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SMALL LOCAL SERVICE PROVISION FOR WATER SERVICE DELIVERY IN WESTERN KENYA

Inception Report

January 2024

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 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 July 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 Water, Sanitation, and Hygiene (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 Water Service Delivery in Western Kenya.* Washington, D.C. USAID URBAN WASH Project.

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Cover photo: Utility-owned kiosk in a low-income area in Homa Bay, Kenya. Photo taken by the research team during field visit.

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ACRONYMS

BUWASCO	The Busia Water and Sewerage Services Company
DMM	Delegated Management Model
FGD	Focus Group Discussion
GESI	Gender Equity and Social Inclusion
GPS	Global Positioning System
GWASCO	Gusii Water and Sanitation Company Limited
HOMAWASCO	Homa-Bay County Water and Sanitation Company Limited
IDI	In-depth Interview
IIPS	International Institute for Population Sciences
IRB	Institutional Review Board
KACWASCO	Kakamega County Water and Sanitation Company
KES	Kenyan Shilling
KIWASCO	Kisumu Water and Sanitation Company Limited
LMIC	Low- and Middle-Income Countries
LVSWWDA	Lake Victoria South Water Works Development Agency
NIPORT	National Institute of Population Research and Training
NIPS	National Institute of Population Studies
NZOWASCO	Nzoia Water Services Company Limited
P&L	Profit and Loss
REAL	Rural Evidence and Learning
RQ	Research Question
SIBOWASCO	SIBO Water and Sanitation Company Limited
SIBO	Siaya Bondo
SLP	Small, Local Provider
SPSS	Statistical Package for Social Sciences
UNICEF	United Nations Children's Fund
URBAN WASH	Urban Resilience by Building and Applying New Evidence in Water, Sanitation, and Hygiene
USAID	United States Agency for International Development

WASH	Water, Sanitation, and Hygiene
WASHPaLS	Water, Sanitation, and Hygiene Partnerships and Learning for Sustainability
WASREB	Water Services Regulatory Board
WSP	Water and Sanitation Program
WSUP	Water and Sanitation for the Urban Poor
WWDA	Water Works Development Agency

1.0 INTRODUCTION

1.1 BACKGROUND

In Sub-Saharan Africa and South Asia, anywhere about half[1] of urban residents do not have piped water connections[2] (Eberhard 2019; IIPS and ICF 2021; NIPORT and ICF 2020; NIPS and ICF 2020). This percentage is likely to keep growing as, globally, 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 water services. A lack of financial resources, technical capacities, and other factors constrain water and sanitation utilities from serving this growing urban population. Typically, small, local providers (SLPs), who are often not recognized or regulated officially, will informally serve a significant proportion of the people without access to piped water connections in the absence of reliable public service provision.

The United States Agency for International Development (USAID) Urban Resilience by Building and Applying New Evidence in Water, Sanitation, and Hygiene (URBAN WASH) conducted a literature review and case studies on approaches to formalize SLPs for expanding drinking water services. 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. This prompts the need for additional implementation research to address the evidence gaps and generate learnings for the sector.

In Kenya, URBAN WASH is entering into a partnership with the national regulator, Water Services Regulatory Board (WASREB), and utilities (known as water service providers) in western Kenya to conduct implementation research in several cities. The partnership was finalized after conducting a scoping trip in April 2023 and meeting stakeholders from 20 organizations. In collaboration with these partners, URBAN WASH will study interventions by utilities to formalize SLPs in western Kenya to generate learnings on the topic for the Kenyan utilities, WASREB, and the global water sector.

Western Kenya[3] presents a good opportunity to conduct implementation research since SLPs (referred to as water vendors in Kenya)—including tanker truck, kiosk, borehole, and pushcart vendors—are highly prevalent in the region. WASREB is also keen to start formalizing[4] these water vendors and has released several guidelines to facilitate this. However, only a few utilities are planning to formalize water vendors. WASREB and the broader sector are keen to understand effective approaches for formalization.

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1 The proportions for urban South Asia were estimated using a weighted average of the proportions across three countries—India, Pakistan, and Bangladesh—representing 97% of South Asia's urban population.

2 This could include piped connections from a formal utility or a private vendor or small-scale service provider. The source data does not define the source of the piped connections.

3 Western Kenya includes 10 counties under the former Western and Nyanza provinces. Our scoping and analysis focuses on eight of these counties - Kisumu, Homa Bay, Migori, Kisii, Siaya, Busia, Bungoma, and Kakamega.

4 This research defines formalization as any effort by a utility to begin formally engaging with a water vendor. The formalization process can involve any activity by the utility to recognize the business of the vendor, such as by providing membership to a registered collective, access to formal finance, a tax code/ company registration or a license to serve drinking water from a regional/national body, or signing a memorandum of understanding/contracts with the vendor.

1.2 ACTIVITY PURPOSE AND AUDIENCE

The activity aims to address critical evidence gaps on the topic of engaging water vendors highlighted in the desk research and has two primary audiences—at the country-level and at the global-level.

The desk research highlighted several evidence gaps (URBAN WASH 2023). The case studies focused on positive deviants, i.e., contexts where engagements have been implemented such as southern Mozambique, Manila, Philippines, and Kisumu, Kenya. As such, there is limited evidence on what conditions may deter engagements. Further, the benefits and challenges of different implementation approaches, including the costs borne by the utilities and the SLPs for the same are not well understood. There is also insufficient evidence on the approaches for engaging vendors in the absence of a large-scale association. Finally, there is a lack of documentation on the impact of transitions on the access to services, and affordability and quality of water for households, and on the vendors' water handling practices post-formalization. The impact of these engagements on the resilience of urban water service delivery is also unclear and is also an important topic as climate shocks and stresses can exacerbate water stress and insecurity, reduce and slow the improvements in coverage of water service delivery, and undermine the achievement of related Sustainable Development Goals if systems are not designed to be resilient (Kohlitz, Chong, and Willetts 2017).

At the country-level, the research aims to generate evidence to guide policy and decision-making by WASREB and the utilities. The research team will ensure that the research is contextually relevant and has buy-in from local decision-makers and implementers in the long term. For this purpose, URBAN WASH created and convened national and regional technical working groups for co-design workshops in July 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.

At the global level, the research will generate learnings for water sector funders, implementers, and associations of regulators, such as Eastern and Southern Africa Water and Sanitation (ESAWAS), to address three critical evidence gaps:

- Identifying the conditions that influence utilities' **choices** to engage water vendors.
- Understanding how utilities **implement** engagements with water vendors.
- Generating data on the **impact** of engaging water vendors from the perspective of households and vendors.

1.3 ORGANIZATION OF REPORT

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

- **Background of the water service provision context** in Kenya and the need for implementation research.
- **Overview of the implementation research**, including the framing, three overarching research questions (RQs) and the timelines of research.
- **Research design**, including analytical approaches and data collection plans for the three RQs.
- **Additional information about the research**, including the data and activity management plan, stakeholder engagement plan, monitoring and evaluation indicators, and timelines and deliverables.

2.0 PROVISION OF WATER SERVICES IN KENYA

2.1 OVERVIEW OF FORMAL DRINKING WATER SERVICES IN KENYA

In Kenya, 87 public utilities are licensed by WASREB to provide drinking water services primarily in urban areas. Previously, the provision of safe drinking water was the responsibility of national agencies (REAL-Water 2022). However, in 2010, Kenya adopted a devolved system of government, due to issues of underdevelopment and inequality stemming from the centralized form of administration (Ng'ang'a and Mbataru 2022). Post-devolution, the responsibility for providing drinking water services was delegated to the county governments, which now own the public utilities that deliver water services, supported by a range of agencies at the national and county level.

Drinking water coverage by utilities varies across the country, with very large utilities[5] achieving between 37 percent to 98 percent coverage, and small utilities achieving anywhere between 5 percent to 89 percent coverage. Overall, the average drinking water coverage across all utilities is ~60 percent (WASREB 2022).

Even utilities with high coverage struggle to reach low-income areas[6] within cities and peri-urban areas surrounding the cities. Low-income areas within cities can be hard to penetrate because of high density that makes it challenging to build piped infrastructure. Further, several settlements have "water cartels" [7] that control the pricing and block attempts by the utility to deliver services (HOMAWASCO, personal interview, 2023; Boakye-Ansah et al. 2019; Hailu, Rendtorff-Smith, and Tsukada 2011). It is estimated that nearly 28 percent of the population within utilities' service areas live within these low-income areas and receive inadequate services (WASREB 2022). Peri-urban areas develop around cities due to urbanization and are often commercially unviable since there is low confidence in the ability of the customers to pay for services (World Economic Forum 2020). Further, the utilities are unclear on whether these areas fall within their jurisdiction since the areas did not exist when jurisdictions were determined (KIWASCO, personal interview, 2023).

2.2 PREVALENCE AND DIVERSITY OF PRIVATE WATER VENDORS

A large number of water vendors are informally addressing this service gap in western Kenya, with a diverse range of vending and distribution systems. While the exact number in western Kenya is unknown, over 7,000 private water vendors (WASREB 2023) are active across the country and are the main source of water for 16.7 percent of the urban population, as per the 2019 Kenya census (Koros 2023). Similarly, informal vendors serve 90 percent of the population in Kisumu (Sima et al. 2013), are

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5 The size of a utility is determined by total number of water and sewer connections, as per the WASREB categorization. Using the total number of registered connections for both water and sewer, utilities have been categorized as "very large" (>35,000 connections), "large" (10,000 – 34,999 connections), "medium" (5,000 – 9,999 connections), and "small" (<5,000 connections) (WASREB 2022).

6 This research uses the term "low-income area." These areas may include both settlements with households that have formal titles to the land and those that do not.

7 The term "cartel" is used by utilities and other stakeholders in Kenya to refer to informal groups/organizations that control the supply of drinking water within certain settlements of urban regions in Kenya. They may even have informal support from within the utility or governments, which allows them to operate without interference, occasionally with threats of violence against utilities that try to formalize or curtail their operations.

one of the main sources of water in Nairobi (Sarkar 2022) and are very active in the western Kenyan region as well, per scoping conversations with eight utilities.

WASREB has defined four types of vending systems—water kiosks, water tankers, hand and animal drawn carts, and water points (WASREB 2019), as summarized in Table 1. These vendors play roles as wholesalers, distributors who sell to other vendors, or as retailers that sell directly to customers.

