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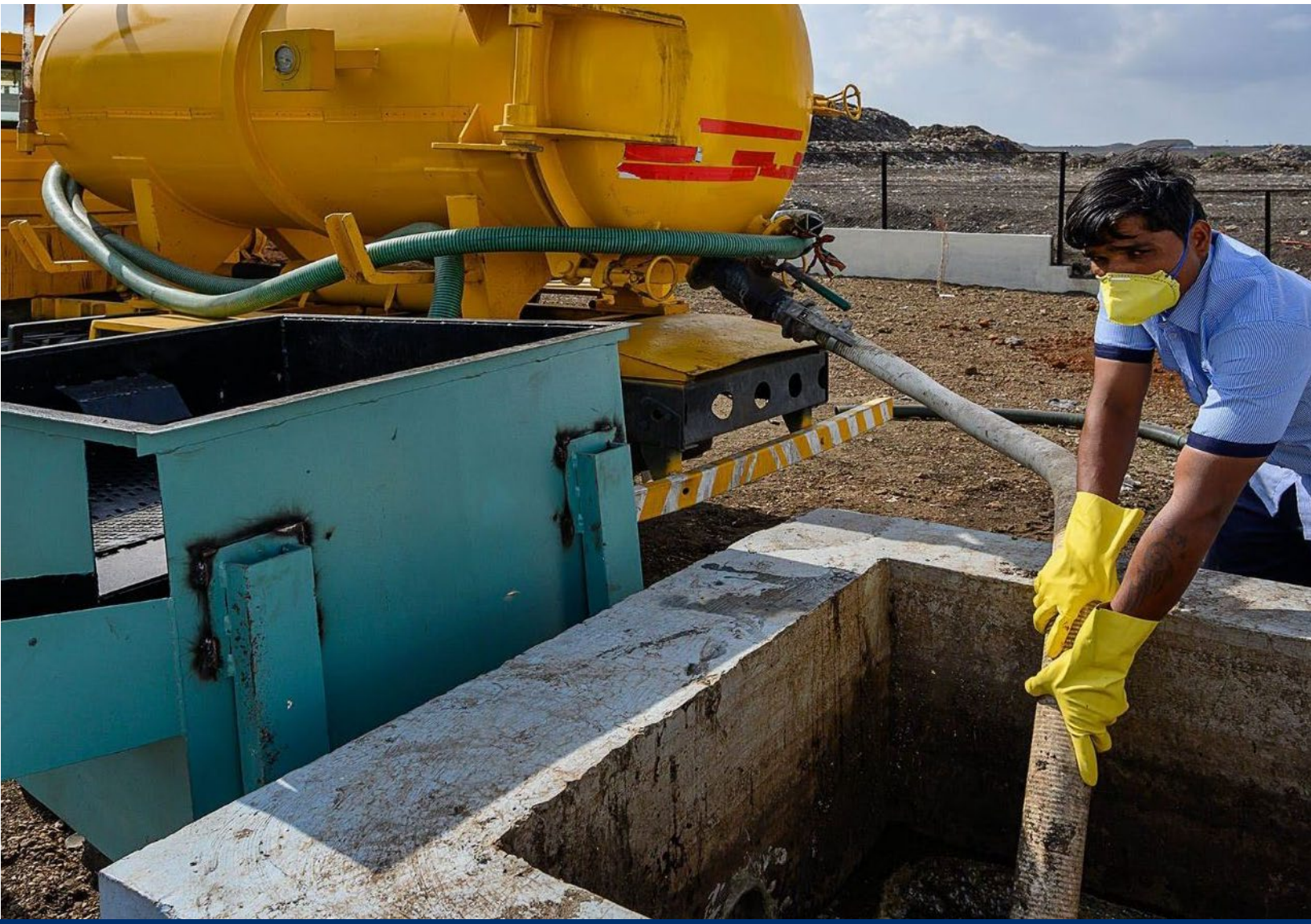
SMALL LOCAL SERVICE PROVISION FOR FECAL SLUDGE MANAGEMENT

Inception Report



NOVEMBER 2023

This report is made possible by the support of the American People through the United States Agency for International Development (USAID). The content of this report is the responsibility of Tetra Tech and FSG and does not necessarily reflect the views of USAID or the United States Government.

ACKNOWLEDGEMENTS

The URBAN WASH team would like to extend their gratitude to the members of the Technical Working Groups (refer to Section 8.1) who contributed to the development of this inception report through valuable inputs provided during the research design workshops on June 27th and 28th 2023. Dr. Klaas Schwartz reviewed this document and provided valuable inputs.

Prepared for the United States Agency for International Development by the Urban Resilience by Building and Applying New evidence in WASH (URBAN WASH) project, under the GSA's One Acquisition Solicitation for Integrated Services (OASIS Unrestricted) Indefinite Delivery Indefinite Quantity Contract, contract number GS00Q14OADU138 and order number 7200AA21M00012.

Preferred citation: USAID. 2023. *Small Local Service Provision for Fecal Sludge Management.* Washington, D.C. USAID URBAN WASH Project.

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Cover photo: FSM truck operator desludging a septic tank in Sinnar, India, 2019, under the scheduled desludging model. Image courtesy of Center for Water and Sanitation, CEPT Research and Development Foundation, Centre for Environmental Planning and Technology University.

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ACRONYMS

CWIS	City-wide Inclusive Sanitation
ESAWAS	Eastern and Southern Africa Water and Sanitation
FGD	Focus Group Discussion
FSM	Fecal Sludge Management
FSTP	Fecal Sludge Treatment Plant
GESI	Gender Equity and Social Inclusion
GPS	Global Positioning System
HH	Household
IWA	International Water Association
IDI	In-depth Interview
IRB	Institutional Review Board
JMP	Joint Monitoring Programme
KCCA	Kampala Capital City Authority
LMIC	Low- and Middle-Income Country
MLGRD	Ministry of Local Government and Rural Development
MOH	Ministry of Health
MOU	Memorandum of Understanding
NGO	Nongovernmental Organization
NI	Narrative Inquiry
NWASCO	National Water and Sanitation Council
P&L	Profit and Loss
PUA	Peri-urban Area
QA/QC	Quality Assurance/Quality Control
RQ	Research Question
SLP	Small, Local Provider
SNV	*Stichting Nederlandse Vrijwilligers*
SOP	Standard Operating Procedure
SPSS	Statistical Package for Social Sciences
TBD	To Be Determined

TWG	Technical Working Group
UNICEF	United Nations Children's Fund
URBAN WASH	Urban Resilience by Building and Applying New Evidence in WASH
USAID	United States Agency for International Development
USD	United States Dollar
WASH	Water, Sanitation, and Hygiene
WASHPaLS	Water, Sanitation, and Hygiene Partnerships and Learning for Sustainability
WHO	World Health Organization
WRM	Water Resource Management
WSC	Water and Sanitation Company
WSUP	Water and Sanitation for the Urban Poor
ZEMA	Zambia Environment Management Agency

1.0 INTRODUCTION

1.1 BACKGROUND

Globally, ~37% of the urban population lacks access to sewerage connections, and over 1.8 billion people lack access to safely managed sanitation services (World Health Organization [WHO] and United Nations Children's Fund [UNICEF] Joint Monitoring Programme [JMP], n.d.). This estimate is likely to keep growing as approximately 78 million people continue to migrate to cities and their fringes every year (Birkmann et al., 2016). Most cities in low- and middle-income countries (LMICs) are unable to keep up with rapid urbanization and provide citywide coverage of sanitation services. Water and sanitation utilities are constrained by their financial capacity and/or capabilities, especially regarding fecal sludge management (FSM). In the absence of reliable public service provision, a significant proportion of the 1.8 billion people without access to safely managed sanitation receive informal services from small, local providers (SLPs).

USAID Urban Resilience by Building and Applying New Evidence in Water, Sanitation, and Hygiene (URBAN WASH) conducted a desk review on the approaches to leverage SLPs for expanding water and FSM services in urban and peri-urban areas. The study indicated that the knowledge base on this topic is still nascent, with limited examples and documentation of cities formally leveraging SLPs to deliver services. There is a need for additional implementation research to address the evidence gaps and generate generalizable learnings for the sector.

URBAN WASH has entered into a partnership with the National Water and Sanitation Council (NWASCO), the national Water, Sanitation, and Hygiene (WASH) regulator in Zambia, to conduct implementation research in several cities in Zambia.

Zambia presents a good opportunity to conduct implementation research on this topic since the FSM sector is actively thinking about leveraging private emptiers to expand services. Zambia has a high prevalence of informal emptying and NWASCO created a framework in 2018 (NWASCO, 2018) for utilities to engage private emptiers to expand FSM services to the urban population without sewerage connections. Several interventions are being planned for formalizing SLPs (referred to as "private emptiers" in Zambia) to implement this framework.

1.2 ACTIVITY PURPOSE AND AUDIENCE

The purpose of this activity is to address three critical evidence gaps on the topic of engaging private emptiers highlighted by the desk research, while providing strategic research support to NWASCO and the utilities to inform decision-making regarding FSM service delivery. The three topics of research are:

- Understanding the **choice** made by utilities to engage private emptiers, and the conditions that influence this choice.
- Understanding how utilities **implement** engagements with private emptiers.
- Measuring and understanding the **impact** of engaging private emptiers for FSM service delivery.

URBAN WASH aims to ensure that the research is contextually relevant and has buy-in from local decision-makers and implementers. For this purpose, the activity has created national and regional technical working groups (TWGs) and convened them for co-design workshops in June 2023 (refer to Section 8.1 for a list of members of both working groups). The research design proposed in this document is based on inputs and validation from the co-design workshops.

The findings from this research have two primary audiences – at the country-level and at the global-level. The country-level audience includes NWASCO and the utilities for whom the findings from this research will guide policy and decision-making for FSM interventions in Zambia. The global audience will include sanitation funders, multi-country implementers, and associations of regulators (e.g., Eastern and Southern Africa Water and Sanitation [ESAWAS]).

1.3 ORGANIZATION OF REPORT

This document lays out the details of the research partnership in Zambia and includes:

- Background on the **provision of FSM services** in Zambia and the need for implementation research.
- **Overview of the implementation research**, including the framing, three overarching research questions, and the timelines for the activity.
- **Research design**, including data sources, data collection plans, and analytical approaches for the research questions.
- **Additional information** about the research, including the data and activity management plan, stakeholder engagement plan, monitoring and evaluation indicators, deliverables, and overall timeline.

2.0 PROVISION OF FSM SERVICES IN ZAMBIA

2.1 OVERVIEW OF FSM SERVICES IN ZAMBIA

Coverage of sewerage networks in Zambia is low, with the remaining population primarily relying on on-site containment facilities.[1] Literature suggests that only 28% of the urban and peri-urban population under the 11 utilities has a sewerage connection (NWASCO, 2022b). The penetration of sewerage connections is below 50% for 9 of the 11 utilities (Table 1).

Table 1: Utilities' service coverage

Utility	Total population under jurisdiction of utility in 2022	Proportion of population with sewerage connections in 2022
Lusaka	3,012,425	18.30%
Nkana	901,756	63.78%
Kafubu	810,273	48.54%
Mulonga	597,318	75.61%
Lukanga	481,163	18.29%
Southern	549,062	18.84%
Chambeshi	505,917	7.96%
Northwestern	306,540	1.35%
Western	253,289	0.72%
Eastern	350,574	4.29%
Luapala	266,044	4.36%

Source: Adapted from the NWASCO Water Supply and Sanitation Sector Report 2022 (NWASCO, 2022b).

Households with on-site containment facilities predominantly rely on private emptiers for emptying services, even in larger cities like Lusaka (USAID URBAN WASH, 2023). There is high reliance on informal service provision, for both mechanized and manual emptying. Mechanized private emptiers operate in jurisdictions of 7 of the 11 utilities (Table 2) (NWASCO, 2018). There is no data on service coverage by manual emptiers, but stakeholder consultations indicate that their prevalence is high across cities. A percentage of the population also relies on utilities for emptying, leaves their pits unemptied, or builds new ones (potentially only in peri-urban areas). Their exact numbers are unknown.

[1] Only 0.78% of the urban population practices open defecation, as per JMP data for 2022 (WHO and UNICEF JMP, n.d.). This is corroborated by the Demographic Health Survey (2018) data for urban Zambia, which states that 1% of the population was practicing open defecation (Zambia Statistics Agency, Ministry of Health (MOH) Zambia, and ICF, 2019). So, the population without a sewerage connection is assumed to be largely using an on-site containment facility.

Table 2: Private vacuum truck coverage

Utility	Number of trucks operated in jurisdiction of utility
Lusaka	31
Nkana	Exact number not known
Kafubu	1
Mulonga	2
Lukanga	Exact number not known
Southern	2
Chambeshi	None
Northwestern	Exact number not known
Western	None
Eastern	None
Luapala	None

Source: NWASCO, 2018 (more recent estimates are not available for this metric).

A few utilities have acknowledged the role the private emptiers play and have formally engaged them to expand formalized service coverage within their jurisdiction (refer to Table 3).

Table 3: Summary of engagements initiated across utilities

Utility	City	Year of engagement	Intervention description	Donor/ program support
Lusaka	Lusaka	2010	**Partnered with Water Trusts**[2] (community-based organizations in Lusaka) to expand coverage to two peri-urban areas (Renouf, 2018) and **set up treatment facilities** in these areas (Renouf, 2017)	Water and Sanitation for the Urban Poor (WSUP)
		2020	Implemented **performance-based contracts** with five emptying enterprises and two Water Trusts (together comprising more than 18 emptiers) to expand coverage to all peri-urban areas of Lusaka	
Southern	Livingstone	2020	**Trained and formalized manual emptiers** to serve areas inaccessible to vacuum trucks (WSUP, 2023)	WSUP
Lukanga	Kabwe	2020	**Partnered with ten emptiers** and **repurposed an old treatment plant**	*Stichting Nederlandse Vrijwilligers* (SNV)
		2024	**Planning to implement scheduled desludging** with four emptiers in one zone of the city	SNV
Chambeshi	4 cities (Nakonde, Mbala, Mpulungu and Kasama)	2019	**Trained four emptiers** and **provided emptying equipment (like the e-Vac)** to the trained emptiers	SNV
Nkana	Nkana	2020	**Engaged community-based enterprises** to provide emptying services in three settlements (Nkana WSC, 2023)	None

Treatment coverage is low across cities, with most of the collected sludge disposed of unsafely. Only three cities (Lusaka under Lusaka Water and Sanitation Company [WSC], Kabwe under Lukanga WSC, and Livingstone under Southern WSC)[3] have fecal sludge treatment plants (FSTPs). Others such as Nkana WSC and Chambeshi WSC use their sewage treatment plants for disposal and treatment of fecal sludge, and face operational and design issues since the plants are not suited for the treatment of sludge (Nkana WSC, 2023; Chambeshi WSC, 2023). It also appears that even where there are treatment plants, sludge is inadequately managed. For example, in Lusaka, over 60% of the generated sludge remains within the residential areas, compromising the environment and public health (Tembo, Nyirenda and Nyambe, 2017).

[2] Formal community-based organizations engaging multiple emptiers, originally delegated to provide water services on behalf of Lusaka WSC in specific zones.

[3] The FSTP in Kabwe, with 4 drying beds, has a capacity of treating 200m^3 of sludge per batch loaded. The FSTP in Livingstone, with an anaerobic baffled reactor (ABR), has a capacity of treating 3.6m^3 of sludge per batch, daily (Lukanga WSC, 2023; Southern WSC, 2023).

2.2 NEED FOR PRIVATE SECTOR ENGAGEMENT

Most utilities lack the appropriate resources and capacity to provide adequate FSM services for their mandated jurisdictions. They plan to play a larger role in fecal sludge treatment in the future by setting up and managing FSTPs themselves but wish to leverage the private sector to expand emptying service coverage.

Extending sewerage connections to replace on-site sanitation is expensive, and utilities often do not have the financial resources to expand this service to unplanned settlements. During the co-design workshops, utility stakeholders indicated that leaving these settlements unserved and unregulated was not an option since the mandate of service provision lies with the utilities. Further, private emptiers are already prevalent and have equipment and customer relationships in these settlements, which leads utilities to believe there is an opportunity for mutually beneficial engagements.

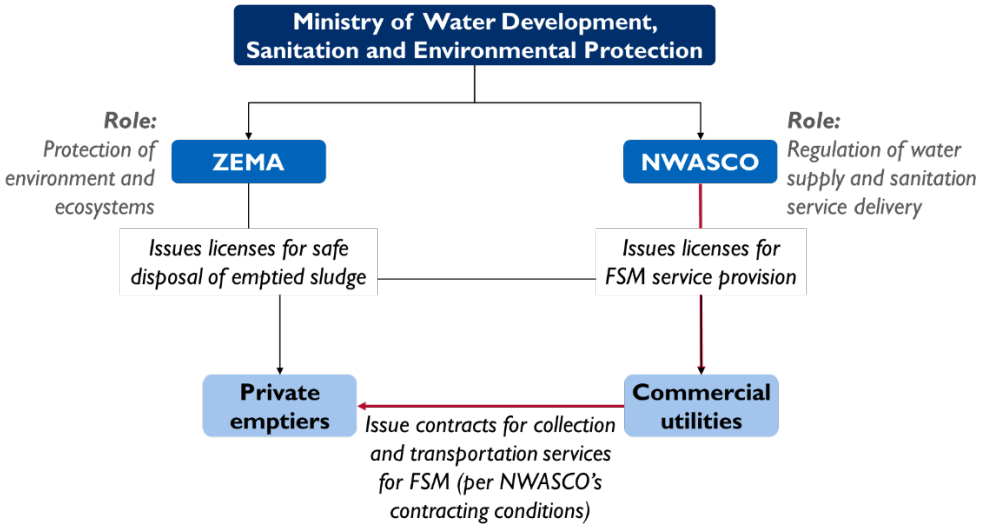
However, the utilities and the regulator note that these engagements need to be formalized to ensure safety and affordability of services. NWASCO noted that inadequate regulation has led to unsafe emptying and dumping, posing a risk to public health, and unregulated pricing for emptying (NWASCO 2018). Utilities also noted that their mandate requires them to work with private emptiers in their jurisdictions to build their capacities and create an enabling environment.

