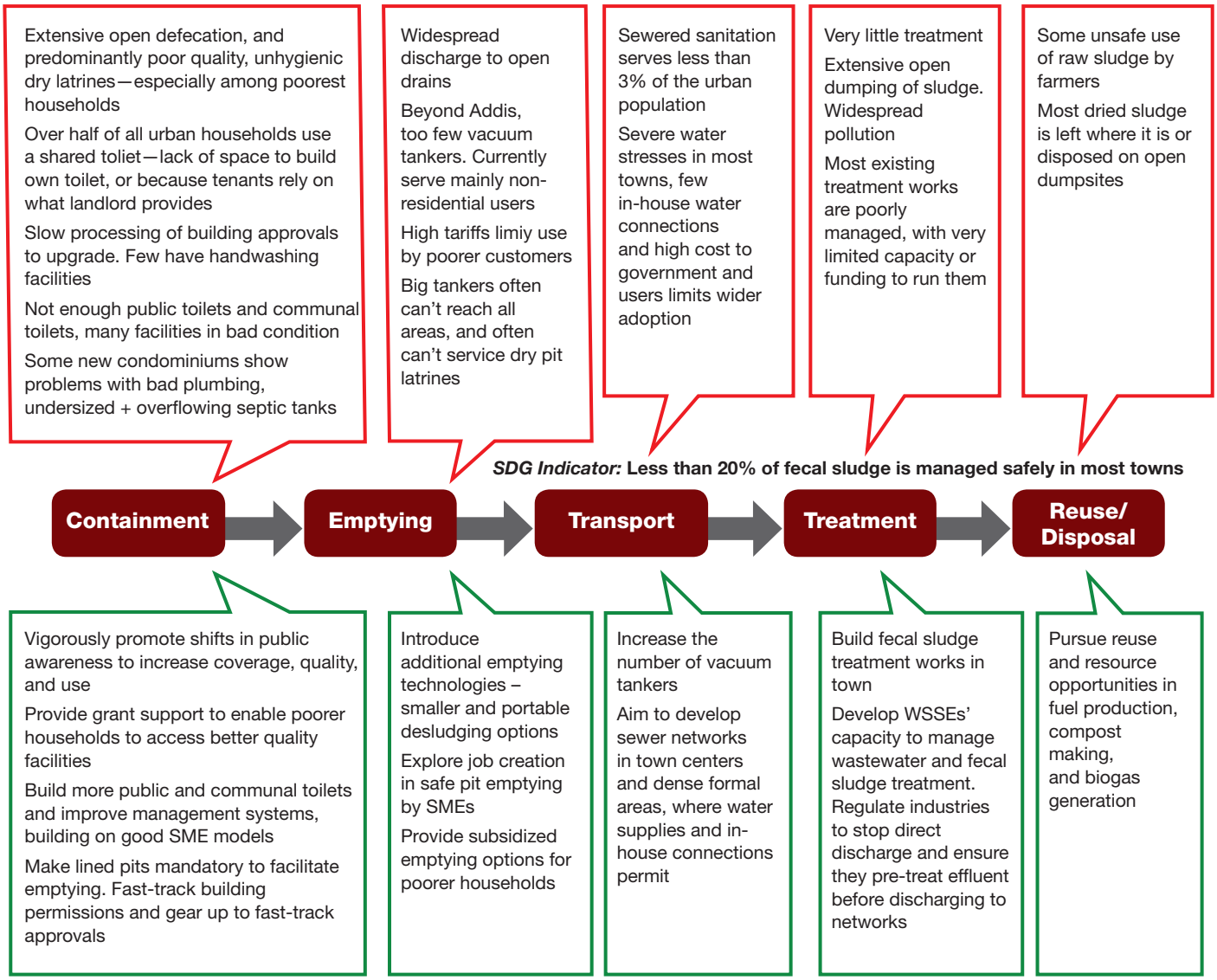
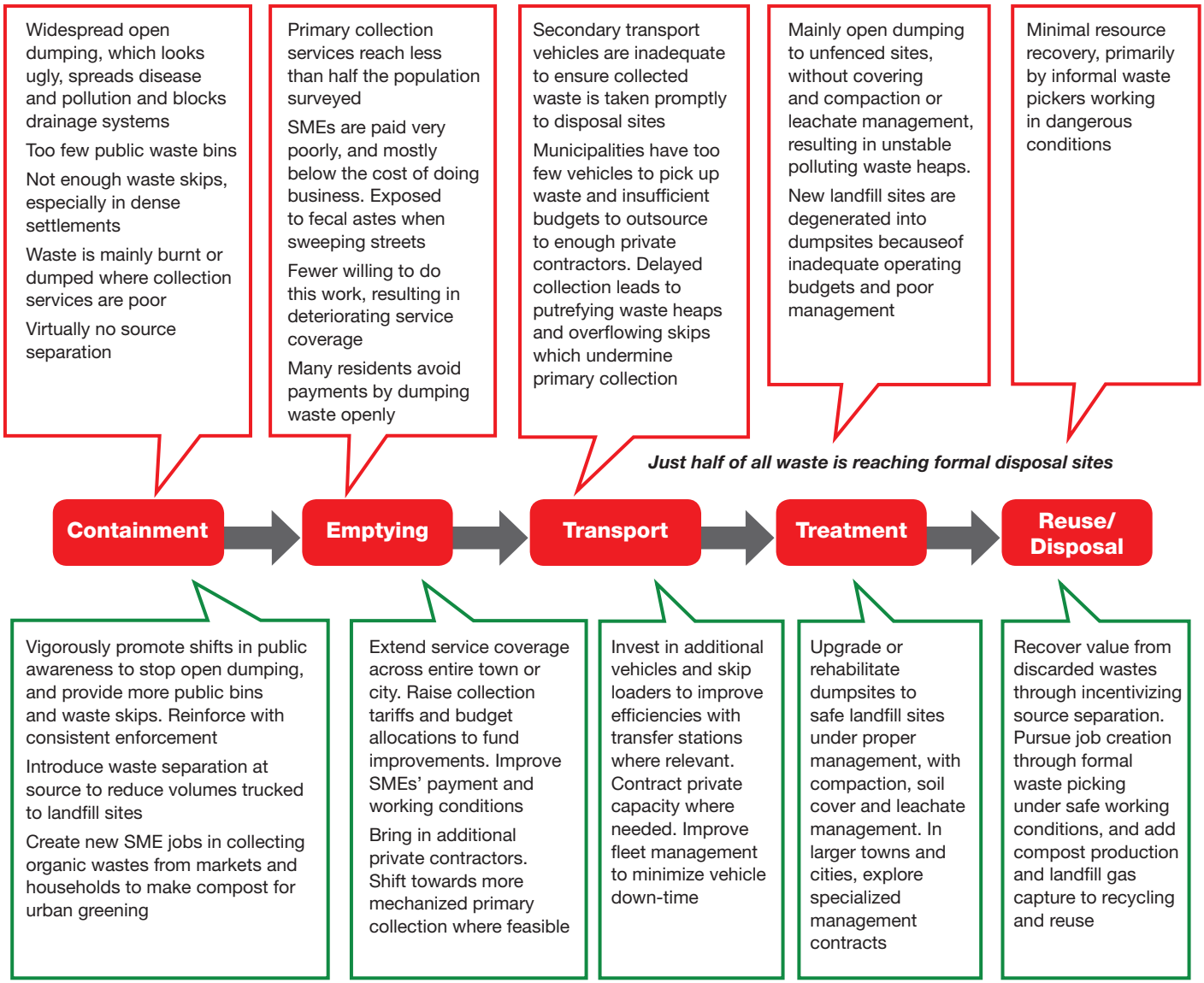
Appendix 1A: Generic Sanitation Challenges Identified across the 10 Towns, and the Core Responses Proposed to Address Them