Table 1: Types of vending systems

Vending system	Description	Source of water	Typical customers
Kiosks	A walled structure that houses (within or above) a water storage tank of 5 – 10 m^3, or a communal stand pipe connected to a water distribution line.	• Piped utility water • Boreholes	• Households • Vendors who purchase from kiosk and sell to customers
Tankers	Trucks fitted with water tanks with a capacity of up to 16m^3.	• Legally from utility designated-points • Illegally from hydrants, private boreholes, lakes	• Households • Kiosks
Hand and animal drawn carts	Vendors that use carts to transport and sell water in 20-liter jerry cans, drums or small tanks.	Multiple sources, including kiosks, wells, springs, boreholes, etc.	Households
Water points	Shallow wells and springs from which people can draw water at a fee.	• Hand-dug wells, where water table is high • Naturally occurring water bodies	Households

Source: WASREB guidelines (WASREB 2019); conversations with different utilities, 2023.

Some of these private water vendors are also politically connected. Cartels, despite being informal, in some settlements have tacit, or even explicit, support from within the utility or the government, which allows them to continue their services (Crow and Odaba 2009; HOMAWASCO, personal interview, 2023; Nyakundi et al. 2021). Tanker trucks may also be owned by "hidden forces" who have connections with influential people within the government, such as owners of hotel chains (GWASCO, personal interview, 2023).

2.3 REGULATORY PUSH FOR FORMALIZATION

WASREB believes there is a need to regulate water vendors to address water quality concerns, since sample testing across the country indicated that their water handling practices may be inadequate (WASREB 2019). In Nairobi City, 53.7 percent of the water vending stations are distributing drinking water that is non-compliant for microbial properties, indicating the population is exposed to unsafe water (Mugo 2022). Inferior quality of the pipes used for illegal connections by vendors can break easily, too, potentially resulting in initially safe water also getting contaminated by externally running water, garbage, and other toxic material (Hailu, Rendtorff-Smith, and Tsukada 2011). This was also highlighted in sampled water from 25 kiosks receiving piped, treated water from utilities, which were shown to have total suspended solids between the range of 0.25 to 18.5 mg/liter, when the acceptable limit is "nil" or "not detectable" (WASREB 2019). In Kisumu, the wells that were used by households as a source of drinking or cooking water were found to have a very high failure rate with respect to the World Health Organization standards for drinking water (Ayalew et al. 2014). The unsatisfactory quality from informal vendors and untreated water sources in low-income urban areas was also associated with the spread of

diarrheal diseases (WASREB 2019), and a cholera outbreak that spread across all sub-counties in Nairobi city in 2015 (Kigen et al. 2020).

WASREB has released several guidelines and frameworks for county governments and utilities to regulate water vendors, with a very recent nationwide push to register all vendors in their jurisdiction. In 2019, WASREB released the "Guideline on Water Vending" (WASREB 2019), which provides guidance for both utilities and the water vendors to ensure improvement in drinking water quality. The document provides guidelines for utilities to maintain an inventory and approve water sources, determine tariffs (approved by WASREB) for vendors in their jurisdiction, and ensure water quality for vendors in their jurisdiction. For vendors, it provides guidelines on ensuring safety of water, obtaining a license to operate, and ensuring their own health and hygiene.

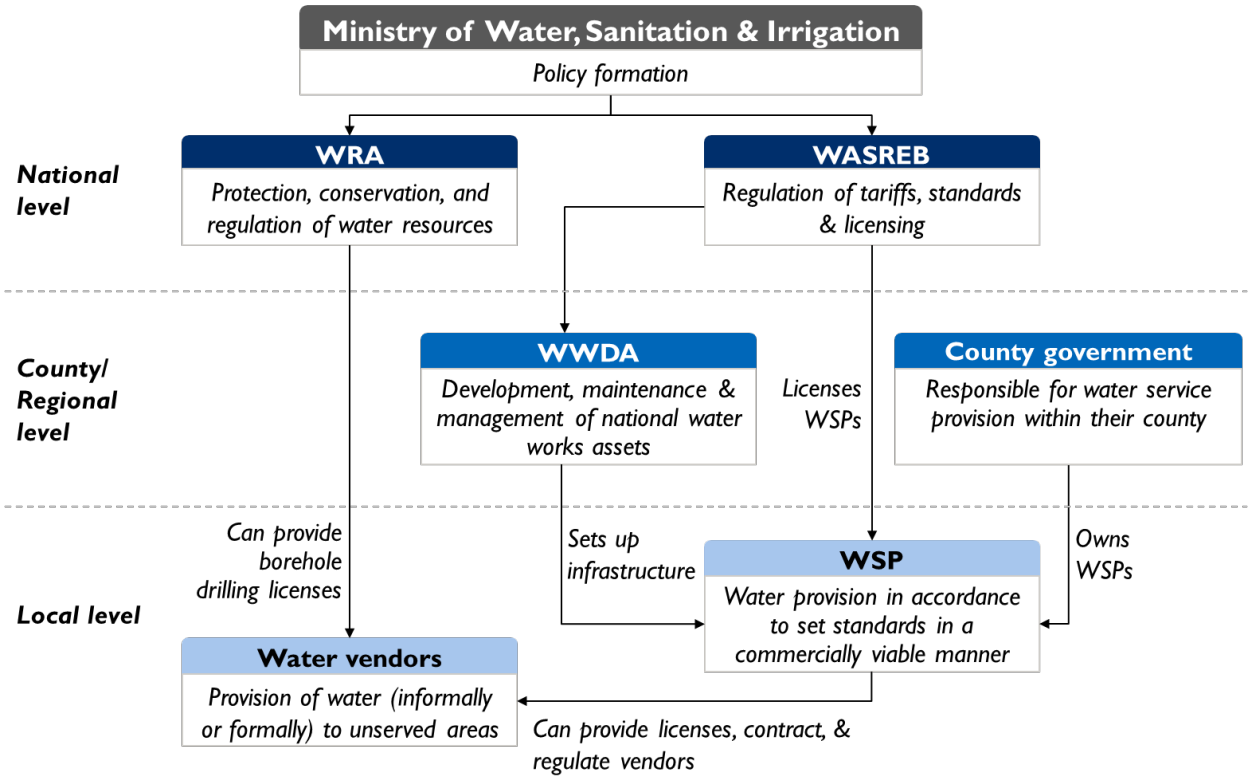
In 2020, WASREB released a framework for water vendors (WASREB 2020) operating in the jurisdiction of utilities to be contracted by the utilities. These water vendors could include water tanker truck and borehole operators (WASREB 2023).[8] The framework allows the water vendors to be contracted by and report to the regulated utilities. The contracting framework also provides for reporting, tariffs, termination, and renewal of the contract (WASREB 2020). While the contract details service indicators (e.g., coverage, service hours, drinking water quality) along with benchmarks, it does not reference or relate in any manner to the vending guidelines released in 2019.

Most recently, in 2023, WASREB released a notice asking all utilities to identify and register all water vendors within their jurisdiction as per the "Guideline on Water Vending" (NZOWASCO, personal interview, 2023; WASREB 2023). The notice also requested that all utilities comply by February 28, 2023; however, scoping conversations with eight utilities suggested that this had not happened by April 2023. The scoping conversations also highlighted that the notice was not very clear on what was required (e.g., creating a database, contracting, licensing, setting tariffs, etc.) in terms of registering the vendors.

Figure 1 provides an overview of the institutional framework for water service provision within Kenya, including the role played by the water vendors.

[8] The framework in 2020 referred to the contract between utilities and "small-scale water service providers." A more recent registration guideline by WASREB, in 2023, for Nairobi refers to small-scale water service providers as water bowsers/tankers and borehole operators, amongst others such as community-based and non-governmental organizations that may be providing water.

Figure 1: Institutional framework for formally engaging water vendors in Kenya



Graphic acronyms: WRA: Water Resources Authority; WASREB: Water Services Regulatory Board; WWDA: Water Works Development Agency; WSP: Water service provider
Source: REAL-Water, 2022; scoping conversations, 2023.

2.4 CHALLENGES AND EVIDENCE GAPS

Utilities in the region acknowledge the prevalence and role played by informal vendors but formalization interventions are rare. There is also a lack of evidence on the reasons for the same and whether utilities should intervene at all. Only two out of eight scoped utilities, Kisumu Water and Sanitation Company Limited (KIWASCO) and Homa-Bay County Water and Sanitation Company Limited (HOMAWASCO) had implemented formal engagements with water vendors. KIWASCO initiated a delegated management model (DMM), partnering directly with cartels (or in some cases with individual organizations within a cartel), in seven low-income areas of Kisumu city (KIWASCO, personal interview, 2023; WSP 2009; WSUP 2018). HOMAWASCO, more recently in 2023, started licensing tanker truck operators, but stated significant challenges in controlling their pricing and sourcing of drinking water (HOMAWASCO, personal interview, 2023). Other utilities only provided services in unserved areas by setting up their own kiosks and partnering with community-based organizations, rather than with existing water vendors (GWASCO, personal interview, 2023; BUWASCO, personal interview, 2023; NZOWASCO, personal interview, 2023; SIBOWASCO, personal interview, 2023). KIWASCO and HOMAWASCO are also the only scoped utilities with concrete plans to implement WASREB's most recent notice to register water vendors. There is a general lack of evidence on how utilities can be incentivized to begin these engagements.

Literature that included studies of water vendors in Kenya also highlights that there is a general lack of evidence on whether utilities should regulate or intervene in markets with water vendors (Garrick et al. 2019). Additionally, there is a need for further research on the perception of other stakeholders,

including utilities, country-level government, and customers, on water vendors (Baker 2009), and an understanding of the influence of politics on water service provision (Nijkamp 2021).

Utilities also highlight two implementation-specific challenges. First, utilities in the region acknowledge the prevalence and role played by the informal vendors but utilities and the water vendors are unwilling to engage with each other. Utilities seem unwilling to engage because they believe the vendors are encroaching on their jurisdiction (HOMAWASCO, personal interview, 2023). They may also be unwilling to engage since they associate water provision in low-income areas with unfair practices such as illegal connections and a high frequency of service disconnections (Boakye-Ansah et al. 2019). Water vendors are also unwilling to engage since they are worried about losing their business (GWASCO, personal interview, 2023), may not share business information with the utilities (NZOWASCO, personal interview, 2023), and are concerned about price regulation (Ayalew et al. 2014).

Second, WASREB at the national level wants to understand the challenges for utilities and the water vendors of implementing its water vending guidelines on the ground. Both WASREB and the utilities also cite a need to understand the costs that vendors face to comply with the guidelines. This has also been highlighted in early literature which stresses the need for a deeper analysis of the regulatory processes and enforcement on water vendors to understand changes required to improve their operations (Baker 2009). Given the high costs involved in monitoring water vendors (especially mobile vendors like tanker truck operators), there is a need to also develop evidence on the costs and benefits of systems to monitor and enforce standards on the vendors (Hailu, Rendtorff-Smith, and Tsukada 2011).