2.3 REGULATORY FRAMEWORK FOR EMPTIER ENGAGEMENT

Until 2016, the focus for sanitation service provision and regulation in Zambia was primarily on sewerage systems (which only serve a minority of the population), despite the law mandating WSCs and NWASCO to address both off-site and on-site sanitation (IWA, 2022b). The lack of a framework for FSM has been noted in a couple of key strategic documents. This was first observed in the National Urban and Peri-Urban Sanitation Strategy (2015 to 2030), which mandated NWASCO to create guidance for enhanced service delivery, tariffs for on-site sanitation, and develop regulatory instruments, benchmarks, and monitoring for sanitation. Subsequently, the 2017 Urban and Peri-Urban Water Supply and Sanitation Sector Report highlighted the lack of regulation of urban on-site sanitation, which resulted in the ministers of Water Development, Sanitation and Environmental Protection (MWDESP) and Local Government (MLGRD) mandating NWASCO to create a FSM framework (NWASCO, 2018).

The framework outlines the roles of various stakeholders and licensing arrangements (Figure 1). It is the first official regulation for FSM created by NWASCO and highlighted the need for working with the private sector to service different areas within a city (e.g., peri-urban). It also provides licensing guidelines for WSCs to engage them for emptying services with a management contract.

Figure 1: Institutional framework for FSM service provision in Zambia



Note: The arrows in red depict the new licensing arrangement after the introduction of the framework in 2018 (NWASCO, 2018). ZEMA: Zambia Environment Management Agency.

Subsequent guidelines on City-Wide Inclusive Sanitation (CWIS) planning by NWASCO (NWASCO, 2022a) provide guidance on how utilities can develop a business-oriented FSM service sector with the engagement of private emptiers. It covers business model development and sanitation planning, including delivery models and permitting and contracting guidelines for private emptier engagement (Figure 2).

Figure 2: Current CWIS guidelines by NWASCO

1 Business model development

Define business model as per a canvas:

- Value propositions.
- Revenue streams.
- Cost structure
- Key resources.
- Key processes.

2 Sanitation planning

Broad guidelines for sanitation planning:

- Conducting a city assessment of sanitation services available and access levels.
- Selecting interventions and technologies appropriate for different areas of the city.

Specific guidelines:

A)Delivery model selection

- Creating zones within cities based on containment facilities present.
- Identifying service providers (either the utility, emptier or NGO) for each zone.
- Signing a contract with each outsourced service provider, if any.
- Maintaining a database of customers and developing SOPs for service providers.
- Monitoring performance based on SOPs through performance reports.

B) Contracting and engaging emptiers

- General conditions:
  - –Identification requirements (name of company, address, contact details).
  - –Licensing requirements (e.g., ZEMA waste transport license, road traffic license).
- Specific conditions for equipment used for emptying (e.g., vehicle and container).

Note: NGO: Nongovernmental organization; SOP: Standard operating procedure.

NWASCO plans to create additional guidelines to support utilities with private sector engagement and is seeking inputs for the same. NWASCO is also advocating for utilities to implement scheduled emptying and has provided some guidance to some WSCs (like Southern) on how to engage private emptiers for the implementation. NWASCO believes that a country-wide adoption of scheduled

emptying will ensure adherence to the emptying cycles of pits and maintenance of consistent demand for the formalized emptiers (Southern WSC, 2023).

2.4 CHALLENGES AND EVIDENCE GAPS

Despite the frameworks and guidelines for private sector engagement, there are several evidence gaps in the implementation of engagements in Zambia and globally.

NWASCO currently lacks evidence on the support that utilities require to engage private emptiers. The conditions that enabled engagements in Lusaka are not replicable. Lusaka WSC received significant donor funding, for setting up treatment plants and customer subsidies (IWA, 2022a), to the amount of ~USD 22 Million as per scoping conversations, which may not be the case for most utilities. They also benefit from economies of scale given the size of the population served, which is more than two times the size of other utilities (NWASCO, 2022b), allowing emptiers to be more viable than in smaller cities, as stated during the co-design workshop. Further, high-ranking utilities such as Eastern WSC (NWASCO, 2022b) appear reluctant to engage emptiers (NWASCO, 2023), and NWASCO is unclear about their challenges and how to incentivize them to do so.

There is also limited data, globally, on the conditions that enable engagements, as the desk review only found positive deviants, i.e., contexts where engagements have been implemented, such as Kampala, Uganda, Lusaka, Zambia, and Sinnar, India (USAID URBAN WASH, 2023).

From a utility perspective, the primary evidence gap is on viable business models. In Zambia, NWASCO's guidelines do not provide guidance on business model options (e.g., types and amount of fees to charge emptiers, benchmarks for costs to be incurred in implementing engagements while remaining viable, etc.). Additionally, the guidelines lack specificity about how to engage with emptiers (e.g., identifying them, creating contracts that incentivize engagement, contract duration, etc.) – a challenge noted by several utilities, given many emptiers are unknown to the utility.

Globally, there is also insufficient evidence on approaches to engage emptiers, and a general lack of data on the viability of service delivery through these engagements. For example, literature highlighted successful engagements through a recognized association or collective (e.g., as in Kampala, Uganda) (USAID URBAN WASH, 2023), which may not be active to the same degree in smaller cities. There is no data on the impact of engagements on the viability of the utility or the emptier, which could be an important factor that influences the success or failure of their engagement. For example, in Khulna, Bangladesh utilities' inability to provide a large enough market led to the emptiers withdrawing from the partnership with the utility but there isn't data that quantifies the viability from both parties' perspective (USAID URBAN WASH, 2023).

Finally, there is a general lack of documentation on the impact of engagements between emptiers and utilities on affordability and the safety of services (especially from the perspective of emptiers and households), and on the resilience of service delivery. The scoping trip and co-design workshop highlighted that the lack of existing data on the impact of formalization on emptiers' business practices or affordability for households in Zambia. NWASCO specifically emphasized the need to understand the impact of these engagements on marginalized households, such as women-led households.

Globally, none of the case studies in the desk research had impact data for households and emptiers (USAID URBAN WASH, 2023). Literature from some contexts stresses the challenges that emptiers face when left unregulated, such as health and safety risks, stigmatization, and challenges to financial viability (Muoghalu, Semiyaga and Manga, 2023; Philippe et al., 2022), but there is no data on how the

engagements with utilities impact these challenges. Only one context, Maputo in Mozambique, appears to have documented impact of engagements with private emptiers on emptying and disposal practices from the households' perspective, but the engagements were driven by an international program, and not the utility (Capone et al., 2020). Finally, understanding the impact on resilience is important because shocks such as climate change can slow down or reverse the progress of improved sanitation coverage and exacerbate inequalities if systems are not designed to be resilient (Kohlitz, Chong, and Willetts, 2017).

The URBAN WASH implementation research is seen as critical for generating evidence for the broader sanitation sector, including regulators, utilities, and donors, that are currently planning on increased investments in FSM and particularly engaging emptiers to expand service provision.

3.0 RESEARCH OVERVIEW

3.1 RESEARCH FRAMING

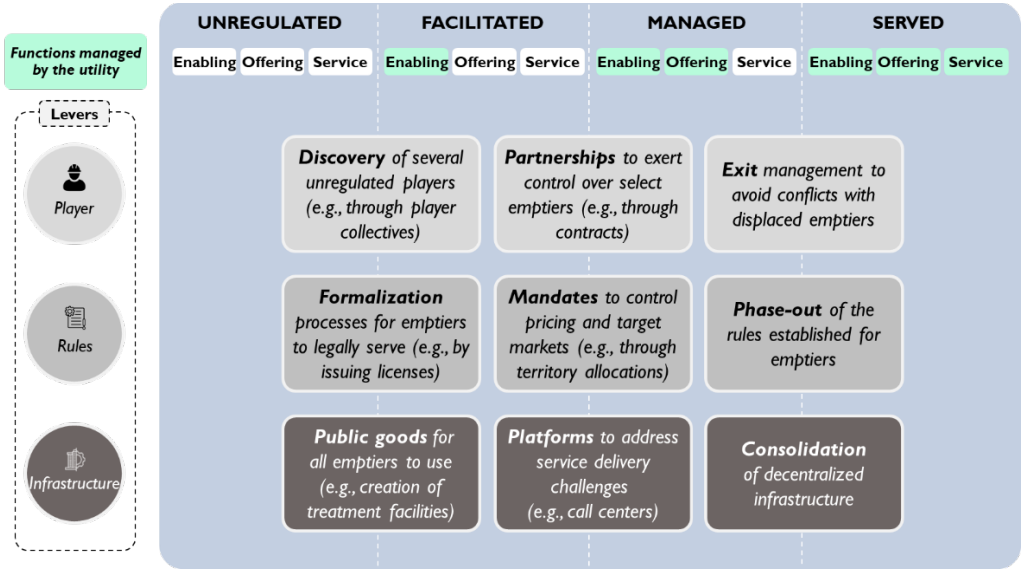
The implementation research in Zambia is framed around studying **market transitions.** URBAN WASH's desk research on SLPs (USAID URBAN WASH, 2023) highlighted that when utilities engage with SLPs, they transition *unregulated* parts of the city to different market archetypes, depending on the type of engagement with SLPs. Utilities can either *facilitate* the participation of SLPs (e.g., by giving them licenses or disposal points) or *manage* the market by actively influencing SLPs' service offerings, such as by setting pricing or taking on marketing roles. Market transitions to these facilitated or managed archetypes allow utilities to improve and expand services to households that they cannot *serve* directly.

Utilities implement transitions using three types of actions or "levers":

- *Player* lever, by managing the engagement with SLPs (e.g., engaging with SLP collectives, designing various types of partnership agreements);
- *Rules* lever, by defining the terms of their engagement with SLPs and influencing their service delivery (e.g., formalization processes to issue licenses, defining pricing as part of contractual agreements); and
- *Infrastructure* lever, by making complementary business environment investments to support service delivery (e.g., developing treatment facilities, marketing platforms).

Implementation of market transitions can be represented visually in the URBAN WASH Market Transitions Framework (refer to Figure 3). Appendix 1 provides further details on the framework.

Figure 3: URBAN WASH Market transitions framework



3.2 RESEARCH QUESTIONS

The implementation research will aim to answer three research questions on the topic of market transitions:

- **Research question 1 (Choice of transitions):** What choices do utilities make to implement transitions with SLPs, and what conditions influence these choices?

- **Research question 2 (Implementation of transitions):** How do utilities implement transitions with SLPs to improve and expand urban FSM services?
- **Research question 3 (Impact of transitions):** What is the impact of these transitions on service delivery outcomes?

Each question was developed on the basis of the evidence gaps from the literature review and case studies, and refined through stakeholder consultations in Zambia. The justification and the sub-research questions are provided in subsequent chapters.

3.3 RESEARCH TIMELINES

The research will run from November 2023 to January 2025, and the timelines and activities for data collection will vary by research question (refer to Figure 4).

For research question 1, we will conduct the following:

- Virtual interviews with utility stakeholders in December 2023.
- In-person workshop with multiple (utility and non-utility) stakeholders in January/ February 2024.
- Targeted in-person in-depth interviews (IDIs) with community stakeholders in January/ February 2024.

For research question 2, we will conduct the following:

- In-person IDIs with multiple respondents (utilities, formal and informal emptiers, treatment plant operators, and community leaders) in January/ February 2024.
- In-person narrative inquiry interviews with marginalized informal emptiers in May 2024.
- In-person IDIs with the same respondents as in the first round in August/ September 2024.

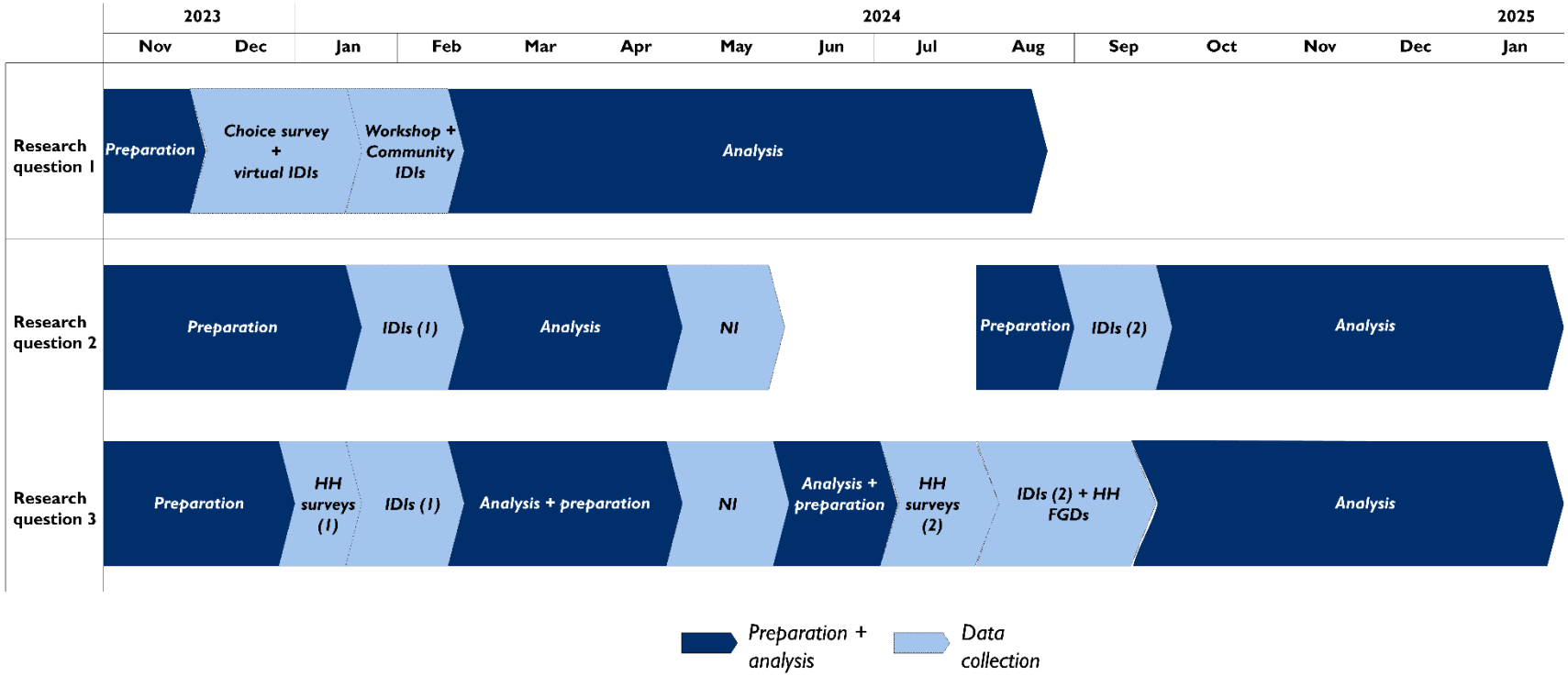
For research question 3, we will conduct the following:

- Households surveys in settlements where transitions are implemented in December 2023/ January 2024.
- In-person IDIs with formalized emptiers in December 2023/ January 2024.
- In-person narrative inquiry interviews with marginalized households in May 2024.
- Household surveys in settlements where transitions are planned (to be implemented in early 2024) in July 2024.
- Focus group discussions with households in August/September 2024.
- In-person IDIs with formalized emptiers and community leaders in August/September 2024.

The activities and purpose of each round of data collection are detailed in the subsequent sections. Each research question is structured in the following manner:

- **Overall approach**, including the sub-research questions, rationale for study, and an overview of our approach for studying the question.
- **Data collection plan**, including the data we will collect, and the methods and sample for data collection.
- **Analysis plan**, detailing our approach for analyzing the data collected for each sub-research question.

Figure 4: Research timelines



Note: HH: Household; FGD: Focus group discussions; NI: Narrative Inquiry.

4.0 RESEARCH QUESTION 1 – CHOICE OF TRANSITIONS

4.1 OVERALL APPROACH

The aim of research question 1 is to understand utilities' choice of implementing transitions. It is framed around two sub-research questions:

- How did utilities make the choice on:
  - **Why** to implement a transition?
  - **Which** transition to implement?
  - **Where** to implement the transition?
- What is the perspective of non-utility stakeholders on the conditions influencing utilities' choices?

The question on utilities' choices is important given NWASCO's interest in incentivizing utilities to make transitions, and the lack of evidence on the conditions required to facilitate transitions. NWASCO seeks to understand how they can support utilities to implement the guidelines they released, since approaches that worked for Lusaka may not be replicable for smaller cities (as detailed in Section 2.0). In the broader sector, documentation has largely focused on positive deviants, i.e., utilities that have engaged emptiers (USAID URBAN WASH, 2023), such as in Zambia, Uganda, India, and Bangladesh (SNV, 2020; KCCA, 2017; KCCA n.d.; IWA, 2022a; Mehta, Mehta and Yadav, 2019). These cities implemented transitions to facilitated and managed markets, but the factors that determined utilities' choices, sequencing and overall aim of transitions, and the settlements in which to implement them are unclear.

The perspective of non-utility government stakeholders is important since they often influence conditions that may trigger transitions, and the perspective of community stakeholders is important since they are the most impacted by the transitions. For example, NWASCO's mandates at the national level impact whether utilities consider transitions, as noted in scoping conversations and the co-design workshop. National-level conditions in other countries (e.g., support from the Ministry of Water and Environment to Kampala Capital City Authority [KCCA] in Kampala) also facilitated transitions (USAID URBAN WASH, 2023). The need for community stakeholders' perspectives was highlighted during the co-design workshops in Zambia, since they have an in-depth understanding of the political, social, and economic conditions that may influence utilities' decisions on choosing settlements.

The overall approach for answering these research questions is:

- A retrospective analysis of the choices that individual utilities made, and the conditions influencing them, to develop an initial conceptual framework.
- Validation and refinement of the initial framework collectively by multiple utilities.
- Capturing of perspectives of non-utility stakeholders on the conditions, with an emphasis on capturing perspectives of community stakeholders, by developing a conflict map.

4.2 STUDY SITES

We will conduct this analysis with six out of the eleven utilities in Zambia. The selection was based on ensuring diversity across the degree of engagement with private emptiers, and utilities' performance rankings and size of the jurisdiction covered (highlighted in green in Table 4). The diversity across

degrees of engagement is important for the comparison of choices on **"why,"** to allow us to compare utilities that did not engage emptiers with those that did. The diversity in rankings and jurisdiction allows a comparison across a broader and more representative set of utilities (rather than focusing on only well-performing/resourced utilities).