Appendix 1B: Generic Solid Waste Management Challenges Identified across the 10 Towns, and the Core Responses Proposed to Address Them



Expanded Municipal Sanitation Office with dedicated Solid Waste Management Unit + Health Office + Building Chief + Environmental Protection Office + *Kebele* structures + Regulation Enforcement Unit + WSSE + Finance and Economic Development + SME Development Office + Office of the Mayor

Clarify roles and strengthen collaboration and communication. Broaden town WASH structures to address Water, Sanitaion, and Solid Waste Management

Appendix 2: Overview of Components of the Technical Assistance

Technical Assistance to the Government of Ethiopia and select cities and towns to improve Urban and Small Towns Sanitation Services

SURPPORT TO FEDERAL GOVERNMENT	SURPPORT TO 10 TOWNS AND CITIES	SURPPORT TO SECTOR DEVELOPMENT
Contributions to the development of the national **Integrated Urban Sanitation and Hygiene Strategy** and **Strategic Action Plan**	**Sanitation Assessment and Improvement Planning in 10 Towns** **Assessment** Household surveys, focus group discussions, key informant interviews, review of documentation town-level workshops to validate and discuss findings **Sanitation Improvement Planning** Interactive development of planning approach with town stakeholders Data collection to support scenario modelling Review of options with local stakeholders Presentation of proposals at local and regional workshops	Preparation of five publications in the **Ethiopia Urban Sanitation Series** 1. A Transformative Approach to Urban Sanitation Improvement in Ethiopia 2. Strengthening Institutional Arrangements for Better Urban Sanitation in Ethiopia 3. Addis Ababa Waste Management: Assessment and Key Recommendations 4. Safer Sludge Removal from On-Site Sanitation Systems: Approaches for strengthening emptying services in urban Ethiopia 5. Reuse and Resource Recovery Options Using Human Wastes. Some options and issues for consideration in Ethiopia

National Workshop and Synthesis Report

Appendix 3: Different Level Role-Players and Proposed Roles in Ethiopian Urban Sanitation

Institutions	Current Role	Summary of Proposed Role under the IUSHS
Federal Government		
The leadership on urban sanitation across sectors remains a challenge. As can be seen below, the IUSHS assigns various coordinating responsibilities to different ministries. While this is legitimate and acknowledges their respective skills areas, there is a need to become clearer on overall leadership. This may well be through a multisector committee, or a single ministry—but whichever option the Government of Ethiopia decides upon, a clear driver needs to be identified and assigned.		
Ministry of Water, Irrigation and Electricity	• No explicit urban sanitation mandate but derives its authority from its mandate to oversee water resources development and a policy, strategy, and mandate to strengthen the capacity of the sector including town water and sewerage authorities	• Coordination and monitoring of the implementation of the water supply, wastewater and fecal sludge management at country level. Introduce decentralized wastewater treatment systems along with conventional sewerage • Introduction of local fecal sludge treatment and engineered sludge drying beds and encourage reuse of sludge for different purposes • Capacity building, including protection of water bodies, and proactive participation in the development of standards
Ministry of Urban Development and Housing	• Coordinated support and capacity building for urban management, develop strategies, guidelines, infrastructure development and service delivery, including solid waste management services	• Coordination and monitoring of implementation of solid waste management at country level • Capacity building and development of standards for SWM in consultation with other sectors
Ministry of Health	• Development of policies and strategies; mobilization of resources for the promotion of safe disposal of solid and liquid wastes by households, and awareness of its public health impacts	• Leadership on: • Awareness creation through Urban Health Extension Program, capacity building, enhancing the construction of sanitation facilities, development of standards in consultation with other sectors • Collection of data and monitoring the development of public health based on agreed indicators to inform the planning, development, and regulation of urban sanitation
Ministry of Culture and Tourism	• Responsible for overseeing the waste management practices of hotels and recreational facilities and protecting heritage sites	• Collaboration with Ministry of Health and other ministries in meeting sanitation and hygiene standards at tourist centers
Ministry of Environment, Forestry and Climate Change	• Responsible for appraising projects with respect to environmental safety, regulation of waste disposal, and enforcement of proclamations safeguarding the environment	• Coordination and monitoring of regulation of environmental standards with respect to sanitation services at country level
Ministry of Construction		• Newly established ministry, responsible for developing construction codes and providing construction and developing guidelines on construction quality standards including sanitary facility constructions
Ministry of Finance and Economic Cooperation	• Mobilization of financial resources, and monitoring the proper use of public resources	• No explicit mention, but as a signatory to the One WASH National program, the role of the ministry will remain responsible for financial resources mobilization, monitoring of financial utilization and development of Financial management guidelines