Finally, the impact of formalization on households' access to formalized water services, affordability and water quality, and vendors' water handling practices are currently unknown due to lack of data, and most stakeholders, during scoping conversations, highlighted a need to understand the same. Current literature, even those that gather data from households or water vendors are dated and primarily focus on unregulated markets (Baker 2009; Ayalew et al. 2014). Literature that has focused on post-intervention impact has also primarily only gathered evidence on pricing of services and had a relatively small sample size, i.e., 30 households across 12 low-income areas in three counties (Boakye-Ansah et al. 2019). Improved data, such as on the impact of monitoring on the quality of water from water vendors may also promote greater investment by utilities, especially in developing fixed point sources which can be easily regulated (Hailu, Rendtorff-Smith, and Tsukada 2011). Utilities and other stakeholders such as the Ministry of Water, Sanitaton and Irrigation also highlighted wanting to compare impact results across different types of water vendors to understand which ones are most likely to benefit from these engagements.

3.0 RESEARCH OVERVIEW

3.1 RESEARCH FRAMING

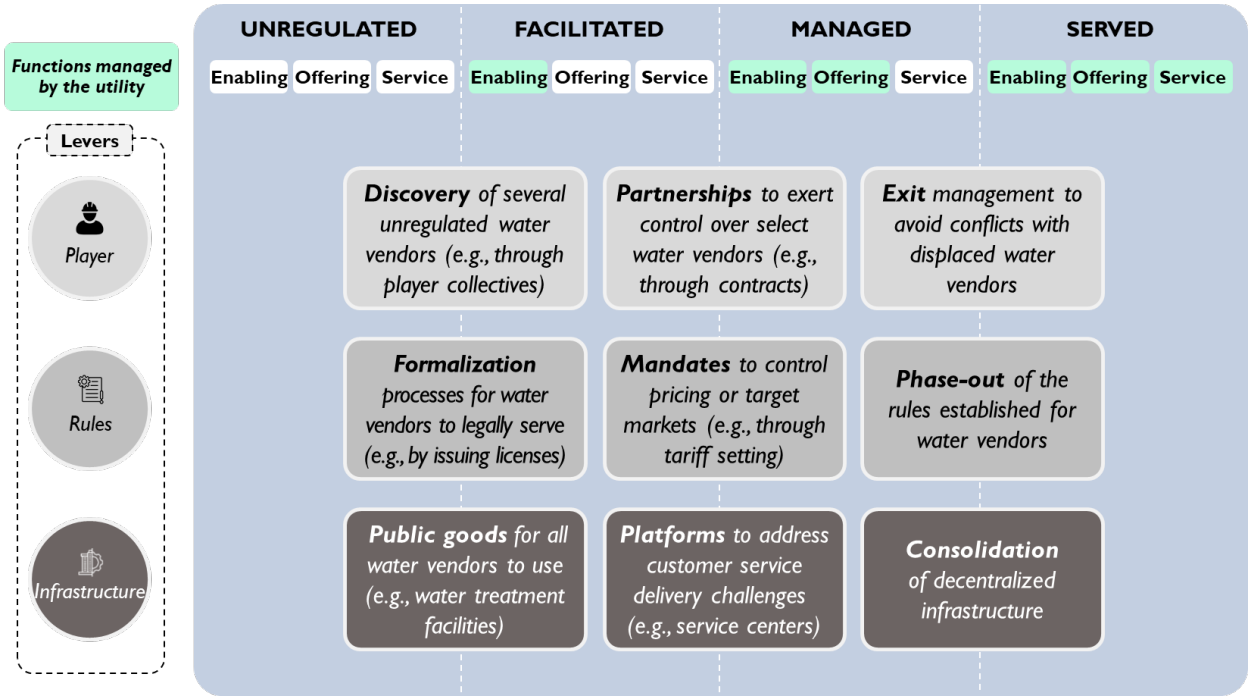
The implementation research in Kenya is framed around studying market transitions. URBAN WASH's desk research on SLPs (URBAN WASH 2023) highlighted that when utilities engage with SLPs, they transition *unregulated* parts of the city to different market archetypes, depending on the type of engagement with SLPs. Utilities can either *facilitate* the participation of SLPs (e.g., by giving them licenses or sources for water) 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 are unable to *serve* directly.

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

- *Player* lever, by managing the engagement with SLPs (e.g., by engaging one-on-one with SLPs or with SLP collectives, designing various types of partnership agreements, providing capacity-building or trainings);
- *Rules* lever, by defining terms of their engagement with SLPs and influencing their service delivery (e.g., formalization processes to issue licenses, defining pricing as part of contracts); and
- *Infrastructure* lever, by making complementary business environment investments to support service delivery (e.g., setting up kiosks, marketing, or customer service departments).

Implementation of market transitions can be represented visually in the URBAN WASH Market Transitions Framework (refer to Figure 2). Appendix 1 provides further details on the framework.

Figure 2: URBAN WASH Market Transitions Framework



3.2 RESEARCH QUESTIONS, ACTIVITIES, AND TIMELINES FOR STUDY

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

- **RQ 1 (Choice of transitions):** What choices do utilities make to implement transitions with SLPs, and what conditions influence these choices?
- **RQ 2 (Implementation of transitions):** How do utilities implement transitions with SLPs?
- **RQ 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 literature review and case studies and refined through stakeholder consultations in Kenya.

The research will run from December 2023 to January 2025, and the data collection timelines and activities will vary by RQ (refer to Figure 3).

For RQ 1, we will conduct the following:

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

For RQ 2, we will conduct the following:

- In-person IDIs with multiple respondents (utilities, formal and informal water vendors) in February 2024
- In-person narrative inquiry interviews with marginalized informal water vendors[9] in May 2024
- In-person IDIs with the same respondents as in the first round in August/ September 2024

For RQ 3, we will conduct the following:

- Household surveys in all settlements[10] of study in January 2024
- In-person IDIs with formalized water vendors in February 2024
- In-person narrative inquiry interviews with marginalized households[11] in May 2024
- Household surveys in settlements where transitions were recently implemented/ 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 water vendors in August/September 2024

The analysis for all RQs will be conducted on an on-going basis as data is collected and will end in August 2024 for RQ 1 and January 2025 for RQs 2 and 3.

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9 This study defines marginalized vendors as water vendors who face systemic disadvantages in accessing formalization opportunities. As informal vendors, they may experience stigmatization due to their work and/or go into this work due to stigmatization.

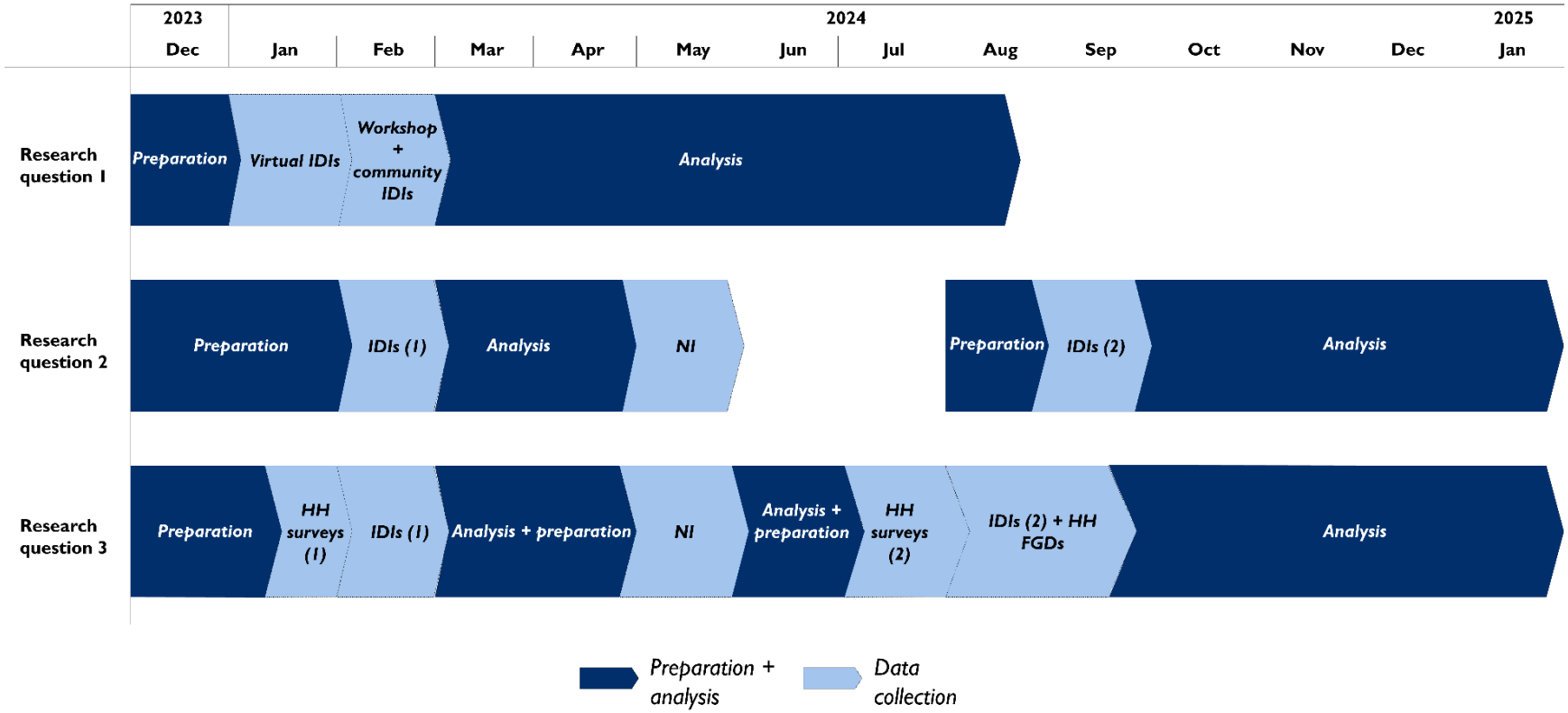
10 A settlement is an area (or micro-market) receiving a specific type of drinking water service, based on the based on the engagement between utilities and vendors. Refer to Appendix 1 for details on micro-markets.

11 This study defines marginalized households as households who face systemic disadvantages in accessing formal drinking water services. Stigmatization may play a role in their ability to access drinking water from both formal and informal sources.

The subsequent sections detail the activities for each RQ and is structured as follows:

- **Overall approach**, including the sub-RQs and justification for their study.
- **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-RQ.

Figure 3: Research timelines



Graphic acronyms: IDI: In-depth interview; HH: Household; FGD: Focus group discussions; NI: Narrative inquiry.

4.0 RESEARCH QUESTION 1 – CHOICE OF TRANSITIONS

4.1 OVERALL APPROACH

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

- 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-utilities stakeholders on the conditions influencing utilities' choices?