The utility's performance ranking was taken from NWASCO's sector report (NWASCO, 2022b). The degree of engagement was determined based on the distribution of formalized emptiers across the utilities (as per the information gathered from scoping conversations with the utilities). "Low" implies that there are no known engagements with private emptiers, "medium" implies engagements with 1 – 5 emptiers and no formal agreements, and "high" implies engagements with six or more emptiers and a formal agreement for the same.

Table 4: Ranking and degree of engagement with emptiers of Zambia's utilities

Rank	Utility	Towns covered	Population within jurisdiction	Transitions implemented	Degree of engagement with emptiers
1	Eastern	10	~351K	No known transitions	Low
2	Southern	21	~549K	Multiple transitions from unregulated to facilitated (Livingstone)	High
3	Lusaka	5	~3,012K	2 transitions from unregulated to managed (Lusaka)	High
4	Nkana	3	~902K	3 transitions from unregulated to managed (Kitwe)	Medium
5	North Western	8	~307K	No known transitions	Low
6	Chambeshi	12	~506K	4 transitions from unregulated to managed (1 each Kasama, Mpulungu, Nakonde, and Mbala)	Medium
7	Mulonga	3	~597K	No known transitions	Low
8	Luapala	7	~266K	No known transitions	Low
9	Kafubu	3	~810K	No known transitions	Low
10	Lukanga	8	~481K	1 transition from unregulated to managed (Kabwe)	Medium
11	Western	10	~253K	No known transitions	Low

4.3 DATA COLLECTION PLAN

For analysis on utilities' choices, we will conduct:

- A short survey, administered through our points of contact at each utility, with the six utilities to catalogue their choices of transitions and settlements.
- Virtual IDIs, conducted by the FSG team, with 2 respondents in each utility to gain a deeper understanding of choices and the conditions that influenced them, and develop an initial framework.

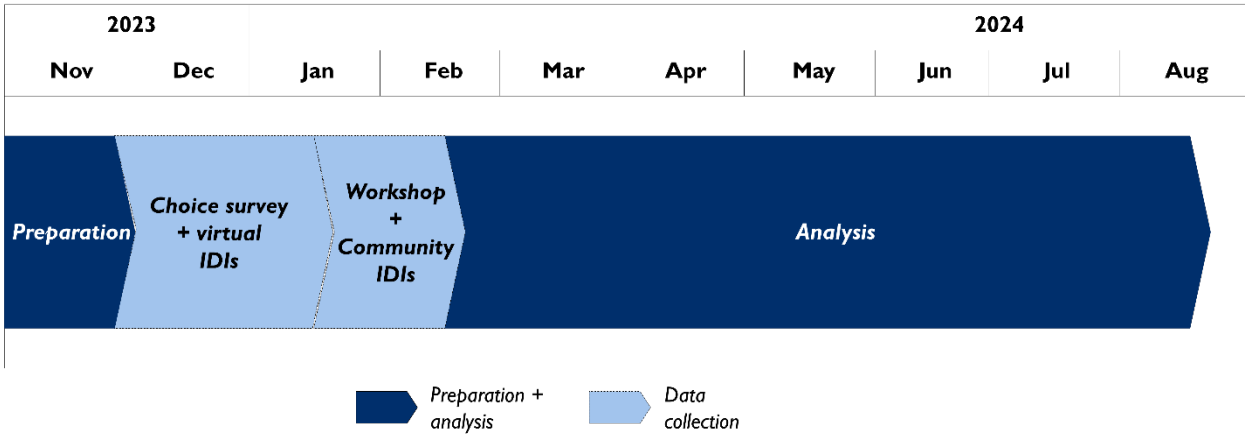
- In-person workshop, conducted by FSG with facilitation and translation support from a local research agency, with all six utilities to validate the framework.

For analysis on the perspectives of non-utility stakeholders, we will conduct:

- An in-person multi-stakeholder workshop (the same as for utilities conducted by FSG with facilitation and translation support from a local research agency, with ~22 stakeholders (10 national and city authority stakeholders, and 12 community representatives) to develop a conflict map.
- Targeted in-person IDIs, conducted by FSG with translation support from a local research agency, with the 12 – 15 community representatives to ensure their perspectives are captured on the map, in the absence of government stakeholders.

The timelines for the activities mentioned above are summarized (light blue) in Figure 5. The activities are detailed in subsequent sections.

Figure 5: Timeline for research question (RQ) 1 data collection and analysis



4.3.1 FOR UTILITY CHOICES AND CONDITIONS

The short survey will ask utilities to list the choices that they made. The points of contact at each utility have offered to pass on the survey to individuals within the utility most suited to provide responses, and collate them to share back with us. Across all utilities, we already have data on whether they implemented transitions or not. We will gather data on:

- For choices on "**which":** Different models they implemented, additional options they considered, and variations in the choice of models for different areas.
- For **"where":** The settlements chosen for implementation, settlements considered but not chosen, and settlements chosen but implementation discontinued.

The virtual IDIs will capture data on the conditions influencing utilities' decisions, and develop an initial framework of conditions for each choice (as detailed in the analysis plan). We will conduct these interviews with the technical inspector/ commercial director, and FSM head/ peri-urban area head/ sanitation engineer, as these profiles were recommended during co-design. Given the emergent nature of the research, we may conduct one more targeted interview per utility (with the respondent profile depending on who is best placed to answer the targeted question).

The interview will be conducted in a semi-structured format,[4] with open-ended questions for identifying conditions. We will add targeted probes as they emerge in each interview. Additionally, if certain types of conditions (e.g., political or social) do not emerge in the first few interviews, we will also add targeted probes for them. Please refer to Appendix 2 for examples along different types of conditions. The detailed instrument is provided as a supplemental document (titled Appendix 1_RQ1 Utility Interview), and the broad areas of inquiry are provided below:

- Background of the respondent, including role and experience within the utility.
- Vision of the utility, including overall aims, goals for FSM, and the role they see in the future for private emptiers.
- Conditions influencing their choice of **"why"** to implement transitions, **"which"** transition and **"where"** to implement it *(the latter two will only be asked to utilities that engaged with emptiers since only they make these decisions).*

The **in-person workshop with the utilities** is aimed at validating the framework developed from the data gathered through the virtual interviews. We will conduct this workshop with a sample of the stakeholders with whom we conduct the virtual interviews based on those identified as most relevant to validate the framework. The workshop will be conducted using specific facilitation techniques, in break-out groups, based on the type of data we want to generate:

- Validation of existing conditions and any additional conditions beyond those in the framework using the "sticky wall" method, which is cited as a helpful method when participants are required to reflect on an output and generate new ideas (Turner, 2019).
- Rating of importance of each condition to the choice using a pairwise comparison matrix of all the conditions for each choice, cited as a helpful method when participants are expected to rank a long list of options by breaking it into binary choices (Kyne, 2023).
- An initial list of the kind of support required by utilities to implement transitions through an open discussion within the groups.

4.3.2 FOR NON-UTILITY PERSPECTIVE

The **in-person workshop** with non-utility, government stakeholders and community stakeholders will aim to capture any disagreements with the utility on the conditions in the framework. The non-utility, government stakeholders will include:

- 3 national-level stakeholders, 1 each from Ministry of Water Development, Sanitation and Environmental Protection (MWDS); NWASCO; and ZEMA.
- 6 city authority stakeholders**,** 1 per utility such as FSM department head at city council/ public health officer.

The community stakeholders will include:

- 6 civil society organizations/ household or community association representatives, 1 per utility.
- 6 emptier representatives, 1 per utility.

[4] Refers to interviews where a few questions are pre-defined but the interviewer has the flexibility to probe or ask follow-up questions based on responses (Mueller & Segal, 2015).

During the workshop, we will gather data on disagreements voiced by the non-utility stakeholders over each condition for each choice. We will do this by seating the non-utility stakeholders in the breakout groups with the utility stakeholders (with a split across government and non-government stakeholders). Moderators seated within these groups will then silently capture any disagreements or conflicts during the activities by capturing the following, for each condition:

- The type of stakeholder (city, national, or community) that agreed to the utility's decision on the condition.
- The type of stakeholder that did not agree to the utility's decisions on the condition.
- Reasons stated for disagreements.

The targeted IDIs with the community stakeholders will aim to gather disagreements by the community stakeholders on each condition in the framework, in the absence of power differentials imposed by the presence of government stakeholders. The sample will include all the community stakeholders invited to the workshop (i.e., emptier and community association representatives). The targeted IDIs will be conducted in a semi-structured format. The exact detailed questions and instruments will be developed based on the conditions identified in the initial framework developed post- the IDIs with utilities. The broad areas of inquiry will include the following for each choice:

- Whether they agree with the utilities' assigned rating of importance for the condition, with reasons.
- Whether there are any additional conditions that the utility has not stated.
- Specific probes to understand how political and social conditions at the settlement level influence choices (since these stakeholders are best placed to answer that and utilities may not voice these aspects).
- Their perception of why the utilities may not have listed the additional conditions.

4.4 ANALYSIS PLAN

4.4.1 FOR UTILITY CHOICES AND CONDITIONS

Question: *How did utilities make the choice on:*

- ***Why*** *to implement a transition?*
- ***Which*** *transition to implement?*
- ***Where*** *to implement the transition?*

We will **develop a conceptual framework of the conditions** influencing each choice. For each choice, we will generate the framework comparing conditions:

- For **"why"**: utilities which implemented transitions vs. those that did not.
- For **"which"**: transitions they implemented – i.e., to facilitated markets vs. those to managed.
- For **"where"**: settlements[5] where transitions were implemented vs. where they were implemented but withdrawn vs. those that were considered but the transition didn't get implemented.

[5] A settlement is an area (or micro-market) receiving a specific type of sanitation service, based on the engagement between utilities and emptiers. Refer to Appendix 1 for details on micro-markets.

We may also generate disaggregated frameworks by different utility archetypes, if the data suggests differences between them (e.g., for smaller utilities, vs. larger utilities).

To develop the initial framework, we will use the data from the initial survey and the virtual IDIs with the utilities. This will be done in an emergent manner.

- First, we will read transcripts from each virtual utility interview as we complete conducting them, and use open coding[6] to generate themes of conditions for each choice. We will capture these themes as sub-categories under three broad categories:
  - Political and legal (e.g., rules, leadership, events);
  - Economic and technical (e.g., availability of financial resources or infrastructure); and
  - Social and environmental (e.g., rules, relationships, events, and political capital and incentives).

  For example, responses like – settlement leader has influence over utility, and settlement leader has links to local program implementer would be captured under the theme "political influence of settlement leadership", under political and legal.
- Then, a second team member will study the transcripts and validate the themes, to reduce bias of only one person reviewing data.
- If additional rounds of virtual interviews are conducted, we will use axial coding[7] on these transcripts to refine the themes.

Finally, we will validate and refine the framework at the workshop by gathering the collective perspective of multiple utilities. We will use selective coding[8] on the data generated from the workshop to further refine the categories (i.e., collapse conditions together, or re-order conditions), once we are able to establish an understanding of root causes for the conditions, and generate a final framework. Our approach for capturing data will vary based on the different facilitation methods used, including:

- Taking notes during group and plenary discussions;
- Listing additional conditions for each choice by reading through the sticky wall notes; and
- Assigning ratings to each condition by reviewing inputs from the pairwise comparison activity.

We will also **develop a list of the support utilities require** to implement transitions. This will be a simple exercise of gathering workshop data on the support required, as stated by the utilities.

4.4.2 FOR NON-UTILITY PERSPECTIVES

Question: *What is the perspective of non-utility stakeholders on the conditions influencing utilities' choices?*

We will **generate a conflict map**[9] to capture disagreements between the utility and each type of non-utility stakeholder for each choice. The conflict map will be produced for each choice made by the

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6 Refers to reading the transcript data several times, breaking down the qualitative research data into excerpts, and make summaries of the concept or theme (Qualtrics, 2023).

7 Refers to comparing data from further data collection to summarise concepts or themes to look for similarities and differences (Qualtrics, 2023).

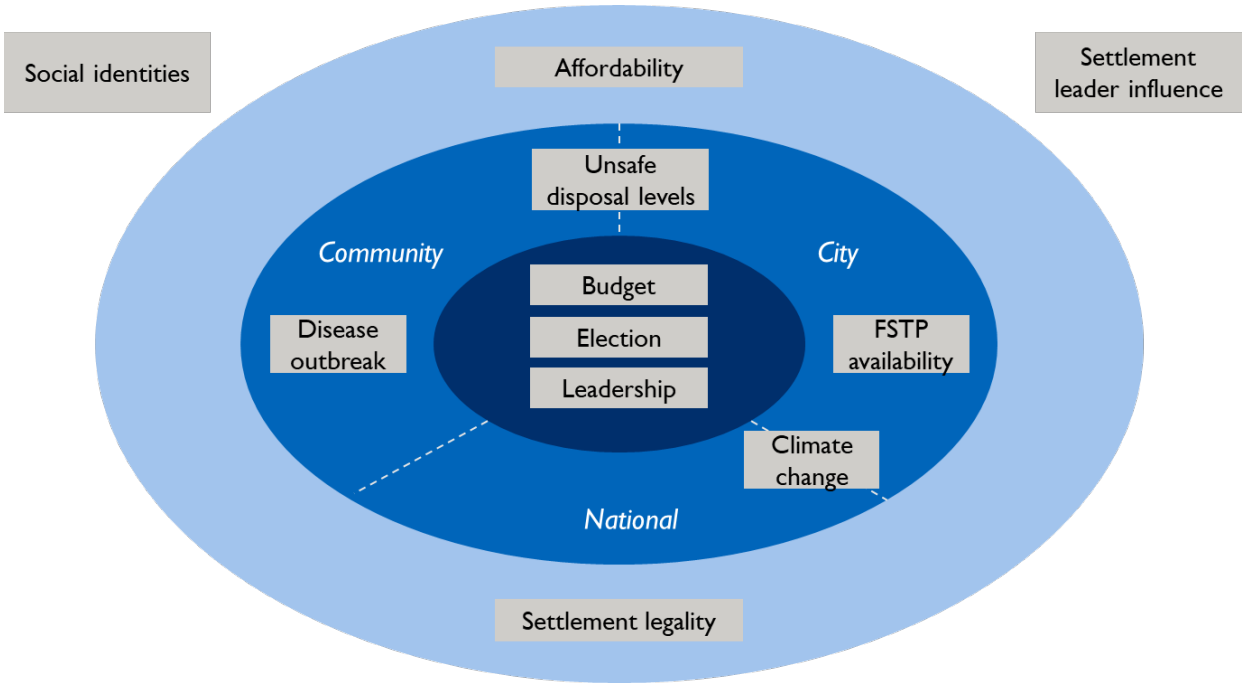
8 Selective coding aims to integrate and validate the different categories that have been developed during axial coding. It aims to understand the root causes of different categories to develop a common core category (Vollstedt and Rezat, 2019).

9 We will generate this by adapting the conflict map (Anglo-American, 2023) approach, which typically maps different stakeholders and their relationship over a specific issue.

utility, with the conditions from the framework as the unit of analysis. The conditions will be mapped along the following dimensions (refer to Figure 6):

- Conditions validated by all stakeholders (dark blue circle in Figure 6).
- Conditions where utility and a few stakeholders agree (medium blue circle in Figure 6), with conditions agreed on by two stakeholders mapped between them (e.g., national and city agreed with the utility on climate change being a condition).
- Conditions where no stakeholder agrees with utility (light blue outer circle in Figure 6).
- Additional conditions not stated by utility, but stated by community representatives (outside the map in Figure 6, e.g., social identities).

Figure 6: Indicative conflict mapping



For disagreements, we will capture the number of stakeholder types (i.e., national, city, community) that agreed with the utility for each condition, by reading:

- Notes from the moderators seated in each break-out group.
- Transcripts from the IDIs with the community stakeholders.

We will read the notes at the end of the day of data collection, and process it into a template that lists each condition and each stakeholder type. The team members will capture the number and type of stakeholders that agreed with each condition. This data will then be transferred onto the map once we have our final list of refined conditions.

For the additional conditions, we will capture any new themes that emerge from the IDIs with the community stakeholders. At the end of the day of data collection, we will produce a long-list of the additional conditions. During the analysis, the team members will read the conditions and identify the new themes that emerge.

5.0 RESEARCH QUESTION 2 – IMPLEMENTATION OF TRANSITIONS

5.1 OVERALL APPROACH

The aim of research question 2 is to understand the implementation of transitions at the utility level. It is framed around one overarching question on the utility's business model,[10] and three lever-specific questions.

- What are the FSM **business models for utilities to implement transitions with private emptiers** and how **viable** are they for **service delivery**?
- What are the implementation processes for **identifying** and **engaging** private emptiers, and how does marginalization play a role in their ability to engage? (player lever).
- What are the implementation processes for **monitoring** private emptiers to **enforce compliance**? (rules lever).
- What are the **costs** for setting up and operating **FSTPs** for private emptiers and how can they be **optimized** at scale? (infrastructure lever).

The topic of business model choice and its impact on viability is important given NWASCO's mandate for utilities to see FSM as a distinct business (NWASCO, 2018). However, the framework provides only high-level guidance on business model elements (refer to Figure 2) without recommendations on choices or options for different contexts (NWASCO, 2022a). Further, the viability of transitions, and its impact on utilities' and emptiers' costs (as noted in Section 2.0) is an evidence gap in Zambia and in the global sector. This is particularly a challenge when utilities need to finance and maintain infrastructure such as FSTPs – a priority area for most utilities implementing transitions (as noted in co-design workshops).

The topic of identifying and engaging private emptiers is important because utilities are still experimenting with approaches to incentivize formalization, and are unclear on what works. In Livingstone, some manual emptiers who were formalized by the utility reverted to being informal (Southern WSC, 2023), and the approaches to negotiations or incentivizing formalization that led to this are unclear. In several contexts, marginalized groups such as informal women or manual emptiers prefer to work at night or remain hidden to avoid penalties and stigmatization (USAID URBAN WASH, 2023; Dery et al., 2023) and there is a lack of evidence on how they can be incentivized to formalize.

Utilities are also keen to understand how to incentivize compliance from emptiers, since their resources to monitor them are limited (as noted in co-design workshops). They also believe that compliance increases costs for emptiers, although there is no documented evidence on this. During the co-design workshops, utilities noted wanting to understand how approaches such as subsidizing or reducing costs for emptiers to transport sludge to disposal sites may improve compliance.