Institutions	Current Role	Summary of Proposed Role under the IUSHS
Regional Bureaus		
Health Bureau	• Implement policies and strategies developed by the ministry, implement agreed programs; ensure mobilization towards the promotion of safe disposal of solid and liquid wastes by households, and awareness of their public health impacts; build capacity of regional personnel	• Coordination of relevant regional institutions to develop standards of urban sanitation facilities, services level standards that have to be implemented by the regional towns • Training and capacity development of town health office staff to establish database systems, carry out promotion and follow up through the UHEP, health facilities, WDA, and community-based systems • Coordination of the Regional IUSH Steering Committee
Water Resources and Energy Bureau[1]	• Mandated to oversee regional water resources development, capacitate, support, and monitor performance of town water and sewerage authorities	• Support towns' water utilities through providing systematically designed capacity building for effective sanitation services' delivery • Introduction of new approaches, solicit funds, and support implementation • Adaptation of guidelines and standards related to wastewater management, water supply to the context of the region
Trade, Urban Development, and Town Planning	• Coordinate regional town and housing development and capacity building for regional urban management; ensure infrastructure development and service delivery at towns' level, including solid waste management services	• Coordination and monitoring of implementation of solid waste management at regional level • Capacity building of human resources, exchange of good experiences and establishment of databases • Development of standards in consultation with other sectors
Culture and Tourism Bureau	• Responsible for overseeing the waste management practices of hotels and recreational facilities and protecting heritage sites within the region	• There is no mention in the strategy but it has assumed the role of implementing policies and strategies developed by the federal sector ministry
Environmental Protection Agency	• Appraise regional projects with respect to environmental safety, regulation of waste disposal, and enforcement of regional proclamations safeguarding the environment. Capacity building to town level offices	• Coordination and monitoring of the regulation of environmental standards with respect to sanitation services at the regional level • Ensure availability of institutions responsible for regulation, monitoring, and follow up of urban sanitation at town level • Capacity building
Finance and Economic Development Bureau	• Ensure the alignment of the plan with regional policies, strategies and macro plans, administer and monitor proper use of resources	• No mention of the Bureau of Finance and Economic Cooperation. However, from the OWNP experience the Bureau will play a key role in soliciting fund and ensure implementation
Town level		
City Administration	• Oversee urban development management • Coordinate town level development programs, including water and sanitation facilities • Ensure that functional services delivery is in place and operating as intended • Mobilize and allocate resources to ensure implementation	• Coordination and monitoring of implementation of the strategy at town level • Allocation of resources and monitoring their efficient use • Ensuring the availability and functioning of a platform where residents can engage in and support the development of sanitation

[1] There is no consistency in naming of functions across the regions. In some regions it is named the Water Resources and Irrigation Bureau; in other regions, the Water, Irrigation and Energy Bureau or Water, Mines and Energy Bureau.

Institutions	Current Role	Summary of Proposed Role under the IUSHS
Beautification and Greenery[2]	• Responsible for the proper collection, transportation and safe disposal of solid waste • Ensure services delivery by the private operators and SMEs • Manage the solid waste disposal site • Build capacity of subcities and *kebele* units engaged in waste collection and transportation	• There is no mention of this institution under the strategy; however, it is key in managing the solid waste component and landfill sites • Drainage cleaning and subsequent information management, also about maintenance
Health Office	• Ensure health promotion workers assigned in each *kebele* • Follow up and performance support to urban health extension workers to ensure promotion and advocacy work is done	• Promote behavioral change and sustained use of hygiene and sanitation facilities
Water Supply and Sewerage Enterprise[3]	• Provide desludging services • Manage wastewater treatment facilities	• Improved access to safe and potable water supply, wastewater management, and desludging services
Environmental Protection Office	• Monitor the waste management system • Compile reports and share findings to the mayor's office and regional Environmental Protection Agency	• This office is not mentioned under the strategy; however, it will have a role of implementing vested to the regional agency
Enforcement Office	• Ensure implementation of proclamations, regulations and by laws • Work closely with relevant sector offices	• This office is not mentioned under the strategy; however, towns have the structure with limited capacity. It is proposed that, in coordination with other offices and better institutional capacity building, it will play an important role
Finance and Economic Development	• Ensure the alignment of the plan with town development priorities, strategies and city plan, administer and monitor proper use of available resources	• Solicitation of development fund and support in financial management
Small and Medium Enterprises	• Organize and train SMEs	• There is no mention under the strategy but this institution will play a role in organizing and capacitating interested groups to form SMEs
Private sector, including SMEs	• SMEs are providing primary collection for solid waste, transport to the transfer stations or dumpsters • Provide solid waste transportation services • Provide desludging services • Provide consultancy, capacity building and construction services	• Enhancing of solid waste collection capacity • Provision of secondary transportation of solid waste from bins to sanitary landfill sites, as required • Supporting management of public toilets, shower facilities and recycling activities, as required

[2] The role varies from town to town. In some towns it includes both liquid and solid waste, and management of public latrines and disposal sites. In other towns the unit deals only with solid waste management.

[3] By proclamation all water utilities are responsible for providing sewerage services. None of the towns have networked systems except Addis Ababa. Some water supply and sewerage authorities provide desludging services.

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