The question on choice of transitions is important because despite efforts from WASREB to push for formalization, very few utilities are engaging with or have a clear plan to formalize water vendors (as noted in Section 2.0), and there is mistrust between utilities and water vendors. WASREB and other stakeholders—including the county governments; Ministry of Water, Sanitation and Irrigation; and water works development agencies (WWDAs) in western Kenya (which in some cases, have worked with water service providers and water vendors to manage the systems they set up [LVSWWDA, personal interview, 2023])—seek to understand the challenges utilities face and the kind of support they require to initiate formalization.

The perspective of non-utility government stakeholders is important since political events or statements can impact decisions of the utilities. For example, during the co-design workshops utilities mentioned that during campaigns politicians often make promises of free water in unserved settlements, forcing utilities to shift resources and priorities to addressing concerns from these unfulfilled promises. The perspective of community stakeholders is important since they are the most impacted by and can play an enabling role in the transitions. Literature on the DMM in Kisumu highlighted that community leaders play an important role in enabling transitions within settlements, as they play a facilitative role between implementers, vendors, and households (WSP 2009). Given they are the most impacted by transitions, they can also provide a more diverse perspective on various factors and conditions at the settlement level, which may not be explicitly stated by the utilities.

The overall approach for answering these RQs is:

- A retrospective analysis of the choices that individual utilities make, and the conditions influencing utilities' choices.
- Validation and refinement of the conditions collectively by multiple utilities.
- Capturing of perspectives of non-utility stakeholders on the conditions, with an emphasis on capturing perspectives of community stakeholders

4.2 STUDY SITES

We will conduct this analysis with six out of eight utilities that we scoped in western Kenya. The selection was based on ensuring diversity across the degree of engagement with water vendors, utilities'

performance rankings, and size of the jurisdiction covered (highlighted in green in Table 2). 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 vendors with those that did. The diversity in rankings and jurisdiction size allows a comparison across a wider range of utilities (rather than focusing on only well-performing/resourced utilities).

The utilities' performance ranking and population in jurisdiction (overall and unserved) was taken from WASREB's impact report (WASREB 2022). The degree of engagement was determined based on the information gathered from scoping conversations. "Low" indicates no engagement with vendors over the past three years. "Medium" indicates utilities have begun discovering vendors for future engagement, but don't have a clear plan for implementation. "High" indicates utilities have formally engaged with vendors in the past three years or have clear plan to begin implementation during the research period.

Table 2: Ranking and degree of engagement with water vendors of scoped utilities in western Kenya

Rank	County	Utility	Towns covered	Population within jurisdiction	Population unserved (%)	Status of vendor engagement	Degree of engagement with vendors
11	Kisumu	KIWASCO	1	~466K	12.7%	One transition from unregulated to managed and one from unregulated to facilitated	High
38	Bungoma	Nzoia Water Services Company Limited (NZOWASCO)	7	~391K	72.7%	No transitions but found 20 borehole operators	Medium
39	Kakamega	Kakamega County Water and Sanitation Company	2	~416K	38.9%	None	Low
52	Homa Bay	HOMAWASCO	1	~214K	48.8%	One transition from unregulated to facilitated	High
72	Siaya	SIBO Water and Sanitation Company Limited	5	~673K	67.6%	None	Low
79	Busia	The Busia Water and Sewerage Services Company	3	~315K	53.3%	None	Low
82	Migori	Migori County Water and Sanitation Company Limited	7	~218K	77.5%	None	Low
85	Kisii	Gusii Water and Sanitation Company Limited (GWASCO)	7	~614K	68.9%	No transitions but initiated discussions with pushcart vendors	Medium

Notes:

- *Ranks are not in sequential order since the ranking is across 87 utilities.*
- *NZOWASCO and GWASCO serve two counties each. The population within jurisdiction (overall and unserved) refers to the population within Bungoma county and Kisii county, respectively, that fall under each of the utilities' service areas.*
- *The number of towns covered by NZOWASCO and GWASCO specifically within Bungoma and Kisii counties, respectively, is unclear. The numbers in the table indicate the total number of towns within the service area across both counties.*
- *Migori is served by two utilities. The data in the table reflects only those for Migori County Water and Sanitation Company Limited, since that is the utility that was scoped.*

4.3 DATA COLLECTION PLAN

For analysis on utilities' choices, we will conduct:

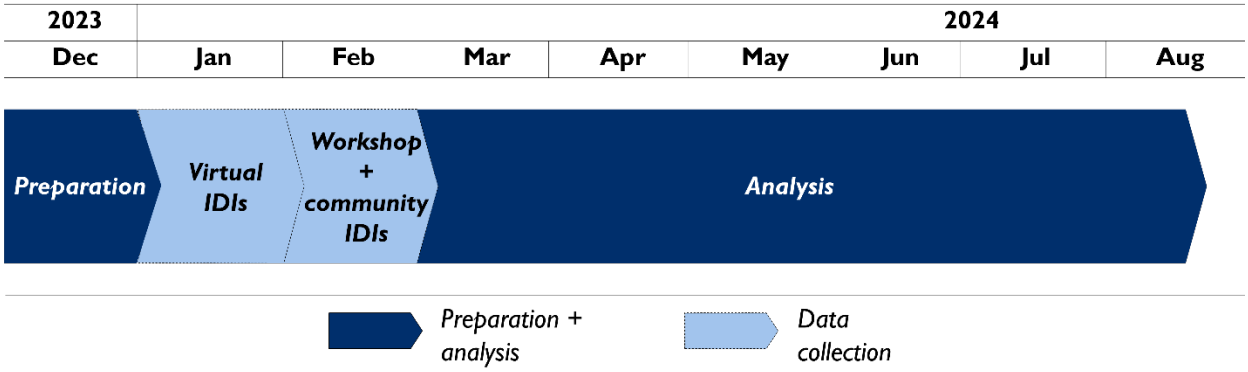
- Virtual IDIs with two respondents in each utility to understand conditions influencing the utilities' choices. These will be conducted by the FSG team.
- In-person workshop with all six utilities to validate the conditions. FSG will conduct this workshop with translation and facilitation support from a local research agency.

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

- An in-person multi-stakeholder workshop (the same as for utilities) with ~20 stakeholders (8 national and county government stakeholders, and 12 community representatives) to develop a conflict map. FSG will conduct this workshop with translation and facilitation support from a local research agency.
- One-on-one in-person IDIs, after the in-person workshop, with 12 community representatives to capture their perspectives on a conflict map. FSG will conduct these interviews with translation support from a local research agency.

The timelines for the activities mentioned above are summarized (light blue) in Figure 4. The activities are detailed in subsequent sections.

Figure 4: Timeline for RQ 1 data collection and analysis



Acronyms: IDI: In-depth interview.

4.3.1 FOR UTILITY CHOICES AND CONDITIONS

The **virtual IDIs** will capture data on the choices made by the utilities and the conditions influencing each choice (as detailed in the analysis plan). We will conduct these interviews with the managing director/head of commercial services and low-income area,[12] revenue, technical, or marketing department heads, 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).

[12] The department may be known by different terms at each utility (e.g., peri-urban area department, pro-poor department, etc.) but typically refers to a unit set up to address coverage needs in low-income areas.

We will conduct the interviews in a semi-structured format,[13] 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 drinking water service delivery, and the role they see in the future for water vendors.
- Conditions influencing their choice of "why" to implement transitions, "which" transition to implement and "where" to implement it *(the latter two will only be asked to utilities that engaged with vendors since only they make these decisions).*

The in-person workshop is aimed at validating the conditions 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 conditions. 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 identified through the virtual IDIs 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).
- Ranking each condition to the choice using a pairwise comparison matrix 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), and scoring conditions to determine which are the most important (e.g., by providing 20 points and asking groups to distribute it across conditions).
- An initial list of the kind of support required by utilities to implement transitions through an open discussion/brainstorming activity within the groups.

4.3.2 FOR NON-UTILITY PERSPECTIVE

The in-person workshop (same as the workshop described above) will aim to capture any disagreements with the utilities on the conditions influencing each choice. The non-utility, government stakeholders will include:

- Two national-level stakeholders, one each from the Ministry of Water, Sanitation, and Irrigation and WASREB.
- Six county government stakeholders, one per county such as the county water department head/ assemblies.

The community stakeholders will include:

- Six civil society organizations/ household or community association representatives, one per utility.
- Six water vendor representatives, one per utility.

[13] 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 aned Segal 2015).

During the workshop, we will gather data on the perspectives (agreements and disagreements with the utility) 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). Members from FSG or the research team seated within these group will only observe (not participate in any manner) and take notes to capture any agreements, 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 conducted after the workshop will aim to validate conditions stated by the utilities and add any new conditions from their perspective, which utilities did not state in the virtual IDIs, 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., vendors 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 IDIs with utilities. The broad areas of inquiry will include the following questions 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.

If required, the research team will follow up with targeted short interviews with utility stakeholders while in the field to gather their responses and perspectives on additional conditions stated by the community stakeholders.

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 an initial list of the conditions influencing each choice. For each choice, we will compare conditions for:

- For "why": utilities that implemented transitions vs. those that did not.
- For "which": transitions to facilitated markets vs. those to managed.

- For "where": settlements where transitions were implemented vs. where they were implemented but withdrawn vs. those that were considered but where they didn't get implemented.

We will also understand how the conditions may vary by different utility archetypes, if the data suggests differences between them (e.g., for higher-ranked vs. lower-ranked utilities).

To develop an initial view of the conditions influencing the choices, we will use the data from the initial survey and the virtual IDIs with the utilities. We will conduct a hybrid approach involving deductive coding to capture conditions that fit into broad pre-determined categories, and inductive coding to understand if any new categories of themes emerge or existing categories should be collapsed.

- First, we will read transcripts from each virtual utility interview as we complete them, and capture themes of conditions for each choice. We will capture these themes 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 read the transcripts and review the themes generated by the first member, to reduce bias of only one person reviewing data, and see if there are any additional categories to be added or existing categories should be combined.
- Then, we will read transcripts from a second round of virtual interviews, with the utilities that we conduct them with, to refine what has already been captured.

Finally, we will validate and refine the initial list of conditions at the workshop to achieve theoretical saturation by gathering the collective perspective of multiple utilities. We will use the data generated from the workshop to finally refine the conditions (i.e., collapse conditions together, or re-order conditions). We will first read the data collected from the workshop and conduct the analysis. Our approach for capturing data will vary based on the different facilitation methods used, including:

- Listing additional conditions for each choice by reading through the sticky wall notes; and
- Assigning rankings and degree of importance to each condition by reviewing inputs from the pairwise comparison and scoring activities.