[10] Business model refers to a company's strategy for profitably doing business and generally includes information such as the services it plans, target markets, and its pricing and cost strategy (Kopp, 2023).

The overall approach for research question 2 will be a combination of retrospective and prospective research (refer to Figure 7). Retrospective research will involve understanding the business model, processes for implementation, and the viability of service delivery for on-going transitions by building:

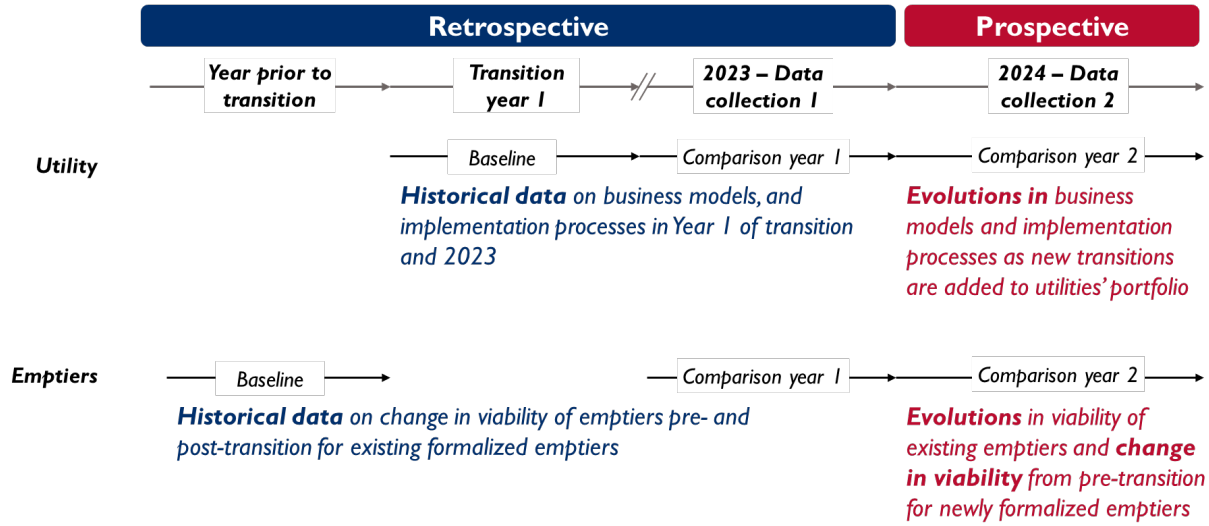
- Utilities' business model and profit and loss (P&L) statements, and treatment plants' P&L statements for:
  - The first year of the transition, which will form the baseline for analysis.
  - 2023, which will provide the current scenario.
- Emptiers' P&L statements for:
  - The year pre-transition, which will form the baseline.
  - 2023, which will provide the current scenario.

The baseline years for analysis are different for utilities and FSTPs, and emptiers. For utilities and FSTPs we will use the first year of the transition, since before the transition, there was no FSM business line for P&L comparison. For emptiers, we will use the pre-transition scenario since they were already involved in the emptying business.

Prospective research will involve understanding how the business model, processes for implementation, and the viability of service delivery evolved as utilities added transitions to their portfolio. This will involve building:

- Utilities' business model and P&L statements, and treatment plants' P&L statements for 2024 for comparison to the baseline (first year of transition) and 2023 versions.
- Emptiers' P&L statements for 2024 for comparison to the baseline (pre-transition) and 2023 P&L statements.

Figure 7: Overall approach for research question 2



5.2 STUDY SITES

The analysis for this research question will be conducted with three utilities that are already implementing transitions and have plans to implement transitions in early 2024—Lukanga WSC, Nkana WSC, and Southern WSC. These utilities were shortlisted after scoping conversations with six utilities (see Table 5), as they have staffing and funding typical of utilities in LMICs. Table 6 provides details of the transitions of the three selected utilities.

Table 5: Background of the six utilities part of scoping conversations

Utility	Population of main city	Utility characteristics		Funding received for FSM	History of/ plans for transitions
		Utility ranking	*FSM staff*		
Lusaka	1,267,440	3	12	~USD 22 Million from multiple funders	Multiple transitions from unregulated to **managed** in several peri-urban areas (PUAs) with mechanical and manual emptiers since 2016
Nkana	400,914	4	None	None	One transition from unregulated to **facilitated** with manual emptiers since 2020
Lukanga	188,979	10	At least 1	Unknown amount from SNV	One transition from unregulated to **managed** since 2022 and one planned for early 2024 in a few PUAs with mechanical emptiers
Southern	109,203	2	At least 1	~USD 0.25 Million from WSUP	Two transitions from unregulated to **facilitated** since 2020 and one from unregulated to **managed** planned for early 2024 with manual emptiers
Chambeshi	91,056	6	None	Unknown amount from SNV and USAID	Multiple transitions from unregulated to **managed** in several areas with mechanical and manual emptiers since 2019
Eastern	85,963	1	At least 1	None	No known transitions

Note: Selected utilities are marked in green. PUA: Peri-urban area.

Table 6: Transitions by shortlisted utilities

Utility	City	Transition details *(each row represents a transition)*			
		Settlement	***Transition status***	***No. of emptiers***	***Transition details***
Lukanga	Kabwe	Hamazoka zone in Kamushanga, with ~5,000 population	Started (2022)	4 *(as of 2023)*	**Unregulated to managed:** • Signed MOUs with mechanical emptiers to implement **scheduled emptying.** • Provided trainings and access to a repurposed treatment facility.
		Another zone (TBD) in Kamushanga, with ~5,000 population	Planned (early 2024)	4 *(maybe with new or same 4)*	**Unregulated to managed:** • MOUs with mechanical emptiers to implement **scheduled emptying.** • Provide trainings and access to a repurposed treatment facility.
Nkana	Kitwe	Ipusukilo with ~25,000 population	Started (2020)	3 *(as of 2023)*	**Unregulated to facilitated** • Verbal agreements along with training for manual emptiers on usage of protective equipment. • Set tariffs but **no formal monitoring**, and utilities do not receive a share of it. • Emptiers expected to dispose sludge at a sewage treatment plant, as there are no FSTPs.
		Kamatipa with ~17,000 population	Started (2020)	3 *(same as above)*	**Unregulated to facilitated** • Verbal agreements along with training for manual emptiers on usage of protective equipment. • Set tariffs but **no formal monitoring**, and utilities do not receive a share of it. • Emptiers expected to dispose sludge at a sewerage treatment plant, as there are no FSTPs.
		Chipata, with ~10,000 population	Started (2020)	3 *(same as above)*	**Unregulated to facilitated** • Verbal agreements along with training for manual emptiers on usage of protective equipment. • Set tariffs but **no formal monitoring**, and utilities do not receive a share of it. • Emptiers expected to dispose sludge at a sewerage treatment plant, as there are no FSTPs.
Southern	Livingstone	Multiple zones with population of 20,000-30,000 each	Started (2020)	6 *(as of 2023)*	**Unregulated to facilitated**: • Signed MOUs with manual emptiers, and provided training to implement safe emptying and disposal practices. • Provided access to an existing treatment facility.
		Multiple zones with population of 20,000-30,000 each	Planned (early 2024)	6 *(maybe with new or same 6)*	**Unregulated to managed** • MOUs with manual emptiers, to implement **scheduled emptying.** • Scale-up of and access to an existing treatment facility.

Note: TBD: To be determined, MOU: Memorandum of Understanding.

5.3 DATA COLLECTION PLAN

For both, retrospective and prospective research, we will gather data as follows:

- In-person IDIs, conducted by the FSG team with translation support from a local research agency, with multiple stakeholders who will provide information across different sub-research questions (refer to Table 7 for information provided across sub-RQs and sample).
- Secondary data sources such as utility and FSTPs' financial statements for costs and revenues, emptier contracts for details on guidelines, utilities' log-books on compliance data, etc.
- Narrative inquiry interviews, conducted by Iris Group, with 5+ informal emptiers from marginalized groups, for targeted research on the impact of marginalization and/or stigmatization for accessing formalization opportunities.

Table 7: Sub-RQs and sample for each respondent

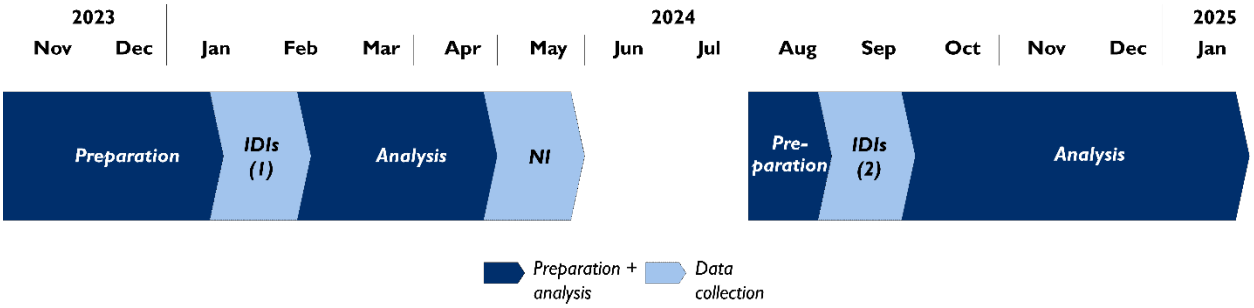
Respondents	Primary focus of interview, by sub-RQs				Sample	
	Business models	*Identifying, engaging*	*Monitoring, compliance*	*Treatment plants*	*Retrospective*	*Prospective*
Utility staff	✓	✓	✓	✓	**6** *(~2 per utility)*	**6** *(same as retrospective)*
Treatment plant operator	✓	×	×	✓	**2** *(1 per utility with FSTP)*	**2** *(same as retrospective)*
Formalized private emptier	✓	✓	✓	✓	**~10** *(3 – 4 per utility)*	**12** *(same as retrospective + 2 new)*
Informal private emptier	×	✓	×	×	**~10** *(3 – 4 per utility)*	
Community leader	✓	✓	✓	×	**3** *(1 per utility)*	**4** *(same as retrospective + 1 new)*

Note:

- *For formalized emptiers, we will add 2 new emptiers to our sample if there are new emptiers formalized under the planned transitions.*
- *For informal emptiers, we will sample a total of 10 across both periods. The sample in each will be based on when utilities, emptier associations, or community leaders are able to connect us.*
- *For community leaders, we will speak to 1 new community leader during prospective for the planned transition.*

The timelines for the activities mentioned above are summarized (light blue) in Figure 8. There are two phases of IDIs, since the first (for retrospective) will focus on transitions already implemented and the second (for prospective) will focus on transitions planned for early 2024. The activities are detailed in subsequent sections.

Figure 8: Timeline for RQ2 data collection and analysis



5.3.1 UTILITY DATA

The in-depth IDIs will gather data to establish the utilities' business models, including the processes for engaging and monitoring emptiers, and setting up infrastructure, and develop their P&L statements. The profile for data collection will include utility staff – one technical inspector/commercial director, and one FSM/peri-urban area head/sanitation engineer. These interviews will be conducted with a mix of semi-structured and structured sections.

- The semi-structured questions will gather data on the business model choices (for the current and the first year of transition), along 6 business model elements, including processes for identification and engagement, and monitoring and compliance, and broad information on treatment plants (under business model processes).
- The structured questions will largely focus on gathering financial data for the P&L statements (for the current and first year of transition). We will ask questions around each line item (e.g., revenues from disposal fees, operating costs for FSM business line), similar to the approach followed for the Water, Sanitation, and Hygiene Partnerships and Learning for Sustainability (WASHPaLS) enterprise viability study (USAID, 2021; USAID, 2022). We will ask overall numbers (e.g., overall salary costs) and also break it down to units (e.g., number of emptiers and per emptier revenue) based on the type of information utilities can provide.

The detailed instrument is provided as a supplemental document (titled Appendix 2_RQ2 Utility Interview), and the broad areas of inquiry are provided below.

- Background and experience of the respondent within the utility and within FSM.
- Value proposition of the transitions they have implemented (for the current year and first year of transition), including their perceived value of the transition for emptiers and customers.
- Description of the different transitions they have implemented.
- Processes for current and first year of transition for engaging the emptiers, monitoring and enforcing compliance, and setting up and maintaining infrastructure.
- Resources for the transition including human resources and financial capital required to start transitions, including differences, if any in the first year of the transition.
- Financial data, including revenues and costs for the current year and in the first year of transition.

Finally, we will supplement this with utility financial records for the current year, and the first year of transition inception, to gather data on costs incurred across the FSM business lines, and any monitoring logs for access to emptier compliance data.

5.3.2 TREATMENT PLANT OPERATOR

The in-depth IDIs will gather data to build P&L statements for the current year, the first year of transition, and 2024. We will gather this data from one operator for each utility that has an FSTP, most suited to provide this information based on recommendations from the utility. We will notify them of the type of data we require so that they can be prepared ahead of the interview.

The IDIs will be conducted in a semi-structured format. We will first broadly understand the operational processes at the treatment and then gather financial data on their revenues by breaking up the questions into units (e.g., unit of the disposal fees, number of emptyings per month, etc.). For costs, we will gather data by each stage and the different components of the treatment plant. This approach has been used for a cost analysis of FSTPs in other contexts (National Institute of Urban Affairs, 2019; Tanoh et al., 2021; Dodane et al., 2012).

The detailed instrument is provided as a supplemental document (titled Appendix 3_RQ2 FSTP Interview), and the broad areas of inquiry are provided below.

- Respondent's background and role at the FSTP.
- FSTP information including year of establishment, cities served, etc. and technology profile including stages and technology used for treatment, treatment capacity and utilization levels.
- Financial data including revenues and costs (up-front capital costs and operating expenses) for current year and first year of the transition.
- Overall challenges for ensuring utilization and cost-optimization.

We will supplement this with any financial records (across the three years) that the operator can provide.

5.3.3 FORMALIZED EMPTIER

The in-depth IDIs will gather data from emptiers to develop their P&L statements and understand their perspectives on the implementation processes for engagement and enforcing compliance. We will gather the data from the following for both retrospective and prospective research:

- 3 emptiers in Nkana WSC (out of a total 3)
- 3 emptiers in Lukanga WSC (out of a total 4)
- 4 emptiers in Southern WSC (out of a total 6)

We will speak to an additional 1 – 2 emptiers for prospective research if any new emptiers are formalized under the planned transitions. These interviews will be conducted with a mix of semi-structured and structured sections.

- The semi-structured questions will gather data on their perspectives of the processes followed for engagement and monitoring of rules within the transition.
- The structured questions will gather financial data to develop their P&L statements. We will ask the emptiers for data on each line item of the P&L statement, and break the questioning into units (for example, ask for price per service and number of services in a week, rather than revenue). This is similar to the approach followed for the WASHPaLS enterprise viability study (USAID, 2021; USAID, 2022) since this approach is likely to provide more accurate data.

The detailed instrument is provided as a supplemental document (titled Appendix 4_RQ2+3 Formalized SLP Interview), and the broad areas of inquiry (across sub-research questions) are provided below.

Please note that the sequencing of the questions in the instrument will be different from below, since the instrument combines questions for research questions 2 and 3 (detailed in Section 6.0) for emptiers.

- Background of the emptier's journey and work.
- Value proposition of the transition for the emptier, including their overall motivations to engage with the utility, and the types of customers that they serve under the transition.
- Their perception of the engagement process, and their ability, willingness, degree of compliance to guidelines, and their experience using the infrastructure provided to them.
- Financial data including revenue and costs (costs of goods sold (Fernando, 2023) and operating expenses), for last year and the year preceding transition.

5.3.4 INFORMAL EMPTIERS

The in-depth IDIs with informal emptiers will gather data to understand informal emptiers' experiences of interacting with the utility (if at all), and reasons for dropping off, and their current emptying and disposal practices. We will conduct this interview with 10 informal emptiers in total, across the three cities, and across both rounds of data collection based on when utilities, emptier representatives, or community leaders can connect us with them.

The IDIs will be conducted in a semi-structured format, with open-ended questions and targeted probes (developed during the course of the interview) to gather data on their engagement experience (if any) with the utility. The detailed instrument is provided as a supplemental document (titled Appendix 5_RQ2 Informal SLP Interview), and the broad areas of inquiry (across sub-research questions) are provided below:

- Emptiers' background, journey and work.
- For emptiers who ever interacted with utilities: Whether they know of the engagement and reasons for not interacting at all, with targeted probes to understand if marginalization played a role.
- For emptiers who were found, but dropped off: Motivations to continue as long as they did, experience engaging with utilities at each stage and reasons for dropping off when they did.
- For all emptiers:
  - Their perspectives on what has changed for them and in the market since the transition, with probes on whether level of interaction within emptier networks has changed.
  - Questions to determine if marginalization played a role in them not engaging with utility.
  - Current emptying and disposal practices, and occupational safety.

The narrative inquiry with marginalized emptiers will aim to understand their experiences of (or barriers to) engaging with the utility and how marginalization shaped their experiences. The narrative inquiry will be conducted with informal emptiers from marginalized groups, since the purpose is to understand how marginalization prevented their formalization. We will identify the marginalized groups based on information that emerges from the IDIs with informal emptiers. The sample will aim to include emptiers across three types—those who didn't interact with the utility at all, those who began interactions but chose not to/ could not formalize, and those who formalized but dropped-off or went back to being informal.

The narrative inquiry will be conducted in a story-like format, designed to be generative based on emerging questions. We will gather the data through one-on-one interviews with the informal emptiers, asking participants to relate their experiences of interactions with the utilities. Participants will be asked to describe events and encounters that have shaped their interactions. The broad themes will include:

- Description of emptiers' experiences regarding their engagement with the utility past XX[11] months, including
  - Differences compared to other emptiers in the area;
  - Their perspective on the reason for differences;
  - Decisions to withdraw from formalization; and
  - Knowledge of opportunity to formalize, but decision against formalizing.
- Description of any events or policies/rules or social stigma that have led them to feel they were excluded from engaging with the utility or getting formalized.
- Description of any events or policies/rules or social stigma that have led them to feel they were included in engaging with the utility or getting formalized.
- Kind of support received, if any, in helping them formalize or engage with the utility.
- Perception on how formalizing might make a difference for them and their ability to provide services, if any.

5.3.5 COMMUNITY LEADER

We will gather data to build a customer-side perspective of the utilities' business models and implementation processes. We will conduct these interviews with one community leader per settlement that is connected to us by the utilities or local implementing programs.

The interview will be conducted in a semi-structured format. The detailed instrument is provided as a supplemental document (titled Appendix 7_RQ2 Community Leader Interview), and the broad areas of inquiry (across sub-research questions) are provided below:

- Respondent's background and role in the settlement.
- Perspectives on utilities' business model including whether they think transitions add value to customers, who they believe utilities target, and utilities' processes to engage them and the households as part of the transitions.
- Perspectives on engagement processes with the emptiers in their settlement, including how the utility found them and initiated engagements and negotiations.
- Perspectives on monitoring and compliance processes followed by the utility in their settlements.
- Degree, frequency, and reasons for interaction with utilities and the emptiers.
- Additional changes they would want in the transition model.

5.4 ANALYSIS PLAN

5.4.1 BUSINESS MODEL AND SERVICE DELIVERY VIABILITY

Question: *What are the FSM business models for utilities to implement transitions with private emptiers and how viable are they for service delivery?*

We will first create a **business model canvas**[12] for each of the three utilities for three periods – the first year of the transition (2020 for Nkana and Southern, 2022 for Lukanga), 2023 and 2024, which will

[11] This number will be determined by time of transition for this settlement.

[12] We defined the elements for business model canvassing by adapting the typical business model canvass for companies (Gary Fox, 2023) and the framework given by NWASCO for utilities to build their business models (NWASCO, 2022a).

allow us to understand the evolution of the business model and processes over time within transitions. We will produce the business model canvas along six elements:

- **Value proposition** for customers and emptiers.
- **Revenue model** to understand different sources of revenue.
- **Cost structure** to understand different drivers of costs.
- **Processes** for implementing each of the three levers – player, rules, and infrastructure.
- **Resourcing** for the transition, including human resources and financial capital invested for the transitions.
- **Customer segments and engagement channels** the utility targets through transitions.

For this analysis, we will use the data generated from IDIs with utilities. At the end of each day of data collection (to ensure better recall from the interviews), team members will capture notes from interview transcripts into a template along the six business elements mentioned above. At this stage, we will also synthesize information provided by different utility stakeholders.

Then, we will **generate P&L statements for the utilities and private emptiers** to analyze the impact of the business model on the viability of service delivery. For utilities, we will build and compare three P&L statements for three years, to understand the impact of adding new transitions, on the viability of the utility's business model:

- First year of the transition, which will provide the baseline for the analysis.
- The most recent year, i.e., 2023, to understand the impact of on-going transitions on the P&L statements.
- 2024,[13] to understand the impact of adding new transitions (where planned) or changing business model processes/ resourcing on the P&L statements.

For private emptiers, we will build the P&L statement for three periods

- The year before the transition, which will provide the baseline for the analysis.
- The latest year post-transition, i.e., 2023, to help us understand the impact of transitions on the viability of emptiers.
- 2024, to help us understand the impact of transitions over one more period.

To build these statements, we will capture the notes from interview transcripts conducted in-person every day (to ensure better recall from the interviews) into a standardized P&L template with line items for the different revenues and costs.

Finally, we will do **scenario modeling** to evaluate the long-term viability of the different utility business models. This will be done by building projected P&L statements for utilities and emptiers for specific scenarios. We will define the exact scenarios to be modeled by identifying 2 – 3 realistic business models through consultations with Lusaka WSC (which has experience in transitions), NWASCO, and other members of the TWGs, including the utilities and emptiers. We will develop the assumptions to model these scenarios by extrapolating data and trends from the three periods of analysis for the P&L statements (stated above). For example, to model a scenario for adding transitions across the city, we

[13] The 2024 P&L statements will be built partially by projection since our data collection for 2024 will happen around August/September 2024.

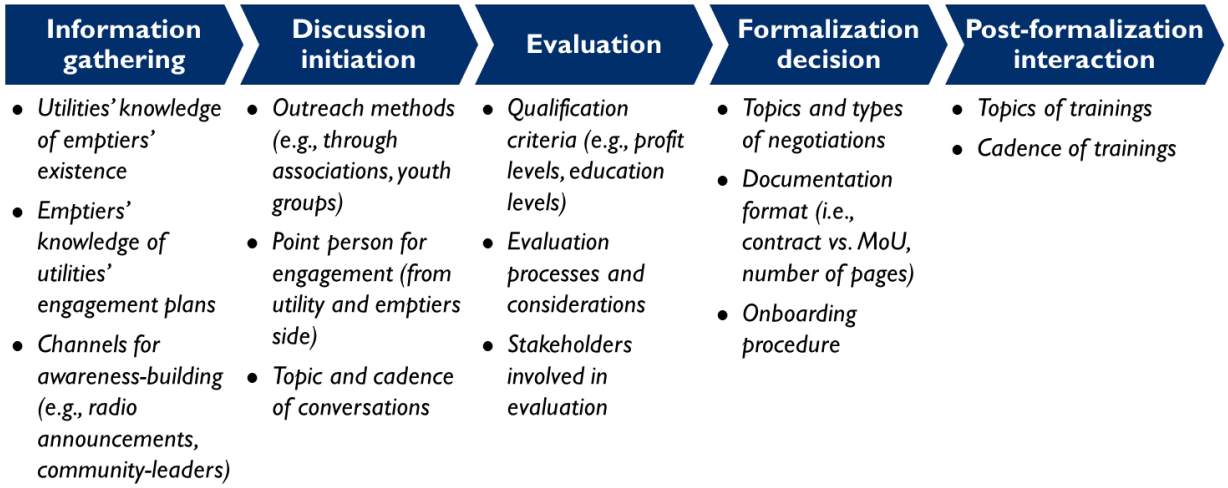
will use the actual marginal cost for the utility for adding a transition based on the P&L statements for 2023 and 2024.

5.4.2 IDENTIFICATION AND ENGAGEMENT

Question: *What are the implementation processes for identifying and engaging private emptiers, and how does marginalization play a role in their ability to engage?*

We will first use deductive thematic analysis[14] to **produce an engagement journey map** for each transition, based on the processes used by the utility to engage emptiers. The engagement journey map will include the key stages involved and the key activities conducted in each stage. We will produce this map from the perspective of utilities, formalized emptiers, and informal emptiers. Refer to Figure 9 for a hypothesized engagement journey map.

Figure 9: Stages of the identification and engagement process



We will do this in two steps, using data from the transcripts from the IDIs with utilities, formalized emptiers and informal emptiers, and documented data from utilities (e.g., logbook on the dates, number of emptiers, and topic/ reasons for interaction).

- At the end of each day of data collection, we will capture notes from the interviews and the logbooks onto the hypothesized engagement map (refer to Figure 9), capturing data that does not fit on this map, separately as "additional stages".
- After all data collection is complete, we will read through the captured notes, to identify themes of activities mentioned across the interviews, especially for data captured under "additional stages", to generate a refined engagement journey map (collapsing or adding stages where required).

Then, we will **evaluate the experience of all the stakeholders** involved through a deductive thematic analysis.

[14] We are using deductive thematic analysis because literature cites it as an appropriate method for qualitative analysis when you have a hypothesized theme (Dovetail Editorial Team, 2023). In this case, we already have hypothesized themes for the steps in the journey and the challenges at each stage.

- For utilities, we will understand the operational challenges mentioned for each of the stages.
- For formal emptiers, we will understand their key decisions, and challenges and motivations to continue through each stage.
- For informal emptiers, we will understand their key decisions and motivations to continue as long as they did (if they interacted at all), and key challenges and reasons for dropping off when they did.

We will do this in two steps, using data from the transcripts from the IDIs with utilities, formalized emptiers and informal emptiers.

- At the end of each day of data collection, we will capture notes from the interviews onto each stage of the hypothesized engagement map, capturing responses that do not fit on this map, separately as "additional stages".
- After all data collection is complete, we will read through the captured notes across different utilities and emptiers, to identify themes of challenges/ key decisions/ motivations by looking out for specific terms:
  - In utility interviews: Lack of skill, lack of time, not enough resources, etc.
  - In formal interviews: Potential to increase customer base, benefits of being legal, etc.
  - In informal emptier interviews: Inability to produce documents, inability to meet eligibility criteria, unaware of engagements, etc.

Finally, we will also **evaluate the stages and processes** through quantitative metrics for the utilities including:

- Costs involved for each stage (done as part of the P&L analysis).
- Time taken to complete each stage.
- Number of emptiers that pass through each stage.

To do this, we will capture data from the interview transcripts with utilities. At the end of each day of interviews, we will capture data along the above three metrics from the notes onto each stage of the hypothesized journey. We will then process the notes after all data collection to compare the metrics for different processes across different utilities.

Finally, for the identified marginalized emptiers we will conduct a **narrative inquiry analysis** to uncover the role of external (the negative attitudes, beliefs, and practices that are directed toward us by others) and internal stigmatization (what happens when a person starts to believe the negative attitudes, beliefs, and practices and it becomes part of how that person sees themselves) in emptiers' ability to formalize and engage with the utility. Where possible, we will also draw on the data sourced from the IDIs with the informal and formal emptiers, to complement the data gathered through narrative inquiry. We will seek to identify:

- Stages of entering, continuing, and exiting FSM service provision (i.e., inflection points or key events that changes the trajectory of a process or situation).
- Risks at the inflection points of entering, continuing, and exiting and what can be done to mitigate them.

If possible, these interviews will be used as a 'snowball' technique to identify emptiers who have yet to enter or have dropped out since the transition and will be later interviewed as part of gender equity and social inclusion (GESI) narrative inquiry research.

For this analysis, we will review field notes, discuss the nuances of interviews, and iteratively code transcripts for themes related to events, enablers and barriers daily. This will help yield narratives of participants' experiences. We will enter these themes into a spreadsheet, with columns generated as the team brainstorms and tries to reach consensus on the naming of themes and nuances of the interviews. The rows of the spreadsheet will contain supporting evidence from field notes, once themes are named. It should be noted that narrative inquiry methods make no claim regarding a 'representative sample,' instead the method allows for rapid data acquisition and theoretical saturation.

5.4.3 MONITORING AND COMPLIANCE

Question: *What are the implementation processes for monitoring private emptiers to enforce compliance?*

First, we will **map the current guidelines** provided by the three utilities to the emptiers that are part of the transition. We will map the guidelines to the different business functions of the emptiers, including pricing, emptying practices, disposal practices, target market, etc. We will gather this data by reviewing the contracts/agreements of the emptiers (where these are available) or by asking our points of contact at the utility.

Then, we will **measure the degree of compliance** by emptiers to these guidelines on a scale of 0 – 5 gathered from both, emptiers and utilities. We will conduct the analysis as follows:

- From the emptiers, we will gather their self-reported compliance from the IDIs. We will capture notes at the end of each day of data collection, from the transcript onto a template mapping their stated compliance against each guideline.
- From utilities, we will gather their perceived compliance for each emptier similarly from their IDIs as above. We will supplement this with data from their logbooks.

If we observe discrepancies, we will select the data that is closest to triangulated data (which we will source from the households, detailed under research question 3, for practices other than disposal) and from treatment plant operators (for disposal practices). We will also compare compliance data provided between emptiers (e.g., those who have been formalized for ~3 years vs. those formalized ~1 year ago) to identify and understand variations amongst them.

We will **identify and analyze key barriers** for utilities to monitor and enforce guidelines and for emptiers to comply with the guidelines by:

- Understanding **costs for implementation**, and its impact on viability.
- Conducting a **deductive thematic analysis of reasons** stated for not being able to implement them.

For costs of implementation, for utilities, we will understand the costs for implementing monitoring and enforcement processes, as part of the P&L analysis detailed above. For emptiers, we will analyze the cost of compliance by

- Quantifying the impact of compliance on their viability for the guidelines they are following.
- Projecting the impact of compliance for the guidelines they do not follow.

We will refer to the data collected from the utility and formalized emptier IDIs for this analysis. At the end of each day of data collection, we will capture costs from the interview transcripts onto a template capturing the costs against each guideline. Once the initial P&L statements have been prepared, we will:

- For guidelines already being implemented: Removing the stated cost from the current P&L statements and capturing the change in the P&L statements.
- For guidelines they do not follow: Adding the expected cost of complying and capturing the change in the P&L statements.

For the thematic analysis of barriers, for utilities, we will understand the operational challenges they face for monitoring and enforcing compliance. For emptiers, we will study the rating they provide, and the reasons they state on awareness of, ability to comply to (self-reported), and willingness to comply with different guidelines. For emptiers, we will also try and understand variations between emptiers (e.g., those who have been formalized for ~3 years vs. those formalized ~1 year ago).

We will conduct this analysis by referring to data from utilities and the formalized emptiers' interviews. We will capture details from the interview transcripts at the end of each day, onto a template against each guideline. After the field trip, we will analyze the key barriers and drivers for implementation by reading responses and identifying themes of challenges (e.g., not enough resources for utilities, or distance to disposal sites/ fuel costs for emptiers).

5.4.4 TREATMENT PLANT COST OPTIMIZATION

Question: *What are the costs for setting up and operating fecal sludge treatment plants for private emptiers and how can they be optimized at scale?*

We will do a **financial analysis** of the two FSTPs in our study sites to understand the main drivers of costs and the degree to which their revenues are able to recover them. We will build the P&L statements for three periods— the first year of the transition, 2023, and 2024 (which will be partially projected, as discussed above). This will help us understand the impact of adding new transitions, and the impact of transitions 1 – 3 years post-inception (depending on when they started) on the financials and utilization of the FSTP.

We will use the data collected from the interviews with the treatment plant operator and any financial records available with the utility/ treatment plant. We will capture notes from the interview transcripts on the same day they are conducted (to ensure better recall from the interviews) into a standardized P&L template with line items for the different revenues and costs. Post-completion of data collection, we will compare the P&L statements across the years and understand the drivers of changes.

We will then do **scenario modeling** to evaluate options for cost optimization of the FSTPs. This will involve building projected P&L statements for the FSTPs. We will define the exact scenarios to be modeled by asking the utilities and the TWGs for inputs on their long-term targets for FSTPs (e.g., sale of compost, sharing of FSTPs across cities, allowing the private sector to run them, setting up transfer stations, etc.). Similar to the modeling exercise for the utilities' FSM business line, we will develop the assumptions for the modeling by extrapolating data and trends from the P&L statements across the two periods of analysis.

6.0 RESEARCH QUESTION 3 – IMPACT OF TRANSITIONS

6.1 OVERALL APPROACH

The aim of research question 3 is to understand the impact of transitions on households, on private emptiers, and on the resilience of services. It is framed around four sub-research questions:

- What is the impact of transitions on **access**[15] to formalized services in a settlement, including for marginalized households?
- What is the impact of transitions on **affordability**[16] **and customer experience**[17] **for households** served by formalized emptiers?
- What is the impact of transitions on the **emptying and disposal practices**, and **occupational safety**[18] of formalized **emptiers**?
- What is the impact of transitions on the **resilience** of service delivery?[19]

Overall, there is a lack of data on the impact of transitions on access, households (especially from marginalized groups), emptiers' practices, and resilience in Zambia and in the global sector.

The topic of access is important because utilities in Zambia implement transitions with the aim of improving access to formalized services within unserved settlements. However, most utilities that have implemented transitions are unable to provide data on how many households were served by the formalized emptiers. Further, the reasons driving households' decisions to take up formalized or informal services post-transitions are unclear. The impact on access for marginalized households is also unclear. Co-design workshops in Zambia highlighted that some households (such as women-led, youth-led, and differently-abled) find it difficult to access emptying services, potentially because they are more prone to poverty and livelihood precarity (Schüring and Lawson-McDowall, 2011; Holmes and Slater, 2008). However, the reasons for them being unable to access formalized services or how they experience the services in comparison to non-marginalized households are unclear.

The topic of affordability and customer experience is important because utilities have implemented approaches to improve these metrics, but the impact on-ground from households' perspective is unknown. For example, utilities in Zambia have fixed prices for formalized emptiers (Nkana WSC, 2023)

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[15] This study is defining access as the proportion of households within a settlement that receive formal emptying services and are able to access the type (e.g., manual, mechanical, etc.) of service they want.

[16] This study is defining affordability as the price paid by households for formal emptying services, relative to general market prices for emptying, and benchmarks such as households' willingness to pay and total annual expenditure.

[17] This study is defining customer experience as the customers' perception of the quality of service in terms of cleanliness, timeliness, payment options offered, and safety practices followed.

[18] This study is defining occupational safety as the prevention of work-related injuries and the promotion of the health of workers.

[19] This study adapted the definition from the USAID Market Systems Resilience Framework (USAID, 2018) for this analysis. Resilience of service delivery refers to the ability of the FSM service delivery network, involving households, emptiers and the utilities to adapt to and recover from shocks. This involves the ability to allocate resources, draw on system-level resources (such as utility and emptier networks, emptier and community networks, guidelines regarding safe emptying and disposal, etc.), and have the ability to innovate in order to solve problems in the face of shocks and stresses.

and have attempted subscription-based payment systems (Southern WSC, 2023). Other contexts have also tried improving affordability through subsidies, and customer experience through call centers and performance-based contracts (USAID URBAN WASH, 2023). However, there is no data on how these different approaches actually impact the affordability and customer experience for households.

The impact of transitions on the emptying and disposal practices is unclear since utilities in Zambia state having difficulties in monitoring emptiers and tracking changes in practices, as noted during co-design workshops. Occupational safety has been raised as an issue given the unsafe environments that emptiers work in. Emptiers, and especially manual emptiers (who are common in Zambia), tend to face stigma and often work in unsafe conditions (e.g., working at night to hide identity, coming directly in contact with fecal sludge, etc.) (Gautam et al., 2021; World Bank, ILO, WaterAid, and WHO, 2019). Several frameworks and recommendations for preventive measures have been developed (Gautam et al., 2021; Repon, Faruq & Mamtaz, 2015), but their actual change in outcomes is currently not adequately documented.

Finally, the topic of resilience is important to understand whether the FSM service delivery system can adapt to stresses. Globally, climate change and urbanization are risks to the continuity of safe FSM practices (UNICEF and Global Water Partnership, 2022; Semiyaga et al., 2015). Data currently does not exist on the impact of transitions on the resilience of the FSM services, and if generated can produce valuable insights for the sector for future urban planning. While the co-design workshop did not explicitly state resilience as a concern, stakeholders validated that this should be a focus for the sector.