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?*

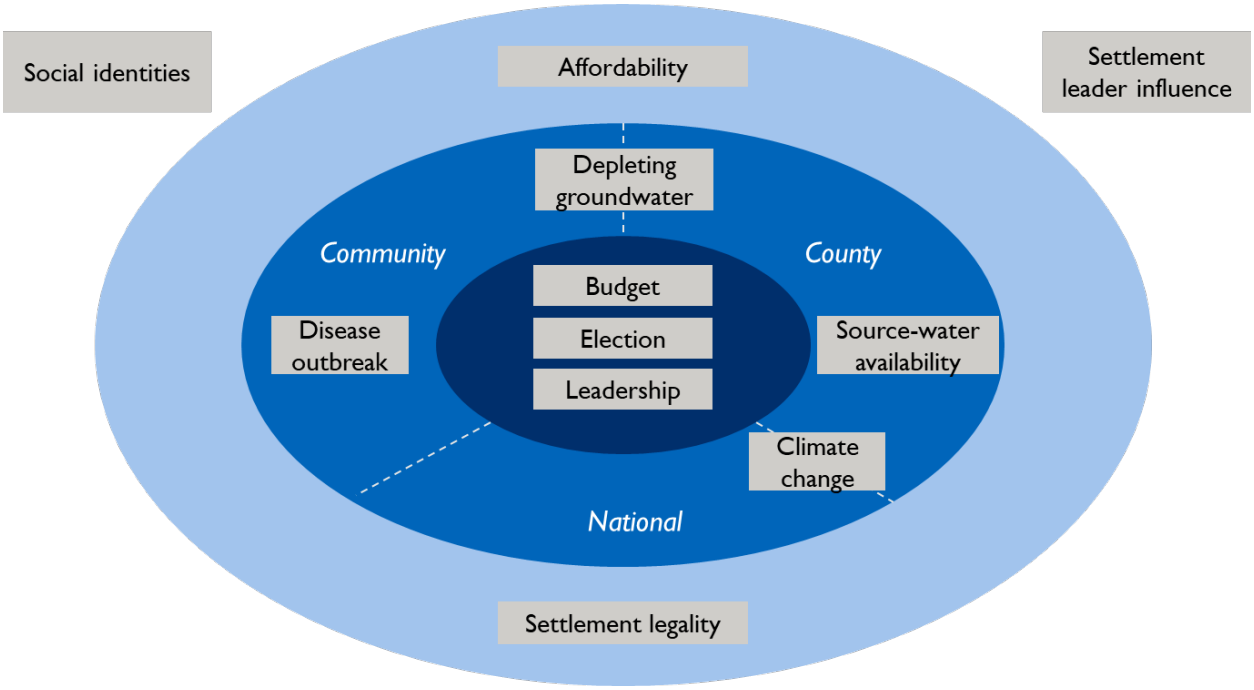
We will capture the perspective of non-utility stakeholders by categorizing conditions along four dimensions, which can be visually depicted using a conflict map (refer to Figure 5):

- Conditions validated by all stakeholders (dark blue circle in Figure 5).

- Conditions where utility + a few stakeholders agree (medium blue circle in Figure 5), with conditions agreed on by two stakeholders mapped between them (e.g., national and county agreed with the utility on climate change being a condition).
- Conditions where no stakeholder agrees with utility (light blue outer circle in Figure 5).
- Additional conditions not stated by utility but stated by community representatives (outside the map in Figure 5, e.g., social identities).

The conflict map will be produced for each of the three choices (why, which, and where) made by the utility, with the conditions mapped along the four dimensions (refer to Figure 5):

Figure 5: Indicative conflict mapping[14]



We will capture if different stakeholders (i.e., national, county, community) agreed or disagreed with the utility's stated conditions by reading:

- Notes from the observer 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 transcripts and develop categories using the same steps as detailed above to produce the initial list of conditions.

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[14] We may take additional cuts for the conflict map (e.g., separating community leaders and vendors) if required, to understand which stakeholders provide what perspective on each choice.

5.0 RESEARCH QUESTION 2 – IMPLEMENTATION OF TRANSITIONS

5.1 OVERALL APPROACH

The aim of RQ 2 is to understand the implementation of transitions by utilities. It is framed around two lever-specific questions.

- What are the implementation processes for finding and engaging different types of water vendors, including for marginalized vendors? (player lever)
- What are the operational challenges and costs for utilities and vendors to implement WASREB's water vending guidelines? (rules lever)

Understanding processes to find and formalize vendors is important since most vendors operate hidden from the utility. Further, the challenges to finding them vary by type and perimeter of operation, and the challenges from the utility and vendor perspectives are currently unclear. During scoping conversations, several utilities referred to water vendors as being "amorphous" or "hidden" (HOMAWASCO, personal interview, 2023; KACWASCO, personal interview, 2023), and not wanting to be identified (GWASCO, personal interview, 2023). Borehole operators with a monopoly, working in a single peri-urban area may be easier to find but hard to engage, since they are worried about utilities controlling their businesses (KIWASCO, personal interview, 2023; NZOWASCO, personal interview, 2023). Even during the DMM initiation in Kisumu, issues of vandalism and non-cooperation were prevalent as existing water vendors felt their business was threatened when KIWASCO tried abolishing all illegal connections (WSP 2009). Cartels operating within dense low-income areas of cities can be hard to identify and resort to violence if utilities visit these settlements (HOMAWASCO, personal interview, 2023). Tanker trucks are mobile, and serve several settlements in a city, so may be hard to locate without a cooperative association (GWASCO, personal interview, 2023; KIWASCO, personal interview, 2023).

These challenges may be exacerbated for vendors from marginalized groups, who may not have the same resources or opportunities to engage with utilities. Stakeholders indicated during the co-design workshops that some groups of marginalized vendors may exist (e.g., women-led enterprises, vendors who need to rent equipment), but were unclear on the kind of challenges they face in formalizing and engaging with the utilities. Literature mentioning marginalized vendors in the Kenya water sector is also rare, and those that do, do not offer insight into their experiences (Sarkar 2020; Mugeni 2023). Further, there is a lack of understanding of the impact of intersectionality and cross-cutting inequalities in the water, sanitation, and hygiene (WASH) sector, both globally and in Kenya (Smiley and Stoler 2020).

Understanding the challenges associated with implementing WASREB guidelines is important because utilities cite lack of capacity to do so. However, WASREB lacks a nuanced understanding of the challenges (e.g., skills, costs, resources, etc.) that the utilities face, and is keen on understanding the kind of support utilities require to address these challenges. As noted in Section 2, literature too, highlights a need to understand costs faced by the utilities in monitoring vendors. Further, stakeholders (utilities and non-utilities) at the co-design workshop sought to understand the impact of compliance on the viability of the vendors, since this can also be a challenge for implementation. For example, licensed tanker truck operators in the co-design workshop highlighted needing to pay higher prices when sourcing water from the utility rather than procuring from informal sources. Similarly, other stakeholders such as the WWDA and local implementing programs indicated the importance of understanding whether licensing can occur without impacting vendors' viability. In Nairobi too, the Nairobi City Water and Sewerage

Company's initiative to contract kiosk operators highlighted the need to protect the kiosk operators from policies or actions that could render their businesses unprofitable (McGranahan et al. 2006).

The overall approach for RQ 2 will be a combination of retrospective and prospective research. Retrospective research will involve understanding the implementation processes for engaging water vendors and implementing the WASREB guidelines under on-going transitions by conducting:

- Thematic analysis of the operational requirements and challenges faced in implementing the processes.
- Financial analysis for the costs involved in implementation involving understanding:
  - Costs incurred by utilities for implementation.
  - Impact of compliance on the viability of the water vendors, by developing their profit and loss (P&L) statements for pre- and post-transition.

Prospective research will involve understanding the processes implemented by the utilities for the new transitions that they implement, for comparison to the processes implemented for on-going transitions.

5.2 STUDY SITES

The study will be conducted with two utilities that are already implementing transitions and have plans for future transitions—KIWASCO (and Kisumu county government for one peri-urban area) in Kisumu and HOMAWASCO in Homa Bay. These utilities were shortlisted after scoping conversations with eight utilities, since they were the only two utilities that had and have planned (with meaningful progress) transitions with water vendors. Table 3 provides details of the known transitions implemented or planned by the two utilities.

Table 3: Transitions for study by shortlisted utilities

Utility	City	Transition details (each row represents a transition)			
		Settlement	**Transition status**	**No. of vendors**	**Transition details**
KIWASCO	Kisumu	1 peri-urban area (Ahero), with a population of ~15,000	Started (2021)	1 (as of 2023)	**Unregulated to facilitated:** Capacity building support for borehole operator from the utility but no further guidelines for enforcement or infrastructure provision
		1 peri-urban area, with a population of ~15,000	Planned (early 2024)	1 (planned)	**Unregulated to facilitated:** Capacity building support for borehole operator from the utility but no further guidelines for enforcement or infrastructure provision
		Multiple dense low-income areas with population ~20,000	Started (~2018)	Multiple (as of 2023)	**Unregulated to managed:** DMM with cartels, involving provision of bulk water, through contracts which included tariffs for customers and monthly monitoring through evaluation reports

Utility	City	Transition details (each row represents a transition)			
		Settlement	**Transition status**	**No. of vendors**	**Transition details**
HOMAWASCO	Homa Bay	Multiple settlements across the city with population less than 5,000	Started (2023)	~10 (as of 2023)	**Unregulated to facilitated**: Provision of licenses for tanker trucks to operate with guidelines on sourcing water, but no infrastructure support.
		Dense low-income area with population ~10,000	Planned (early 2024)	1 (planned)	**Unregulated to managed:** DMM with cartel, involving provision of bulk water, but rules are currently yet to be defined

5.3 DATA COLLECTION PLAN

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

- In-person IDIs with utility staff, and formal and informal vendors across the different types (e.g., borehole operators, tanker truck operators, and vendors that are members of a cartel, etc.) with whom transitions are being implemented (refer to Table 4 for information on sample). For transitions that are already implemented, we will gather data from these respondents in two rounds. For planned transitions, we will speak to them only in the second round after transitions have started. The FSG team will conduct these IDIs with translation support from a local research agency.
- Secondary data sources such as utilities' financial statements for costs, WASREB guidelines and vendor contracts for details on guidelines, utilities' logbooks on compliance data, and vendors' logbooks and financial records (where available).
- Narrative inquiry interviews with five or more informal vendors from marginalized groups, for targeted research on the impact of marginalization and/or stigmatization for accessing formalization opportunities, conducted by Iris Group.