The overall approach for research question three will involve a point-in-time **comparative analysis of the pre-transition** (i.e., baseline) and **post-transition** market for FSM services by capturing change in:

- Access (especially for marginalized households) in a settlement.
- Affordability and customer experience for households using services from formalized emptiers.
- Emptying and disposal practices, and occupational safety for formalized emptiers.
- The resilience of the service delivery market.

The post-transition markets will allow for studying changes in the above at different points, based on when transitions begin in each of our study sites.

- For transitions that began in 2020: 3 – 4 years post-transitions
- For transitions that began in 2022: 1 – 2 years post-transition
- For planned transitions: 3 – 6 months post-transition

6.2 STUDY SITES

The research for this analysis (except for a targeted study of marginalized households) will be conducted in four settlements spread across the cities of Kabwe, Kitwe, and Livingstone. These cities are under the jurisdiction of Lukanga, Nkana, and Southern WSCs, respectively (same as the utilities for research question 2). These settlements were chosen since transitions have been implemented or are planned there. For the settlements with planned transitions, we have shortlisted two, of which we will study whichever one is implemented (or implemented first) during our research period. The settlements are diverse in their profiles and types of transitions (refer to Table 8), allowing diverse research on impact.

The targeted research on access for marginalized groups will be conducted in two (out of the four) settlements, Ipusukilo in Kitwe and one in Livingstone. These settlements were chosen because

transitions started several years ago and interviews will capture the impact of these transitions, if any, retrospectively (refer to the analysis plan below for the analysis to be conducted).

Table 8: Settlements for research question 3

Utility	City	Settlement details			Transition details			Research method
		Zone	*Population*	*Type*	*Status*	*No. of emptiers*	*Type*	
Lukanga	Kabwe	Hamazoka zone in Kamushanga	~5,000	Peri-urban area	Started (2022)	4 *(as of 2023)*	**Unregulated to managed,** with mechanical emptiers	Retrospective + Prospective
		Another zone[1] (TBD) in Kamushanga	~5,000	Peri-urban area	Planned (2024)	4 *(maybe with new or same)*	**Unregulated to managed,** with mechanical emptiers	Prospective
Nkana	Kitwe	Ipusukilo	~25,000	Unplanned settlement	Started (2020)	3 *(as of 2023)*	**Unregulated to facilitated,** with manual emptiers	Retrospective
Southern	Livingstone	One zone[2]	20,000-30,000	Peri-urban area	Started (2020)	6 *(as of 2023)*	**Unregulated to facilitated**, with manual emptiers	Retrospective
		One zone (TBD)[1]	20,000-30,000	Peri-urban area	Planned (2024)	6 *(maybe with new or same)*	**Unregulated to facilitated**, with manual emptiers	Prospective

Notes:

1. *Utilities are still finalizing the settlements for the transitions that haven't started yet (for prospective research).*
2. *The transition in Livingstone was implemented in multiple zones across the city, out of which one will be studied.*

6.3 DATA COLLECTION PLAN

For the research on access, and affordability and customer experience, we will collect data from households through the following methods:

- Household surveys, administered by a local research agency, with a total of 200 households (~50 per settlement) to generate pre- and post-transition data on access, and indicators to measure affordability and customer experience.
- Focus group discussions, facilitated by a local research agency in FSG's presence, with 40 households (~8 – 10 per settlement) to help validate findings and understand reasons for households choosing the services that they did.
- Narrative inquiry with 42 marginalized households (~21 per settlement) to understand how external and internal stigmatization affect households' ability to access formalized emptying services, conducted by Iris Group.

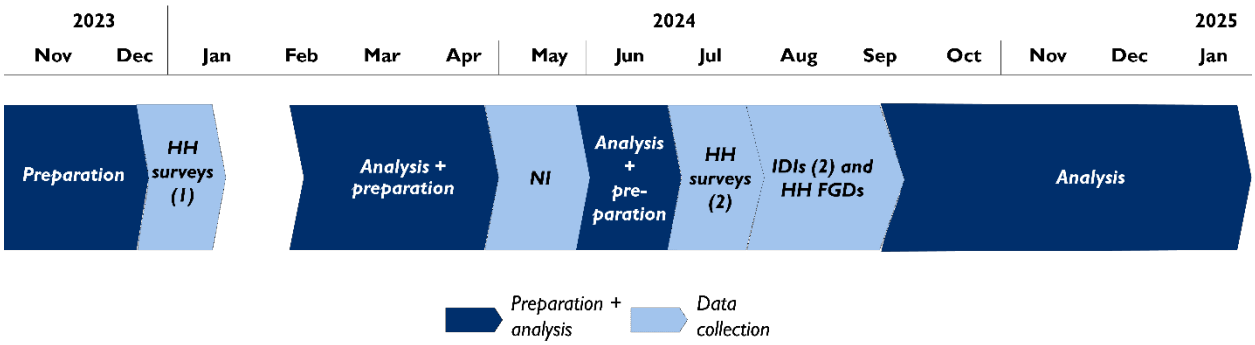
For the research on emptiers' practices and occupational safety, we will gather data through the following:

- In-person IDIs, conducted by the FSG team with translation support from a local research agency, with ~10 emptiers (~3 – 4 per settlement) to capture changes in their stated practices and occupational safety post-transition.
- Household surveys (as mentioned above), and IDIs with treatment plant operators (under research question 2) to triangulate the data on practices stated by emptiers.

For the research on resilience, we will gather data from the households, emptiers (formal and informal), community leaders, and utilities as part of the surveys and interviews we are conducting with them under research questions 2 and 3 (refer to Table 9 in analysis plan for the data source for each indicator).

The timelines for the activities mentioned above are provided in Figure 10. The activities are detailed in subsequent sections.

Figure 10: Timeline for RQ3 data collection and analysis



Note: For planned transitions, we will do the household surveys post-implementation of transition around July 2024.

6.3.1 FOR ACCESS, AFFORDABILITY, AND CUSTOMER EXPERIENCE

The household survey will be conducted with a random sample of 50 households per settlement. The sample will only include households who use individual on-site sanitation systems or shared (with other households) systems, for which they are the key decision-maker. It will exclude the following:

- Households that practice open defecation since they do not face the decision we want to study for this analysis, and their population in urban Zambia is negligible (implying a negligible impact on settlement-level analysis).

- Households that only built a toilet for the first time post-transition, since there is no pre-transition decision to compare this to.

The sample for analysis will vary by sub-research question:

- For the study on access, we will sample ~50 households per settlement (a total of 200 households). The sample of ~50 households per settlement gives a 95% confidence interval with 6% margin of error at the settlement level, assuming 5 members per household and the settlement population to be ~15,000.
- For the study on affordability and customer experience we will sample ~10 – 50 households that use formalized services post-transition (from the 50 randomly sampled for access), depending on the penetration of the formalized emptier post-transition. If penetration of formalized emptiers is low in the random sample we will purposively sample a minimum of 10 per settlement. If penetration of formalized emptiers is moderate to high in the random sample, we will sample as per the proportion in the random sample.

The survey will be a structured quantitative survey involving close-ended, coded questions, and a few open-ended questions for which the response will be captured verbatim. The questions will be focused on understanding the market for emptying services pre-transition (i.e., the baseline market) and the market post-transition. The detailed instrument is provided as a supplemental document (titled Appendix 6_RQ3 Household Survey) and the broad areas of inquiry (across sub-research questions) are given below.

- Qualification questions to ensure sampled households have on-site sanitation facilities and respondent was the primary decision maker for emptying or building their toilets (based on their course of action taken) pre- and post-transition.
- Household details, including details of the respondent, asset-related questions to establish wealth quintiles, and income- and expenditure-related questions.
- Post-transition experience:
  - If availed emptying service: Service provider used (i.e., manual vs. mechanical, informal vs. formal), reasons for choice and whether it was their preferred choice, price paid, and customer service experience.
  - If self-emptied or built a new toilet: Reason for choosing to self-empty/ build a new toilet, costs incurred, and overall experience.
- Pre-transition experience: Same areas of inquiry as above.
- Future course of action *(if the respondent has not had a post-transition activity)*: Their planned choice (emptying with formal/ informal provider, self-emptying, or building new toilet/pit) with reasons.
- Current willingness to pay for a typical volume of sludge emptied using their ideal service.

For the focus group discussions, we will gather data to understand the key reasons for households choosing their preferred services post-transition. We will gather the data from 8 – 10 households in one focus group discussion per settlement (i.e., ~32 – 40 households across 4 focus group discussions in total), with an equal split of those who chose to empty with a formalized emptier and those who did not, post-transition. The areas of inquiry for the focus group discussions with households will be determined after analyzing the data from the surveys.

For the interviews with marginalized households, we will gather data to understand the experience of marginalized households in accessing formalized services. We will gather this data from 21 households per settlement, i.e., 7 from each group identified through literature review, stakeholder consultations, and the co-design workshops. These groups include women-headed households, elderly-headed households, and disabled-headed households. Where possible, we will triangulate with data collected through the quantitative survey.

The interview will be conducted in an open-ended and generative manner based on emerging information, one-on-one with the heads of households. Participants will be asked to narrate their experiences in a story-like format. Participants will be asked to describe events and encounters that have shaped their access to emptying services, especially as they relate to the formalization of services. The broad theme of questioning will include:

- Description of their experiences regarding the ability to access emptying services in the past XX[20] months and their understanding and explanation of differences compared to others in the area.
- Events that have led them to feel they were excluded from accessing services.
- Events that have led them to feel they were included in accessing services.
- Kind of support, if any, received in helping them access emptying services.
- Description of encounters, if any, with emptiers in the past XX months and their understanding and explanation of differences compared to others in the area.
- Events involving providers, if any, that have impacted their ability to access services.
- Experience with service delivery prior to the past XX months, or since they have had access to a latrine at your home.
- Expected changes/ differences if household had access to emptying services.

6.3.2 FOR EMPTIERS' PRACTICES AND OCCUPATIONAL SAFETY

For the IDIs with formalized private emptiers, we will gather stated data on the changes in their practices and occupational safety. We will speak to the formalized emptiers that have provided emptying services to the surveyed households (out of all the formalized emptiers in the settlement) so that we can triangulate the data with the surveys.[21]

The interview will be conducted in a semi-structured format. We will have specific, verbatim questions to capture data on the practices of the emptiers and occupational safety, pre- and post-transition, and open-ended questions (with targeted probes developed emergently) to understand reasons for changes, if any. The detailed instrument is provided as a supplemental document (titled Appendix 4_RQ2+3 Formalized SLP Interview), and the broad areas of inquiry are provided below.[22]

- FSM service profile in their settlements of service, including the number and type of service providers, their interactions, and any changes since the transition inception.
- Occupational safety, including proportion of jobs resulting in an injury/ accident, and the proportion of jobs when they come into direct contact with feces.
- Change in emptying and disposal practices, and other practices such as booking methods, payment terms offered, etc., and reasons for changes, if any, since the transition year.

6.3.3 FOR RESILIENCE

We will gather all data for resilience through the interviews and surveys already mentioned for research questions 2 and 3, and there will be no separate tool developed for the same. The indicators for which we will gather data, and its source (i.e., the surveys/ interviews) are provided in Table 9.

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[20] This number will be determined by time of transition for this settlement.

[21] We will speak to 3 of the most commonly cited emptiers out of the 4 formalized ones in Kabwe, 4 out of 6 in Livingstone, and all 3 in Kitwe.

[22] Note that the sequencing of the questions in the instrument will be different from below, since the instrument combines questions for research question 2 and 3 (detailed in Section 6.0) for emptiers.

6.4 ANALYSIS PLAN

6.4.1 FOR ACCESS, AFFORDABILITY, AND CUSTOMER EXPERIENCE

For access to formalized services

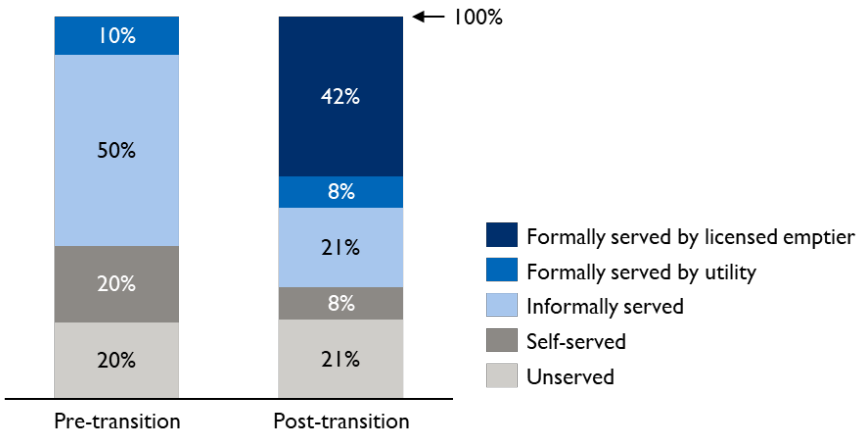
> ***Question:*** *What is the impact of transitions on access to formalized services in a settlement, especially for marginalized households?*

We will **measure the change in access** understanding the split between formally served, informally served, self-served, and unserved households in a settlement pre- and post-transition (refer to Figure 11).

- Formally served households are served by the utility or formalized emptiers (only applicable post-transition), when they face a desire or need to empty their pit.
- Informally served are served by informal emptiers when they face a desire or need to empty their pit.
- Self-served are those who empty the pits themselves or through a neighbor/ family member, when they face a desire or need to empty their pit.
- Unserved households include those who have either:
  - Faced the need to empty a toilet, but built a new pit/ toilet when the need arose; or
  - Have not faced the need yet (i.e., built a new toilet that hasn't required emptying), in which case we will capture their future decision when the need arises.

We will also aim to disaggregate the data for different segments (e.g., by wealth quintiles, for male vs. female-led households, etc.) to determine if access to formalized sources varies by segment.

Figure 11: Illustrative pre- and post-transition service map for access in a settlement



We will use the data gathered through household surveys for this analysis, using descriptive statistics in Statistical Package for Social Sciences (SPSS) to identify frequencies of households for each category in Figure 11, pre and post-transition.

We will also **understand the reasons for the shifts in access** to see if the transition caused increases (if any) in the access to formalized services. We will also understand if households are able to access services from their preferred service provider while making their choice. We will compare the reasons and preferred services stated by households who shifted to formalized emptiers post-transitions, with those who did not choose formalized emptiers post-transition.

We will do this through two data sources:

- From coded responses on reasons for households' choices of services pre- and post-transition, for which we will analyze the data in the manner mentioned above.
- From open-ended responses by different types of households in the focus group discussions, for which we will de-brief as a team daily after focus group discussions and capture reasons from our notes for each type of household. We will also compare these and add details where necessary once we receive transcripts from the research agency.

Finally, we will **conduct a narrative inquiry analysis** to understand how marginalized groups experience access to formalized emptying services post-transition. We will do this by determining how external stigmatization and internal stigmatization play a role in households' ability to access formalized pit emptying services. We will also draw on data from the household surveys, where possible to complement the findings from narrative inquiry. We will create summary composite profiles by target group to identify:

- Stages of entering, continuing, and exiting FSM service consumption (i.e., inflection points or key events that changes the trajectory of a process or situation);
- Risks at the inflection points of entering, continuing, and exiting and what can be done to mitigate them; and
- Opportunities to overcome GESI-related barriers.

For this, we will use data collected through narrative inquiry interviews. For this analysis, we will review field notes taken at the time of the interview by Iris Group and research assistants, discuss the nuances of interviews, and iteratively code transcripts for themes related to events, enablers and barriers daily. This will help yield narratives of participants' experiences. We will enter these themes into a spreadsheet, with columns generated as the team brainstorms and tries to reach consensus on the naming of themes and nuances of the interviews. The rows of the spreadsheet will contain supporting evidence from field notes, once themes are named.

For affordability and customer experience

> ***Question:*** *What is the impact of transitions on affordability and customer experience for households served by formalized emptiers?*

We will **measure the change in affordability and customer experience** by conducting a point-in-time comparison of the two metrics for services availed from formalized emptiers post-transition with the general market prices and service pre-transition and post-transition (for services from any source other than formalized emptiers). The analysis is focused on understanding shifts in a market for services from transitioned emptiers, and is not meant to be a statistical test for the comparison of services between markets that were transitioned vs. those that are not.

For affordability, we will compare the price paid for a typical volume of emptying[23] to a formalized emptier with the general market price paid for the same volume pre-transition and for services from informal emptiers today. We will do this comparison using either averages or medians at the settlement level based on the distribution of the data and outliers. We will also account for inflation in the Zambian economy when comparing the data.

To better understand affordability, we will also compare the price paid to a formalized emptier with two benchmarks:

- Willingness to pay for emptying a typical volume.

[23] We will normalize the unit for a typical emptying volume (e.g., per barrel/ per pit/ per cubic meter).

- Households' stated total annual expenditure.[24]

We will also disaggregate the analysis for different segments (e.g., top two vs. bottom three wealth quintiles,[25] male vs. female-led households, etc.) within settlements to understand variations in affordability for these segments, since the sample of each segment in a settlement may be small.

For customer experience, we will compare the services of the formalized emptier with the pre-transition services of all emptiers and post-transition services of informal emptiers, along the following indicators:

- Number of booking platforms and number of emptiers available.
- Time taken to reach and empty the pit.
- Whether emptier followed safe practices (i.e., wearing personal protective equipment, cleaning surrounding areas of the pit, and transporting sludge away in a secure container).
- Flexibility in payment modes and frequency offered.
- Emptiers' response to post-service complaints.
- Overall customer satisfaction levels.

For the analysis on affordability and customer experience, we will use the data gathered through the household surveys. We will conduct the analysis on the sub-set that uses services from a formalized emptier post-transition. As noted above, we will use SPSS to conduct the analysis through descriptive statistics.

6.4.2 FOR EMPTIERS' PRACTICES AND OCCUPATIONAL SAFETY

Question: *What is the impact of transitions on the emptying and disposal practices, and occupational safety of formalized emptiers?*

We will **measure change in emptying and disposal practices, and occupational safety** by comparing emptiers' stated practices pre- and post-transition. For emptiers who were already providing emptying services pre-transition, we will compare the stated practices and occupational safety for the same emptier for pre- and post-transition. For emptiers who newly entered the market (i.e., were not providing services pre-transition), we will compare stated post-transition practices and occupational safety to those of informal emptiers in the city.

For emptiers' practices, we will compare the proportion of emptying services provided by a formalized emptier where they:

- Used personal protective equipment (e.g., gloves, boots, face masks);
- Entered the pit.
- Cleaned area outside the pit.
- Ensured attendance to pit at all times during the emptying and closed the pit after service.
- Disposed the emptied sludge at the designated site.

We will also triangulate the information stated by emptiers with the following sources:

- With households (disaggregated for each emptier) based on their observation of these practices (except disposal).

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[24] We are using expenditure as a proxy for income, since the research team's experience suggests that it is more likely to get accurate data on expenditure rather than on income.

[25] Wealth quintiles for the settlement created using households' responses as per the equity tool (Equity Tool n.d.).

- Treatment plant operators (in cities where they exist)[26] for data on disposal.

For occupational safety, we will measure the change in the number of accidents/ injuries faced on the job in the last six months and the proportion of emptying services provided where they come into contact with feces. These indicators were developed based on the key concerns highlighted for emptiers in literature (Gautam et al., 2021; World Bank, ILO, WaterAid, and WHO, 2019).

For both, practices and occupational safety, we will capture notes from interview transcripts with the formalized emptiers every day (to ensure better recall from the interviews) into a template per emptier, that captures data along each indicator. Post-data collection, we will analyze the data to see if any emptiers have stated a difference in their practices and occupational safety post-transition.

For emptiers who have stated a difference, we will also conduct a deductive thematic analysis to **understand whether the changes are due to transitions** based on the reasons stated by emptiers for changes. We will specifically look for mentions of licensing, training by utilities, and other activities under the transition while capturing data from the hand-written notes. For this analysis, we will use the data captured through IDIs with formalized emptiers in the following manner:

- Capture data from interview transcripts every day post-interviews on a template that checks whether specific factors (e.g., licensing, training by utilities) were mentioned.
- Capture any additional reasons stated in the interview verbatim into the template.
- Conduct the full analysis of identifying themes in the reasons after all data collection.

Finally, we will **understand the impact of changes in practices on the emptiers' viability**. We will isolate the costs stated by emptiers for implementing the above-mentioned practices, and remove them from the current P&L statement to determine the impact of implementing these practices on their viability. We will use the financial data gathered and analyzed under research question 2 for this analysis.

6.4.3 FOR RESILIENCE

Question: *What is the impact of transitions on the resilience of service delivery?*

We will **measure the change in resilience pre- and post-transition** in each settlement through an indicator-led approach, adapted from USAID's market system resilience tool (USAID, 2018). We are using an indicator-led approach, given we may not be able to observe actual shocks or stresses during the course of this research period. We will measure the impact of transitions on three characteristics of the FSM market that indicate resilience:

- **Competition with rule of law**: Markets with lower concentration of power and rules for emptiers' service delivery will be more resilient as they are likely to have a consistent supply of services meeting minimum standards during shocks.
- **Connectivity and cooperation**: Markets with avenues for interaction between, and representation from households, emptiers, and the utility will be more resilient as they allow coordinated responses during shocks.
- **Strength of business models**: Markets with viable service providers, and access to emptying and transport equipment and treatment and disposal sites will be more resilient due to an increased chance of suppliers remaining in the market and possibly lower price fluctuations.

[26] Treatment plant operators of Kabwe and Livingstone, as spoken to during RQ2 (Section 5.3.1).

We will **compare a composite score** per settlement, pre- and post-transition, for each market characteristic. The score will be developed by taking an average score across defined indicators for the characteristic on a 4-point scale. The composite score will be developed by weighing each indicator equally, unless the data observed intuitively suggests otherwise.

The market characteristics, rationales, indicators, and an indicative scoring for each are given in Table 9. Based on the data we gather, we will define the full range of scores and refine the scoring developed. For example, we will see whether quarterly utility and community associations are considered too frequent or too infrequent based on how often it actually takes place.

For this analysis, we will use data from multiple sources across research questions 2 and 3. We will maintain a separate template to capture data for these indicators when processing data from the interviews and surveys (as detailed earlier).

Table 9: Market characteristics and indicative scoring of indicators

Characteristic	Indicator	Rationale for indicator	Indicative scoring	Data source
Competition with rule of law	Number of emptiers (quantitative)	More emptiers indicate continuity of services during shocks	• 4: Several emptiers available, with a few formalized emptiers. • 1: Only 1 emptier available in a settlement.	• IDIs with formalized emptiers *(Appendix 4_RQ2+3 Formalized SLP Interview Q95 - 97)* • Household surveys *(Appendix 6_RQ3 Household Survey Q33 and Q77)*
	Emptiers' degree of involvement in deciding guidelines (qualitative)	Emptiers having a say in guidelines improves the chances of them following guidelines, ensuring better services even during shocks	• 4: Active involvement of emptier with some contract rules defined by them. • 1: Emptier having no discussions on the contract.	IDIs with: • Formalized emptiers *(Appendix 4_RQ2+3 Formalized SLP Interview Q17)* • Informal emptiers *(Appendix 5_RQ2 Informal SLP Interview Q9)* • Utilities *(Appendix 2_RQ2 Utility Interview Q35)*
	Existence of guidelines and degree of compliance (qualitative)	Existence of guidelines and high compliance indicate better services	• 4: Existence of, and emptiers stating a high degree of compliance with most rules. • 1: Non-existence of guidelines or emptiers stating low compliance with most rules.	IDIs with: • Formalized emptiers *(Appendix 4_RQ2+3 Formalized SLP Interview Q31 – 34)* • Utilities *(Appendix 2_RQ2 Utility Interview Q53, 56)* Utility logbooks on emptiers' compliance
Connectivity and cooperation	Degree of activity within emptier network (qualitative)	A network between emptiers helps with planning coordinated responses to shocks	• 4: An organized network of emptiers (formal and informal), with activities/ information sharing every quarter. • 1: No interaction between emptiers.	IDIs with: • Formalized emptiers *(Appendix 4_RQ2+3 Formalized SLP Interview Q100 – 102)* • Informal emptiers *(Appendix 5_RQ2 Informal SLP Interview Q13 – 15)*
	Interactions between emptiers, community association and utility (qualitative)	Interactions between different stakeholders also help with coordinated response to shocks	• 4: Interactions at least once a quarter between the emptiers, community association and utility. • 1: No interactions.	IDIs with: • Formalized emptiers *(Appendix 4_RQ2+3 Formalized SLP Interview Q102)* • Community leaders *(Appendix 7_RQ2 Community Leader Interview Q8)* • Utilities *(Appendix 2_RQ2 Utility Interview Q15-17, 42-43)*

Characteristic	Indicator	Rationale for indicator	Indicative scoring	Data source
Diversity in business models	Viability of emptiers (financial data)	Having emptying as a profitable business improves likelihood of them continuing service provision during shocks	• 4: All formalized emptiers being profitable and emptying as a significant source of income. • 1: All formalized emptiers being unprofitable.	IDIs with formalized emptiers *(Appendix 4_RQ2+3 Formalized SLP Interview Q 40 – 94)*
	Disposal points for emptying (qualitative)	Having easy access to disposal sites improves likelihood of safe practices during shocks	• 4: Easily accessible disposal point, as stated by emptier. • 1: No disposal point.	• IDIs with formalized emptiers *(Appendix 4_RQ2+3 Formalized SLP Interview Q36 - 39)* • Secondary data
	Access to emptying equipment and repair services (qualitative)	Access to emptying equipment and repair services improves likelihood of sourcing required items during shocks	• 4: High access, as stated by emptier. • 1: Negligible access, as stated by emptier.	IDIs with formalized emptiers *(Appendix 4_RQ2+3 Formalized SLP Interview Q36 - 39)*

7.0 DATA MANAGEMENT PLAN

7.1 ETHICAL CLEARANCE AND HUMAN SUBJECTS PROTECTION

We have obtained an ethical clearance exemption from our research partner, NWASCO, after detailing our areas of inquiry with them. In addition to this, we will collect verbal informed consent from all study participants. We will not communicate any personally identifiable information to local stakeholders and will only present summary statistics and statements while communicating findings. The team will remove all personal identifiers (names and global positioning system (GPS) coordinates) before uploading data to USAID's Development Data Library.

Further, all data collected by the team members will be securely uploaded onto password-protected computers and shared within the team only using password-protected, company mail servers. For data collected by the research agency, we will ensure that it is only shared via password-protected, company mail servers, and detail in their contract that all data collected for the purposes of this research will need to be deleted post-termination of the contract.

Specifically for the narrative inquiry research on marginalized groups (for research questions 2 and 3), we will seek Institutional Review Board (IRB) approval in Zambia and also submit for ethical approval in the United States through Health Media Lab IRB. Ethical considerations outlined in the Common Rule will be adhered to, and all personally identifiable information collected through this research will be managed appropriately. The Do No Harm (DNH) principle will guide all aspects of this research, and we will ensure that individuals participating in the research study do not face any undue risk as a result of their involvement.

7.2 DATA QUALITY ASSURANCE

We will ensure data quality across the two broad types of data collection activities planned:

- Household surveys conducted by the research agency.
- IDIs conducted by FSG and narrative inquiry research conducted by Iris Group.

Household surveys

- Preparation:
  - Hire a well-reputed market research agency based on the URBAN WASH team's past experience of working with them.
  - Embed non-falsifiable questions (e.g., GPS coordinates of interview) within the surveys.
  - Create translated versions of the data collection tools in local languages (languages will be based on inputs from the local research agency given their knowledge of the context).
- Training of the agency (remotely by FSG)[27]:
  - Explain the research instruments along with the purpose of each section.
  - Conduct simulated surveys for different kinds of research methods for settlements.
  - Run pilots of surveys and refine the survey question (including for updating wording in translated versions based on learnings from the field) based on learnings.

[27] FSG has conducted remote training of this research agency for data collection in multiple countries as part of the WASHPaLS project and have had the desired results.

- Data collection:
  - Review incoming quantitative data daily (or every alternate day, depending on frequency of agency sharing data) and follow up with data collection teams on inconsistencies.
  - Check for outliers and consistency of quantitative data through interview times, GPS locations, etc.

In-depth interviews and narrative inquiry research

- Preparation:
  - Conduct simulated interviews within the team and refine instruments based on mocks.
  - Conduct simulated interviews with the translator to explain the purpose of each question/ section.
  - Refine framing of questions/ probes after initial interviews.
  - Conduct first few interviews in the presence of two team members to be able to debrief and refine interview instruments, before team members split up for data collection.
- Data collection:
  - Transcribe interview notes daily into a template on computers to ensure better recall to identify and fill in gaps through subsequent interviews.
  - Conduct consistency checks of financial data through specific questions at the end of the interview (e.g., revenue and cost increase/ decrease since year X).
  - Review data collected through narrative inquiry daily.
  - Compare interview notes to audio transcripts (where collected based on informed consent and observed comfort of the respondent) and translator's notes.

8.0 STAKEHOLDER ENGAGEMENT PLAN

8.1 ENGAGEMENT WITH TECHNICAL WORKING GROUPS AND RESEARCH PARTNERS

We have created two TWGs, at the national and regional levels, for this implementation research. Table 10 lists the organizations that are part of the TWGs. The objective of creating these groups is to:

- Integrate the perspectives of diverse stakeholders that are a key part of FSM decision-making to ensure the relevance of the research.
- Build ongoing buy-in from local stakeholders who can take up the findings from the research.

The **national-level steering committee** has representation from government agencies, ministries, researchers, funders, Lusaka WSC, and an emptiers' association. The **regional-level advisory group** has representation from utilities, local authorities, emptiers' associations, community organizations, and local programs from Kabwe, Kitwe, and Livingstone (cities for in-depth research). We identified the members during the scoping trip (April 2023) through recommendations from NWASCO, the utilities, WaterAid, and USAID/Zambia.

Table 10: National and regional TWG members

Category	Organization
National-level steering committee	
Government	NWASCO
	ZEMA
	MLGRD
	MOH
Local, non-government	University of Zambia (UNZA)
	Lusaka WSC
	Zambia Emptiers' Association
Funders	USAID/Zambia
	Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ)
Regional-level advisory group	
Kabwe	
Utility	Lukanga WSC
Local authority	City council for Kabwe
Emptier representative	Emptiers' association of Kabwe
Household representative	Community leader for Kamushanga ward
Local program	SNV
Kitwe	
Utility	Nkana WSC
Local authority	City council for Kitwe

Category	Organization
Emptier representative	Community-based enterprise for Kitwe
Livingstone	
Utility	Southern WSC
Local authority	City council for Livingstone
	Provincial Health Office of southern province
Emptier representative	Manual emptier from Livingstone
Household representative	Ward Development Committee Libiyu
Local program	WSUP

We convened the national and regional groups for co-design workshops on 27th and 28th June, 2023 respectively. Their inputs on the research design were incorporated while finalizing the analytical and research approaches for each of the three research questions.

Going forward, an engagement manager from Lusaka will lead the formal and informal interactions with all local stakeholders, with support and guidance from the research teams.

We will engage the members formally (through the engagement manager) quarterly during the course of the research through in-person meetings in Lusaka, for the national-level steering committee members and in Kabwe, Kitwe and Livingstone for the regional-level advisory group members. We have spread out each engagement instance over multiple months to provide flexibility in scheduling meetings with TWG members (refer to Table 11).

The members will also have access to a WhatsApp group for informal engagement, shorter updates, providing updates on changes in local context or policy affecting research design or queries, which will be answered by the engagement manager.

Additionally, the engagement manager will help with preparing our research partners for the research. These partners will also include utilities that are only part of the sample for research question 1, and as such, are not part of the TWG. The first of such engagements is scheduled for November 2023.

Table 11: Engagement with TWG members and research partners

Quarterly meeting date	Key content to present	Key inputs required
Research partners		
Engagement 1 – November for all six utilities part of research question one (refer to Section 4.2)	Updates on research plan and preparing them for RQ1 data collection activities	Respondents to sample and availability for RQ1 interviews and workshop.
TWG members		
Engagement 1 • January 2024 – Lusaka and Livingstone • February/ March 2024 – Kabwe and Kitwe	Updates on the kick-start of research and broad research timelines	Recommendations on subsequent phases of data collection
Engagement 2 • April 2024 – Lusaka and Livingstone • May 2024 – Kabwe and Kitwe	Early findings on the utilities' choice of transitions	Recommendations on support needed by utilities to implement transitions

Quarterly meeting date	Key content to present	Key inputs required
Engagement 3 • July 2024 – Lusaka and Livingstone • August 2024 – Kabwe and Kitwe	Early findings on implementation and impact of transitions	Interpret early findings and suggest additional questions for interviews during the final phase of data collection for research questions 2 and 3
Engagement 4 • November 2024 – Lusaka and Livingstone • December 2024 – Kabwe and Kitwe	Early synthesis of the research	Generate recommendations on operationalizing transitions for utilities and ensuring buy-in from local stakeholders

8.2 ENGAGEMENT WITH NON-TWG STAKEHOLDERS

The engagement manager will also use appropriate channels for enhancing buy-in of findings from local stakeholders who are not part of the TWG. This will include attending and presenting the research at:

- Local WASH conferences/ events that are relevant to the research, like:
  - Zambia Water Forum (ZAWAFE) in Lusaka in June.
  - Biannual conference by Engineering Institution of Zambia in Livingstone in April.
- District-level committee/ local government authority quarterly meetings, like:
  - District WASH Committee (DWASH) in each of our research cities every quarter.
  - Epidemic Preparedness Committees (focused on preventing WASH disease outbreaks) in each of our research cities every quarter.
  - Planning Development meetings with local government authorities every quarter.

The dates of the quarterly meetings with regional TWG members in Kabwe, Kitwe and Livingstone may change marginally according to the dates of the conferences/ meetings (mentioned above) with non-TWG members, to ensure that both can happen during a single trip.

9.0 ACTIVITY MANAGEMENT PLAN

Tetra Tech/ URBAN WASH will have overall management, financial, and quality assurance/quality control (QA/QC) responsibilities for the URBAN WASH core activity. Chief of Party Dr. Elizabeth Jordan and Deputy Chief of Party Dr. Miriam Otoo will provide technical oversight of the research activities and provide QA/QC of all deliverables. We will report to Dr. Elizabeth Jordan and Dr. Miriam Otoo and be responsible for the technical research activities, with support from the wider URBAN WASH team.

Additional details on roles and responsibilities are included in Table 12 below.

Table 12: Summary of team roles and responsibilities

Team member	Role	Responsibilities
Dr. Elizabeth Jordan	Chief of Party	Elizabeth and Miriam will oversee the management of the URBAN WASH activity, coordinate with relevant external stakeholders and support the review and quality control process for deliverables.
Dr. Miriam Otoo	Deputy Chief of Party	
Rishi Agarwal	Team Lead	Rishi will provide strategic inputs on the research design, analysis, and development of deliverables.
Abhishek Khanna	Project Lead	Abhishek will lead day-to-day implementation of the research activities, including coordination with key stakeholders, data collection activities, data analysis, and development of deliverables.
Dr. Kathleen O'Reilly	GESI analysis	Kathleen will lead the day-to-day implementation of the GESI research, including coordination with stakeholders, data collection activities, data analysis, dissemination, and development of deliverables.
TBD	Research team	Research assistants will implement the data collection activities and data analysis.
Dr. Klaas Schwartz	Research Advisor	Klaas will provide advice and guidance for the research design and implementation. He will support data analysis and the review and quality control process for all deliverables.
Adamson Sakala	Engagement Manager	Based in Zambia, Adamson will support the implementation of the research activities including engagement with the TWG members, field research, and data collection activities.

10.0 MONITORING AND EVALUATION

The research will employ monitoring, evaluation, and learning (MEL) reporting as required by URBAN WASH. Quarterly and annual reporting will include progress on this research. URBAN WASH will be able to use the activity's custom indicators (refer to Table 13) to measure the results of the research and dissemination.