Table 4: Sample and respondents for IDIs

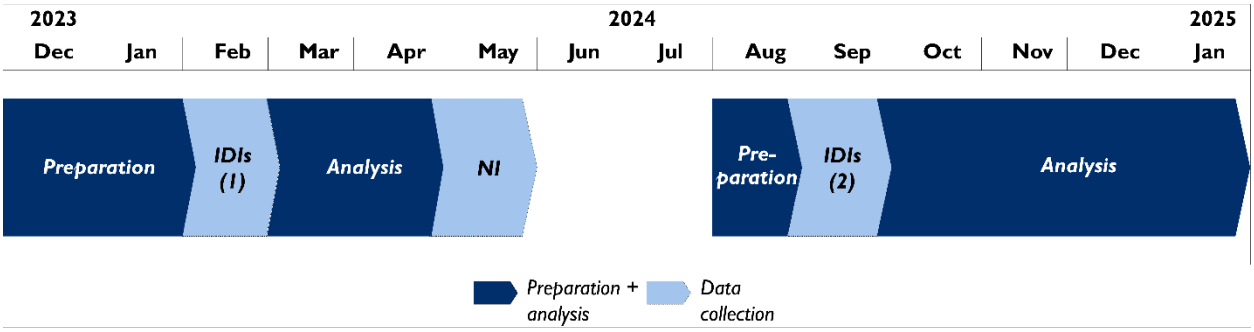
Respondents	Sample		
	Kisumu	***Homa Bay***	***Total***
Utility staff	**2**	**2**	**4**
Formalized vendors	**2** *borehole operators* **2–4** *vendors within a cartel*	**4–5** *tanker truck operators* **2–4** *vendors within a cartel*	**~10**
Informal vendors	**5** *across borehole operators and members of cartels*	**5** *across tanker truck operators and members of cartels*	**10**

Notes:

- *For the cartels with multiple vendors, we will interview the vendors within each cartel for this research. While utilities noted that cartels are unwilling to engage with them, they stated that the cartels are willing to talk to researchers.*
- *For informal vendors, we will sample a total of 10 across both periods. The sample in each will be based on when utilities, vendor associations (where available), or community leaders are able to connect us.*

The timelines for the activities mentioned above are summarized (light blue) in Figure 6. The activities are detailed in subsequent sections.

Figure 6: Timeline for RQ2 data collection and analysis



Acronyms: IDI: In-depth interviews.

5.3.1 UTILITY DATA

For the in-person IDIs, we will gather data to establish the processes and associated costs for engaging and implementing guidelines for vendors. The profile for data collection will include:

- Managing director/head of commercial services of utility or county water department head (for the transition they are implementing); and
- Low-income area, revenue, technical, or marketing department heads.

These interviews will be conducted with a mix of semi-structured and structured sections.

- The structured questions will largely focus on gathering data on the awareness and implementation of the WASREB guidelines (shared on a separate sheet, in a survey-like format), and the costs associated with implementing processes for vendor engagements and monitoring.
- The semi-structured questions will gather data on the processes for identification and engagement, and monitoring and compliance, and challenges associated with the same.

The detailed instrument, along with survey sheets for understanding awareness and degree of implementation of guidelines, is provided as a supplemental document (titled Appendix 2_RQ2 Utility Interview), and the broad areas of inquiry (across sub-RQs) are provided below.

- Background and experience of the respondent within the utility.
- Processes followed and choices made along the engagement journey for each transition.
- Awareness and degree of implementation of WASREB guidelines.
- Processes followed and challenges for implementing and enforcing WASREB's guidelines, and their perception of water vendor compliance.

We will also supplement this with utility monitoring logs, for details on compliance data and financial data on costs involved in implementing the guidelines, where they exist.

5.3.2 FORMALIZED VENDOR

For the in-person IDIs, we will gather data from vendors 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 in both retrospective and prospective research:

- Four to five tanker truck operators in Homa Bay (out of a total of ~10–12).
- One borehole operator in Kisumu's Ahero peri-urban area (out of a total of one).

- Two to four vendors within the cartel in Kisumu (total number to be determined).

In addition, in the prospective phase, we will also interview vendors for the transitions that start in early 2024, including:

- Two to four vendors within the cartel in Homa Bay (total number to be determined).
- One borehole operator in Kisumu's peri-urban area (out of a total of one).

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 vendors within the transition, including their stated levels of compliance with guidelines.
- The structured questions will gather financial data to develop their P&L statements. We will ask the vendors 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 Water, Sanitation, and Hygiene Partnerships and Learning for Sustainability (WASHPaLS) enterprise viability study (WASHPaLS 2021; WASHPaLS 2022).

The detailed instrument is provided as a supplemental document (titled Appendix 3_RQ2+3 Formalized SLP Interview), and the broad areas of inquiry (across sub-RQs) 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 RQs 2 and 3 (detailed in Section 6.0) for vendors.

- Background of the vendor's journey and work, and reasons for engaging with the utility.
- Their perception of the engagement process.
- Their stated degree of implementation and challenges for compliance to guidelines.
- Financial data including revenue and costs (costs of goods sold [Fernando 2023]) and operating expenses), for last year and the year preceding transition.

5.3.3 INFORMAL VENDORS

For the in-person IDIs with informal vendors, we will gather data to understand their experiences of interacting with the utility (if at all), and reasons for dropping off. We will conduct this interview with 10 informal vendors in total, across the two cities. The informal vendors will be purposively sampled to reflect the same types (i.e., tanker trucks, borehole operators, and cartel members) as the formalized vendors, since the transitions we are studying target a specific type of vendor. The aim is to compare the experiences of formal versus informal vendors under each transition.

The IDIs will be conducted in a semi-structured format, with open-ended questions and targeted probes (developed during 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+3 Informal SLP Interview), and the broad areas of inquiry (across sub-RQs) are provided below:

- Vendors' background, journey, and work.
- For vendors who never interacted with utilities: Whether they know of the possibility to engage with the utility and reasons for not having done so.
- For vendors who started interactions 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 vendors:
  - Their perspectives on what has changed for them and in the market since the transition, with probes on whether level of interaction within vendor networks has changed.
  - Questions to determine if marginalization played a role in them not engaging with utility.

Additionally, we will conduct narrative inquiry with informal vendors from marginalized groups to understand how marginalization prevented their formalization. We will aim to understand their experiences of engaging with the utility and how marginalization shaped their experiences. We will identify the marginalized groups based on information that emerges from the interviews with informal vendors and select our sample from that group. The sample will aim to include vendors across three groups—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.

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

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 vendors, 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 vendors' experiences regarding their engagement with the utility over the past XX[15] months, including
  - Differences compared to other vendors 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 of how formalizing might make a difference for them and their ability to provide services, if any.

5.4 ANALYSIS PLAN

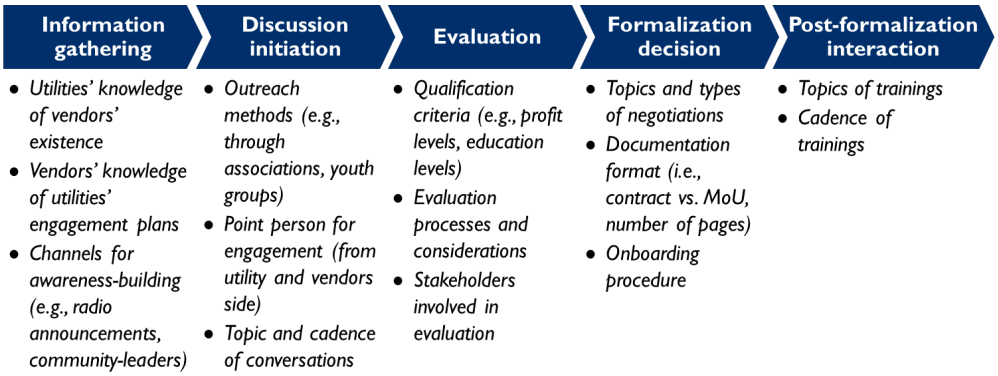
5.4.1 IDENTIFICATION AND ENGAGEMENT

Question: *What are the implementation processes for finding and engaging different types of water vendors?*

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

We have developed a set of hypothesized engagement journey stages (refer to Figure 7) by adapting a typical consumer buying process journey.[16] Through deductive thematic analysis,[17] we will produce an engagement journey map that describes the processes used by the utility to engage vendors. We will produce this map for each transition (i.e., each type of vendor engaged) by each utility. The engagement journey map will include the key stages involved and the key activities conducted in each stage. We may produce different maps for each stakeholder under each transition (utility, formal vendor, and informal vendor) if their perspectives on the stages are significantly different from each other. If we identify significant differences, we will aim to understand reasons for the same.

Figure 7: 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 vendors and informal vendors, and documented data from utilities (e.g., logbook on the dates, number of vendors, 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 stages (refer to Figure 7), capturing activities that do not fit in these, separately as "additional stages."
- Post all the data collection, we will read through the notes, to identify the different 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 to understand the challenges faced, decisions made, and motivations to engage with each other (or not), through a deductive thematic analysis.

- For utilities, we will understand the operational challenges mentioned for each of the stages and compare them across the transitions they implement (e.g., for Homa Bay we will compare their engagement experience with tanker truck operators vs. with vendors that are members of cartels).
- For formal vendors, we will understand their key decisions, challenges, and motivations to continue through each stage.

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[16] The consumer buying process journey map is a tool used by companies to understand the various stages of decision making a consumer goes through, with the aim of understanding the stages that are most successful and those that are in need of improvements (The Chartered Institute of Marketing 2023).

[17] Deductive thematic analysis because literature is 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 activities in the journey and the challenges at each stage.

- For informal vendors, 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 vendors, and informal vendors.

- 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 under "additional stages."
- Following data collection, we will read through the captured notes across different utilities and vendors, to identify themes of challenges, key decisions, and motivations for each type of vendor engaged by looking out for specific terms, such as:
  - In utility interviews: skills to engage, time required for the activities, resource availability, etc.
  - In formal vendor interviews: potential to increase customer base, benefits of being legal, etc., and challenges such as time or documentation required, etc.
  - In informal vendor interviews: benefits of legality, incentives from utility or other stakeholders, and challenges such as inability to produce documents, inability to meet eligibility criteria, unaware of engagements, etc.

Finally, we will also understand and compare the activities and processes within each stage through quantitative metrics including:

- Costs involved for each stage for both utilities and SLPs.
- Time taken to complete each stage for utilities and SLPs.
- Number of vendors that pass through each stage.

We will compare the above, by transition (e.g., for Homa Bay we will compare the costs and time involved for engaging with tanker truck operators vs. with vendors in a cartel).

To do this, we will capture data from the interview transcripts with utilities, formalized vendors, and informal vendors. 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 data collection to compare the metrics for different processes across both utilities and for different types of vendors.

Finally, for the identified marginalized vendors we will conduct a narrative inquiry analysis to uncover the role of external stigmatization (the negative attitudes, beliefs, and practices that are directed toward them 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 vendors' 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 vendors, to complement the data gathered through narrative inquiry. We will seek to identify:

- Stages of entering, continuing, and exiting water 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.

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. The GESI narrative inquiry research will allow for analysis of the individuals' lived experiences of intersecting inequalities during transitions.

5.4.2 GUIDELINE IMPLEMENTATION

> ***Question:*** *What are the operational challenges and costs for utilities and vendors to implement WASREB's water vending guidelines?*

For this sub-RQ, we categorized over 70 guidelines detailed by WASREB for water vending (WASREB 2019), in two steps, to reduce the challenges associated with capturing responses to 70 individual guidelines. First, we categorized guidelines into those that the utility implements and those that the utility is meant to enforce on the water vendors to implement. Then, we identified guidelines that need to be implemented one-time or an on-going basis by both, along the following categories (refer to Table 5):

Table 5: Categories of WASREB Guidelines

Category	Description
Utilities to implement	
Tariff setting	**On-going:** Defining and revising (as required) tariffs for each vendor type
Source water standards	**One-time:** Identifying and publicizing sources for procurement of water
Vendor collectivization	**One-time:** Setting up associations and assigning representatives for monitoring
Licensing	**On-going:** Licensing (including renewal) of vendors within their jurisdiction
Vendor monitoring	**On-going:** Ensuring vendors are following guidelines and adhering to licensing standards
Reporting	**On-going:** Reporting to WASREB on the status of and conflicts with (if any) vendors
Vendors to implement	
Business registration	• **One-time**: Receiving permits • **On-going:** Renewing permits
Equipment set-up	**One-time**: Setting up the technology and equipment to deliver water services
Collectivization	**One-time**: Joining a vendor association
Reporting	**On-going**: Reporting issues, maintaining logbooks on activities, and displaying of prices and hours of operations
Health and hygiene practices	**On-going**: Ensuring vendors' health and hygiene while handling water

Note: There are additional guidelines on practices to ensure water safety, which we will study as part of impact of transitions on vendors' water handling practices under RQ 3.

We will understand the degree of implementation, costs, and barriers faced to implementation for utilities. We will measure the degree of implementation by utilities for each category based on whether

they are aware of the guidelines in each category, and then understand the degree to which they implement each category. The analysis will involve:

- Capturing whether utilities are aware of the category of guidelines[18] during the IDIs with utilities.
- Capturing whether utilities are implementing the category at all (for one-time activities) or the frequency of implementation (for ongoing activities) during the IDIs with utilities.
- Measuring the proportion of guidelines implemented, and (for ongoing activities) comparing the utility's stated frequency with WASREB's proposed frequency after data collection.
- Identify common reasons across the categories under high-degree of implementation vs. those under low-degree of implementation, by looking at the costs and operational challenges involved (as detailed below).

We will measure the costs of implementing guidelines by utilities based on the (a) processes required in implementation; (b) time required on the activity (total time spent for one-off activities, and time spent per month/ year for on-going activities); (c) personnel required and the remuneration per person; and (d) any other costs incurred. The analysis will involve:

- Capturing data from the utilities for each of the above during the IDIs with utilities. For guidelines they are implementing, we will understand current processes and costs. For guidelines they are not implementing, we will understand their projected processes and costs.
- Compare the costs incurred across different transitions and compare costs for guidelines implemented vs. those that are not implemented after data collection.

Finally, for the guidelines not implemented by utilities, we will conduct a thematic analysis of their operational challenges. The analysis will involve:

- Capturing verbatim notes on the operational challenges stated by the utilities during the IDIs with utilities.
- Identifying common types of challenges stated (e.g., insufficient resources for utilities, or sourcing costs involved for procuring water) by reading the transcripts after data collection.

We will measure the degree of implementation by water vendors to the guidelines and understand the costs, and barriers faced by vendors. The analysis will involve:

- Capturing whether vendors are implementing the category at all for one-time activities during the IDIs with the water vendors.
- Capturing frequency of implementation (for all on-going activities) during the IDIs with the water vendors by:
  - For activities that need to be done regularly, capturing the proportion of the time it is practiced (e.g., out of every 10 times they source water, out of every 10 hours the tank is operational); and
  - For activities that need to be done discretely (e.g., providing reports, cleaning pipes), capturing the frequency of implementation (e.g., per month, per week).

[18] Given that the study has developed its own categories of guidelines, we will ensure to provide a condensed view of the guidelines within each category during the interview so that the respondents understand what guidelines the categories refers to.

- Measuring the proportion of guidelines implemented, and, for ongoing activities, comparing the vendor's stated frequency with WASREB's proposed frequency, after data collection.
- Comparing the proportion and type of guidelines being implemented by the vendor with those that the utility states as being enforced.

We will measure the costs of implementing guidelines by water vendors based on the (a) processes required in implementation; (b) time required on the activity (total time spent for one-off activities, and time spent per month/ year for on-going activities); (c) personnel required and the remuneration per person; and (d) any material (e.g., treatment chemicals, stationary) costs incurred. The analysis will involve:

- Capturing the costs for implementing guidelines for each of the above during the IDIs with water vendors. For guidelines they are implementing, we will understand current processes and costs. For guidelines they are not implementing, we will understand their projected processes and costs.
- Capture their current costs and revenues to deliver services during the IDIs, and capture data for each line item of revenues and costs on a template.
- Build the P&L statements for the vendors, and understand impact of compliance costs on vendors' viability after data collection by:
  - For guidelines already being implemented: Remove the cost from the current P&L statements and capture the change in the P&L.
  - For guidelines they do not implement: Add the expected cost of complying and capture the change in the P&L.

Finally, for the guidelines not implemented by the water vendors, we will do a thematic analysis of their operational challenges. The analysis will involve:

- Capturing verbatim notes for the operational challenges stated by the utilities during the IDIs with utilities.
- Identifying common challenges stated (e.g., not enough resources for utilities, or sourcing costs involved for procuring water) by reading the transcripts after data collection.

6.0 RESEARCH QUESTION 3 – IMPACT OF TRANSITIONS

6.1 OVERALL APPROACH

The aim of RQ 3 is to understand the impact of transitions on households, the practices of water vendors, and the resilience of services. It is framed around five RQs:

- What is the impact of transitions on access to formalized services in a settlement, including for marginalized households?
- What is the impact of transitions on affordability and perceived quality of water for households served by formalized vendors?
- What is the impact of transitions on the water handling practices of formalized vendors across water sourcing and provision stages?
- 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 for households (including from marginalized groups), affordability and perceived quality of services for households, vendors' practices, and resilience in Kenya.

Stakeholders at the co-design workshops emphasized the need to measure the consumption of water from formalized vendors as part of the impact study because households often have multiple sources of water, and the proportion they access from a licensed vendor is currently unclear. In Kisumu, households may use as many as five different sources, including additional sources such as rainwater during the wet season (Ayalew et al. 2014). In Nairobi, the middle- and low-income households typically have multiple sources (including self-sourcing) in an attempt to minimize costs (McGranahan et al. 2006).

Further, marginalized groups particularly face challenges to accessing drinking water, and the impact of transitions on them is unclear. The co-design workshops highlighted various marginalized groups, including women-led households, Muslim households, and ethnic and indigenous communities. Women-led households face generalized stigma associated with poverty, including drinking unclean water (Bisung and Elliott 2017; Mwangi 2017). More specifically, "sextortion"—the compulsion to exchange sex for water—is a documented phenomenon in Kenyan low-income areas that is a form of gender-based violence and externally stigmatizing (BBC 2022) and was validated as a common occurrence by stakeholders during the co-design workshop. Muslim households were cited, during the co-design workshop, as being more at risk of being impacted during water shortages, given they typically consume more water. Finally, ethnic and indigenous communities face discrimination and persecution (Mbadugha 2022) that needs to be explored as it relates to accessing WASH services. Currently, there is no evidence on the impact of transitions for access to formalized drinking water services for these marginalized communities.

Understanding affordability is important because current literature highlights that vendors may charge exorbitant prices (WASREB 2019; McGranahan et al. 2006). Utilities have also indicated that vendors

[19] We have 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 drinking water service delivery network, involving households, vendors 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 vendor networks, vendor and community networks, guidelines regarding safety of drinking water, etc.), and have the ability to innovate in order to solve problems in the face of shocks and stresses.

charge higher prices than the utilities. For example, in Homa Bay, tanker truck operators purchase water from the utility at ~Kenyan Shilling (KES) 80/m^3 and sell to households at ~KES 1,000/m^3; borehole operators charge KES 100–150/m^3, compared to the utility tariffs of ~KES 44/m^3 (HOMAWASCO, personal interview, 2023). Within Kisumu, before the DMM, the cartels were charging over 10 times the tariffs of the utility, and kiosk operators were charging between KES 3–5 instead of the recommended KES 2 per 20-liter container (Boakye-Ansah et al. 2019). While guidelines have been released to define tariffs for formalized vendors, the change in affordability for households accessing services from formalized vendors is currently not documented.

Water supplied by informal vendors has been associated with poor handling practices, being non-compliant for drinking water standards, and incidences of water-borne diseases (WASREB 2019; Ayalew et al. 2014; McGranahan et al. 2006; Hailu, Rendtorff-Smith, and Tsukada 2011). During co-design workshops, utilities raised concerns about the cleanliness of the infrastructure used by the informal vendors (e.g., of pipes and inside tankers of trucks) to deliver water to customers. Utilities are also concerned that the vendors source water from nearby streams and lakes, and do not invest in treating the water (BUWASCO, personal interview, 2023). The water quality issues led WASREB to detail nearly 10 pages of guidance on identifying risks and listing water handling practices for different types of water vendors (WASREB 2019). However, there is no evidence on whether there has been a change in the water handling practices of vendors post-formalization.

Finally, the topic of resilience is important to understand whether the drinking water service delivery systems can adapt to stresses. Globally, climate change and urbanization are risks to the continuity of provision of safe drinking water (UNICEF 2023; Hassan Rashid, Manzoor, and Mukhtar 2018). Data currently does not exist on the impact of transitions on the resilience of drinking water services, and if generated can produce valuable insights for the sector for future urban planning.

The overall approach for RQ 3 will be a combination of retrospective, prospective, and retrospective plus prospective methods to understand impact of transitions at different points in time relative to when they began:

- Retrospective research will involve gathering only historical pre- (i.e., the baseline) and post transition data for transitions that started in 2021.
- Prospective research will involve gathering real-time pre (i.e., the baseline) and post transition data for transitions that are planned.
- Retrospective and prospective research will involve gathering historical pre-transition (i.e., the baseline) and historical and real-time post transition data for transitions that started in 2023.

6.2 STUDY SITES

The research on impact will be conducted in four settlements in Homa Bay and Kisumu. These cities fall under the jurisdiction of HOMAWASCO and KIWASCO (or Kisumu county government in case of peri-urban areas), respectively, which are the same utilities we will study for RQ 2. These settlements were chosen as transitions were either implemented or are planned here (refer to Table 6).

The targeted research on marginalized groups will be conducted in two settlements: Ahero in Kisumu, and one settlement (with licensed tanker truck operators) in Homa Bay. These settlements were chosen because transitions started one to three years ago, and we can understand impact of these transitions, if any, retrospectively.