Table 13. URBAN WASH performance indicators

No.	Performance indicator [and type]	Disaggregation
C.1	Number of partners and stakeholders applying URBAN WASH-generated learning [Custom, Outcome]	Type of partners/stakeholders; Learning topic area; Geographic area
C.2	Number of institutional tools (reports, policies, laws, agreements, action plans, regulations, strategies, or investment agreements) influenced by URBAN WASH [Custom, Outcome]	Type of Guidance; Topic area; Type of institution; Stage (proposed/draft, adopted/final); Influence level (strong, medium, weak); Geographic area
C.3	Number of technical publications/communications materials developed to share information and learning [Custom, Output]	Type of products; Topic area; Type of institution; Geographic area
C.4	Number of individuals exposed to WASH and water resource management (WRM) approaches/tools through attendance at URBAN WASH presentations/ events, communication materials and knowledge products [Custom; Output]	Sex (Male/Female/ Undisclosed); Age (15–29, 30+); Type of exposure (events, knowledge, and communication products); Topic area; Affiliated institution; Geographic area
1.1	Number of partnerships established and supported by URBAN WASH [Custom; Output]	Type of partnering institution(s); Level (global, national); Status of partnership (established, supported)
1.2	Level of partners' satisfaction with the URBAN WASH's engagement [Custom; Output]	Type of partners; Level (global, national); Topic area; Geographic area
2.1	Number of country- or local-level workshops/events for research co-design and presentation of findings [Custom; Output]	Level of project role (organized, co-organized, presented); Topic area; Geographic area
2.2	Number of local partners actively participating in design and implementation of URBAN WASH research activities [Custom, Output]	Level of project role (organized, co-organized, presented); Topic area; Geographic area

11.0 DELIVERABLES AND TIMELINE

11.1 DELIVERABLES

This research will lead to two categories of deliverables:

- **Cross-country reports:** Two cross-country reports that will integrate the analysis from Zambia with the implementation research in other countries. The two reports will focus on:
  - The choice of transitions (research question 1).
  - The implementation and impact of transitions (research questions 2 and 3)[28].
- **Country-specific briefs:**
  - Study brief describing the overall research at the outset.
  - Research brief on the choice of transitions (research question 1).
  - Research brief on the implementation and impact of transitions (research questions 2 and 3).

The audiences and objectives of these deliverables are summarized in Table 14.

Table 14: Deliverables

Deliverables	Audience	Objective
Cross-country reports		
Report on choice of transitions	National-level stakeholders in LMICs, including regulators, ministries, and funders	To provide guidance to plan for transitions at a macro level and nudge and support city-level stakeholders
Report on implementation and impact of transitions	Utilities, city-level stakeholders in LMICs, such as FSM departments in city councils	To provide guidance for implementing transitions at a micro level, with the knowledge of the impact
Country-specific briefs		
Study brief	National and regional stakeholders in Zambia	To inform local stakeholders about the research activity
Research brief on choice of transitions	National-level stakeholders in Zambia, including regulators, ministries, and funders	To provide drivers and barriers to implementing transitions, specific to Zambia
Research brief on implementation and impact of transitions	Utilities, city-level stakeholders in Zambia, such as FSM departments in city councils	To provide guidance on implementation and impact of transitions, specific to Zambia

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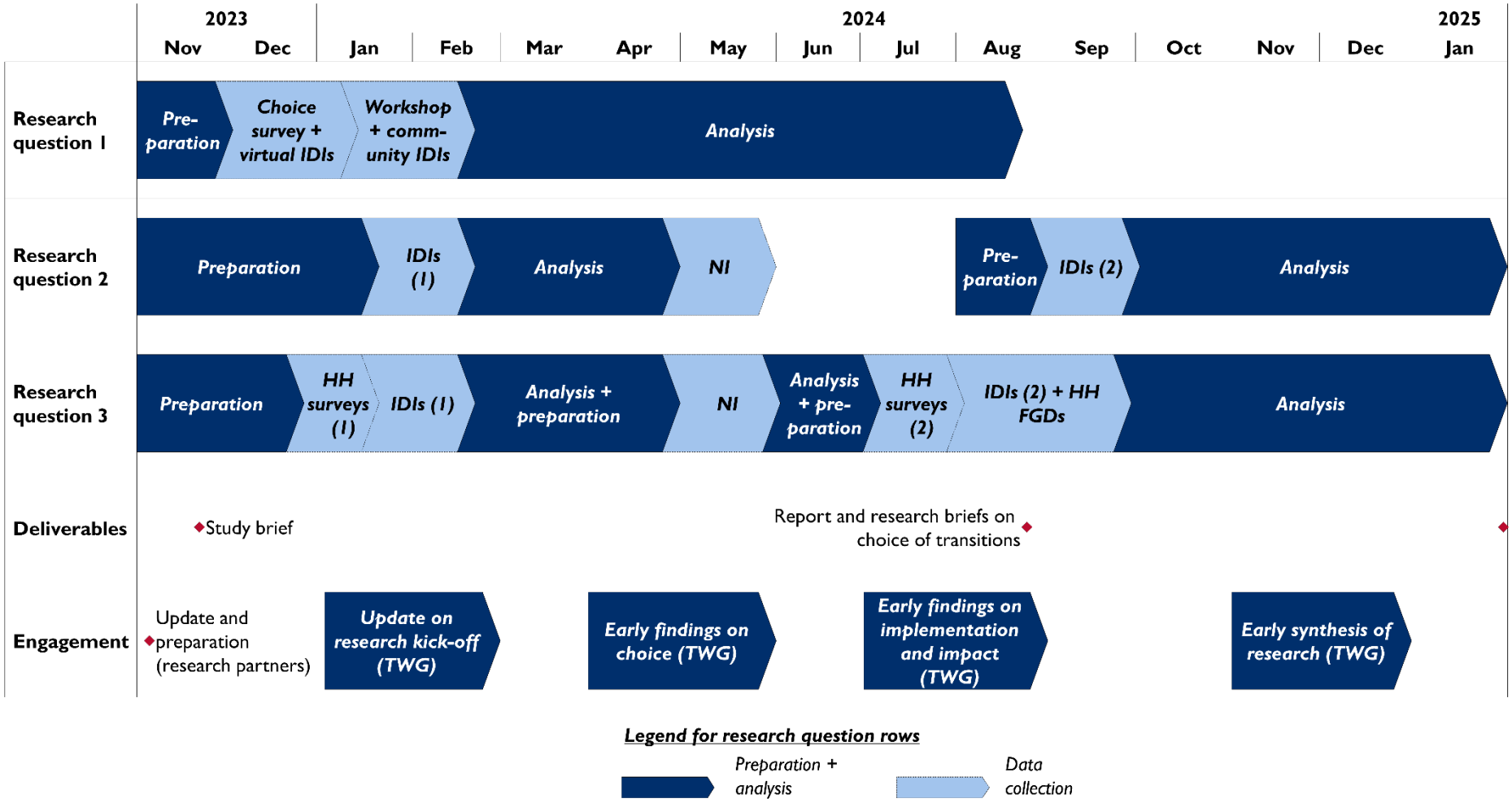
[28] URBAN WASH will decide in 2024 if the reports require to be sector-specific (for water and FSM) or not.

11.2 TIMELINE

The timelines of the research, deliverables, travel and stakeholder engagement are summarized in Figure 12. Each research question will involve data collection in phases, followed by synthesis and findings summarized in reports.

Figure 12: Timeline for research



Note: The timeline does not include engagements with non-TWG members and research partners/ sample. The former will depend on when conferences and events are scheduled. The latter will be developed as the need arises. Where this involves travel outside Lusaka, we will coordinate events and meetings for efficiency and maximizing the value of each trip.

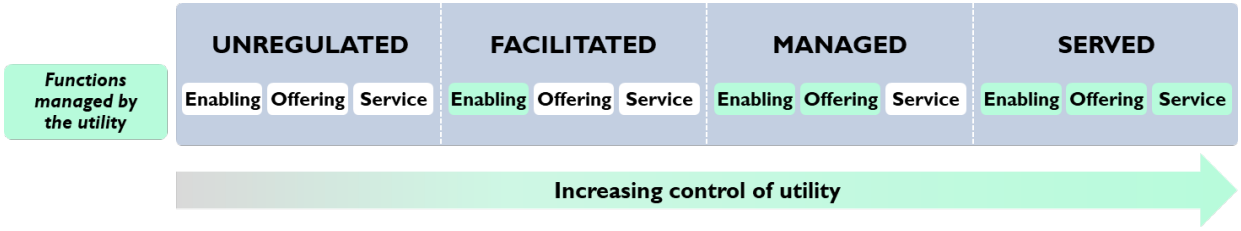
APPENDIX 1 – FRAMEWORK FOR TRANSITIONS

The USAID Urban Resilience by Building and Applying New Evidence in Water, Sanitation, and Hygiene (URBAN WASH) desk research developed a framework for utilities to implement market transitions with small, local providers (SLPs).

1-1.1 MARKET ARCHETYPES AND TRANSITIONS

Different parts of a city may consist of different micro-markets with market archetypes (unregulated, facilitated, managed, served), based on the functions (enabling, offering, service) managed by city authorities/ service providers in these areas (see Figure 13).

Figure 1-1: Market archetypes



Unregulated markets represent markets served by SLPs in the absence of utility-led arrangements and in which they do not manage any functions or have oversight over SLPs.

Facilitated markets are characterized by utilities influencing the service delivery of SLPs (e.g., through the issuance of licenses or the creation of treatment facilities) by managing a range of enabling functions, typically following the introduction of regulatory frameworks for SLPs. Enabling functions can include:

- ***Licensing*** or similar mechanisms that provide SLPs the "right to operate" under specified standards and guidelines (often defined under regulatory frameworks);
- ***Dependency*** or points of interaction of the service with the external environment, like disposal and treatment of sludge after delivery; and
- ***Financing*** for enterprises to invest in their business or for customers to pay for services.

Managed markets are characterized by utilities managing SLPs' offering and enabling functions (e.g., performance-based contracts). The offering functions define SLPs' core product and marketing functions and include:

- ***Pricing*** of different types of service delivery for different customer segments;
- ***Customer acquisition*** through selection of micro-markets for SLPs to serve, and sales and marketing efforts;
- ***After-sales engagement*** with the customer beyond the delivery of the service; and
- ***Technology*** employed for delivering services to the customer.

Served markets receive utility-led provision directly, through utility-led decentralized systems for fecal sludge management (FSM).[29] Utilities manage all the functions, including last-mile service delivery which may involve two separate functions of transport and delivery of services. For example, mechanical emptying of fecal sludge requires delivery of the emptying service at the household, followed by transport of waste to a disposal site.

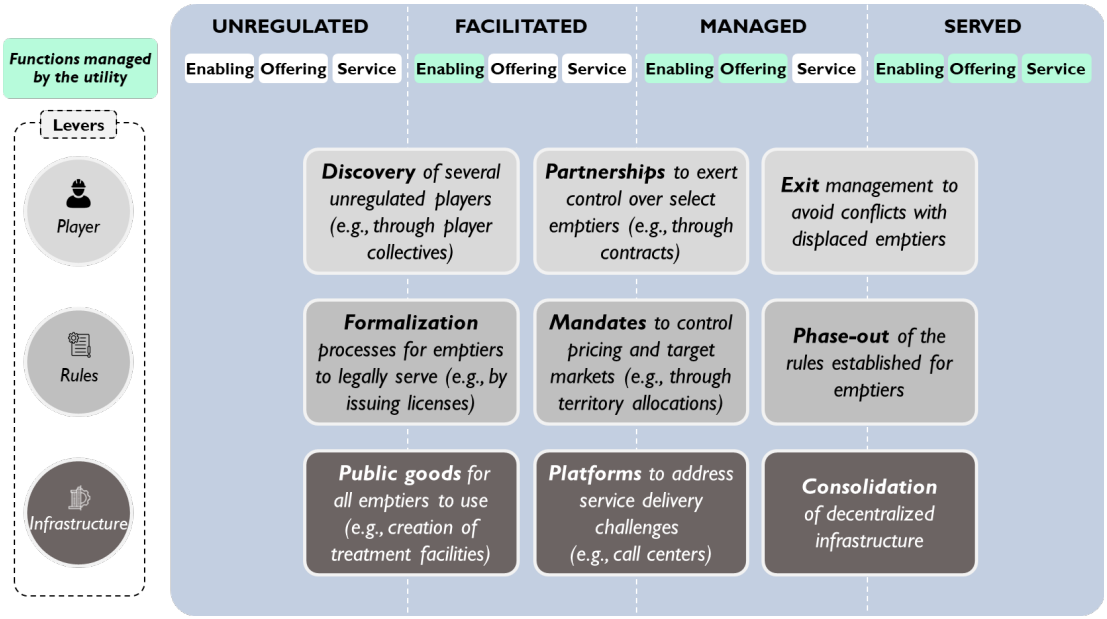
A utility's objective of engaging SLPs and implementing market transitions may not only be limited to expanding services. For example, utilities may want to monitor the activities of emptiers to reduce unsafe disposal of sludge.

1-1.2 LEVERS

Utilities can expand or improve services and meet their mandate of providing citywide coverage by transitioning micro-markets across the four archetypes. Transitioning across these archetypes requires actions. These actions can be classified into three **types of levers**: (1) managing the engagement with **players**, (2) establishing **rules** for the engagement, and/or (3) creating **infrastructure** that supports SLPs to deliver services.

The purpose of these levers varies by transition (refer to the **Market Transitions framework** in Figure 14).

Figure 1-2: URBAN WASH Market transitions framework



[29] Decentralized systems entail utilities providing mechanical emptying and transportation services for non-sewered sanitation systems.

APPENDIX 2 – CONDITIONS FOR RESEARCH QUESTION 1

The research will aim to analyze three categories of conditions that influence choices for implementing transitions:

- **Political and legal factors**, including rules, relationships, events or political capital and incentives.
- **Economic and technical factors,** including financial resources, knowledge capacity or infrastructure and technologies.
- **Social and environmental factors,** including informal norms, public health and climate considerations, and social circumstances.

These categories of factors could play out at four different administrative levels, i.e., the country, utility, city, or settlement level (the utility is placed above the city as utilities in Zambia often have multiple cities under their jurisdiction).

Table 15, Table 16, and Table 17 provide examples of these conditions mapped to the four administrative levels (where applicable).

Table 2-1: Examples of political and legal conditions at different administrative levels

Administrative level	Rules	Relationships	Events	Political capital and incentives
Country	• National acts or laws detailing roles and responsibilities for sanitation service provision • National guidelines defined for private sector participation (e.g., permitting guidelines for emptiers)	• Between national sanitation ministries and agencies • Between national and sub-national level ministries and agencies	• Leadership changes through national elections or cabinet reshuffles • National health campaigns	Ability of national government to incentivize utilities to engage with private emptiers
Utility	Guidelines assigning jurisdiction and coverage targets for service delivery	• Between utility administration • Between private emptiers and utility administration	Ownership change of utility due to privatization or change in government structures	Ability of utilities to incentivize: ○ Private emptiers to engage ○ Settlement leaders to promote uptake of formalized emptying
City	• City-level guidelines defined for private sector participation (e.g., approvals required for engagement) • City-level governance structures detailing roles for service provision	• Between city council fecal sludge management (FSM) departments • Between city council FSM departments & utilities	• Leadership changes through local government elections or cabinet reshuffles • City-level campaigns to reduce illicit dumping	Ability of city authorities to incentivize utilities to choose settlements/ private emptiers within their cities
Settlement	• Legality and the property rights of settlements • Settlement-level guidelines that define roles of community leaders, households and private emptiers for service provision	• Between households and private emptiers • Between community and political leaders	• Community-leadership changes through informal nominations or elections (e.g., ward development committees) • Advocacy for improvements in sanitation services	Ability of settlement leaders to incentivize: ○ Utilities to choose their settlements for engagement with private emptiers ○ Households to uptake formalized emptying

Table 2-2: Examples of economic and technical conditions at different administrative levels

Administrative level	Financial resources	Knowledge capacity	Infrastructure & technologies
Country	Economic and technical factors are likely to play out at the city, utility and settlement level where the transitions are actually operationalized		
Utility	• Capital available to make investments to extend service delivery	• Number of employees dedicated to engaging with private emptiers • Skills of staff to execute engagement with private emptiers, define their rules, and build infrastructure	• Availability of fecal sludge treatment plants • Availability of emptying technologies
City	• City authority's budget allocated towards sanitation as a percentage of total budget	• Staff available to interact and provide support to utilities for transition • Skills of staff to set guidelines for private sector participation	• Availability of land to set up fecal sludge treatment plants or disposal sites • Availability of road networks to transport fecal sludge from settlements to disposal sites
Settlement	• Average monthly household income	• Number of private emptiers serving the settlements • Skills of private emptiers to engage in safe (e.g., with the use of protective equipment) emptying	• Availability of emptiable containment technologies • Quality of road networks within the settlement • Geography of settlement (terrain, past incidents of water logging)

Table 2-3: Examples of social and environmental conditions at different administrative levels

Administrative level	Informal norms	Public health and climate considerations	Social circumstances
Country	Social and environmental factors typically play out in local interactions within the city, and within and between settlements		
Utility			
City	• Preference for specific groups of emptiers (e.g., based on social class) • Perception of private sector participation • Perception of importance of FSM business line of utility (as compared to water)	• Prevalence of diseases at city-level • Prevalence of unsafe emptying at city-level • Frequency of emptying in city	Population levels and density of city
Settlement	• Preference for specific types of services (e.g., manual vs. mechanical) • Stigmatization of emptying business	• Awareness of health effects of unsafe disposal • Need for climate mitigation in sanitation • Prevalence of diseases within settlement	• Population density within settlement • Social characteristics (e.g., language spoken, religion) of households

APPENDIX 3 – TRAVEL TIMELINES FOR DATA COLLECTION

The table below details the timelines and expected duration of travel for field data collection by the FSG and Iris Group teams (refer to Table 18):

Table 3-1: Travel for data collection

Trips	Number of travelers	Purpose	Expected duration
January/February 2024	3	• Conduct workshop for research question 1 (refer to Section 4.3) • Conduct first round of data collection for research question 2 (refer to Section 5.3) • Conduct first round of data collection for research question 3 (refer to Section 6.3)	15 days
May 2024	2	• Conduct narrative inquiry for research questions 2 and 3 (refer to Sections 5.3 & 6.3)	14 days
August/September 2024	2	• Conduct second round of data collection for research question 2 (refer to Section 5.3) • Conduct validation for research question 3 (refer to Section 6.3)	7 days

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