Table 6: Settlements for RQ 3

Utility	City	Settlement details		Transition details			Research method
		Settlement	Population	Status	No. of vendors	Type	
HOMAWASCO	Homa Bay	Shauri Yako, low-income area	~10,000	Planned (2024)	To be determined (multiple vendors in cartel)	**Unregulated to managed,** through DMM with cartel involving provision of bulk water, but rules are currently yet to be defined	Prospective
		Low-income area in city[1]	~10,000 - 15,000	Started (2023)	1–2	**Unregulated to facilitated,** with provision of licenses for tanker trucks to operate with guidelines on sourcing water, but no infrastructure support	Retrospective and Prospective
KIWASCO	Kisumu	Ahero peri-urban area	~15,000	Started (2021)	1	**Unregulated to facilitated**, with capacity building support for borehole operators from the utility but no further guidelines for enforcement or infrastructure provision	Retrospective
		One peri-urban area[2]	~15,000	Planned (2024)	1	**Unregulated to facilitated**, with capacity building support for borehole operators from the utility but no further guidelines for enforcement or infrastructure provision	Prospective

Notes:

1. *The licensing of tanker truck operators is being implemented city-wide. We will identify one settlement for study, served by one to two licensed vendors based on inputs from the utility.*
2. *Utilities are still finalizing the settlements for the transitions that haven't started yet (for prospective research).*

6.3 DATA COLLECTION PLAN

For the research on access, affordability, and perceived quality of water, 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 perceived water quality.
- Narrative inquiry with 42 marginalized households (~21 per settlement) for targeted research on how marginalization impacts households' ability to access formalized drinking water services, conducted by Iris Group.
- 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 changes in access to formalized services.

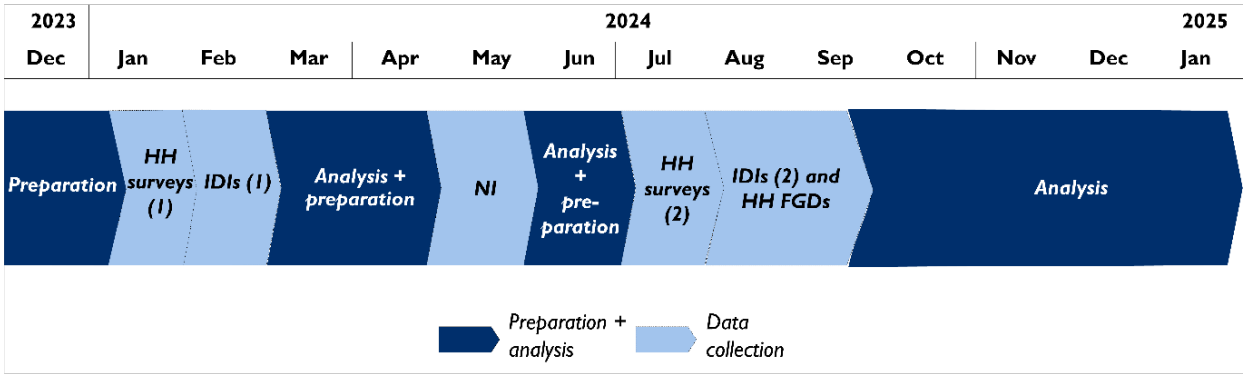
For the research on formalized vendors' water handling practices, we will gather data through in-person IDIs, conducted by the FSG team with translation support from a local research agency, with ~10 formal

vendors to capture changes in their stated water handling practices, and reasons for the change (e.g., utility trainings, enforcement processes, etc.) and ~10 informal vendors to capture their current practices for comparison for formalized vendors.

For the research on resilience, we will gather data from the vendors (formal and informal) and utilities as part of the surveys and interviews we are conducting with them under RQs 2 and 3 (refer to Table 8 in analysis plan for the data source for each indicator). Additionally, we will gather data from approximately four community leaders, one per settlement, through short targeted IDIs.

The timelines for the activities mentioned above are provided in Figure 8. The activities are detailed in subsequent sections.

Figure 8: Timeline for RQ 3 data collection and analysis



Acronyms: HH: Household; IDI: In-depth interviews; FGD: Focus Group Discussions.
Note: For planned transitions, we will do the household surveys post-implementation of transition around July 2024.

6.3.1 FOR ACCESS, AFFORDABILITY AND PERCEIVED QUALITY

The household survey will be conducted with a representative[20] set of households in each settlement where the respondent is the household member who purchases water, or the decision maker for matters related to water purchase, and also ask if they are best placed to provide information regarding volumes and pricing of water purchased. The sample for the household surveys will vary by period of data collection, by sub-RQ, and by research method (refer to Table 7).

[20] The research agency will employ the random walk methodology to ensure a representative sample. This will involve defining a starting point (e.g., west edge of the settlement) and using a predefined set of rules for the random walk to sample further households (e.g., every fifth household from the starting point).

Table 7: Sampling plan for household interviews

City	Settlement	Method	Sub-Research Question	Household surveys		Narrative Inquiry	FGDs
				Dec '23/ Jan '24	July '24	May '24	Aug/Sept '24
Homa Bay	To be determined	Retrospective + Prospective	Access	~50	~30	21	8–10
			Affordability and perceived quality	~10–50	~10–30	N/A	
	Shauri Yako	Prospective	Access	~50	~30	N/A	8–10
			Affordability and perceived quality	*None*	~10–30	N/A	
Kisumu	To be determined	Prospective	Access	~50	~30	N/A	8–10
			Affordability and perceived quality	*None*	~10–30	N/A	
	Ahero	Retrospective	Access	~50	*None*	21	8–10
			Affordability and perceived quality	~10–50		N/A	
Total distinct households				~200	~90	42	32–40

Acronyms: FGD: Focus Group Discussions.

In the first round of household surveys, we will:

- For the analysis on access: Randomly sample 50 households[21] in each settlement, across all research methods.
- For the analysis on affordability and perceived quality: Sample a sub-set of these that have used services from a formalized vendor post-transition in settlements where transitions have started (i.e., retrospective and retrospective and prospective methods). The exact sample will depend on the penetration of the formalized vendor in the settlement.[22]

In the second round of household surveys, which we will conduct for prospective and retrospective + prospective methodologies, we will:

- For the analysis on access: Sample a representative set of 30 households, from the sample of 50 in the first round (e.g., based on proportion of female vs. male headed households, source of water, etc.).
- For the analysis for affordability and perceived quality: Sample a sub-set of these that have used services from a formalized vendors post-transition (sample to be determined based on penetration).

The survey will be a structured quantitative survey, with the research agency asking questions verbatim, in a pre-defined sequence. It will involve 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 households' different suppliers of water, and the prices and perceived quality of these suppliers, pre-transition (i.e., the baseline market) and post-transition. The detailed instrument is provided as a

[21] The sample of ~50 households per settlement gives a 95 percent confidence interval with a 6 percent margin of error at the settlement level, assuming five members per household and the settlement population to be ~15,000

[22] If penetration of formalized vendors is low in the random sample, we will purposively sample a minimum of 10 per settlement. If penetration of formalized vendors is moderate to high in the random sample, we will sample as per the proportion in the random sample.

supplemental document (titled Appendix 6_RQ3 Household Survey) and the broad areas of inquiry (across sub-RQs) are given below.

- Qualification questions to ensure sampled respondent was the primary purchaser of water or decision maker for water purchase, 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 consumption, involving questions to establish the different sources and vendors, and volume of water consumed from (including proportion used for drinking), price paid to, and time taken to receive water from each vendor.
- Pre-transition consumption, with similar questions as for post-transition.
- Willingness to pay for drinking water from a formalized vendor.
- Perceived drinking water quality from formalized vendors, and all other vendors that household sourced water from pre- and post-transition.

For the interviews with marginalized households, we will gather data from 21 households per settlement, i.e., seven from each group identified through stakeholder consultations and the co-design workshops (refer to Table 7). These groups include women-headed households, Muslim households, and ethnic and indigenous groups. Narrative inquiry methods make no claim regarding a "representative sample"; instead the method allows for rapid acquisition of in-depth information that is then triangulated with existing literature. 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 drinking water 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 drinking water services from formalized vendors in the past XX[23] 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 drinking water services.
- Description of encounters, if any, with formal water vendors in the past XX months and their understanding and explanation of differences compared to others in the area.
- Events involving vendors, if any, that impacted their ability to access formalized services.
- Experience with service delivery prior to the past XX months.
- Expected changes differences if household had access to formalized drinking water services

For the focus group discussions, we will gather data from 8–10 households in one focus group discussion per settlement (i.e., ~32–40 households across four settlements in total) (refer to Table 7), including those who sourced drinking water from a formalized vendor post-transition and those who either did not source from a formalized vendor or significantly reduced sourcing from formalized vendors post-transition. We will also ensure that each group consist of at least three to four women-led households to ensure we capture any gender-related considerations involved in the purchase of water.

[23] This (and following) number(s) will be determined by time of transition for this settlement.

The specific composition and areas of inquiry for the focus group discussions with households will be determined after analyzing the data from the surveys.

6.3.2 FOR VENDORS' WATER HANDLING PRACTICES

For the IDIs with formalized water vendors, we will gather stated data on the changes in their water handling practices during sourcing, treatment, and distribution. We will speak to a total of ~10 formalized vendors across transitions already implemented, and planned transitions, including:

- Two borehole operators out of total two (one per settlement) in Kisumu.
- Two to four vendors within the cartel in one settlement of Homa Bay.
- Four to five tanker truck operators (out of ~10) in the second settlement for Homa Bay.

The interview will be conducted in a semi-structured format. We will have specific questions to capture data on the practices of the vendors, pre- and post-transition, and open-ended questions (with targeted probes developed emergently) to understand reasons for changes, if any. It will also focus on understanding whether they have changed any practices that affect affordability and the quality of water provided to households, whether they have seen a change in number of customers availing their services, or reductions in volumes purchased by customers, and reasons for these changes (if any). The detailed instrument is provided as a supplemental document (titled Appendix 3_RQ2+3 Formalized SLP Interview), and the broad areas of inquiry are provided below.[24]

- Changes in water handling practices as recommended for water safety by WASREB, including whether recommended practices for each stage are implemented, frequency of implementation, and processes, costs, and challenges to implementing practices.
- Changes to affordability or quality of water for customers, and reasons for the same.
- Proportion of, and reasons for customers significantly reducing their consumption from the vendor, if any.

For the IDIs with informal vendors, we will gather data on their current water handling practices during sourcing, treatment, and distribution. We will conduct this interview with 10 informal vendors in total, across the two cities. The informal vendors will be purposively sampled to reflect the same types (i.e., tanker trucks, borehole operators, and cartel members) as the formalized vendors, since the transitions we are studying target a specific type of vendor. The aim is to compare the practices of formal versus informal vendors under each transition.

The detailed instrument is provided as a supplemental document (titled Appendix 5_RQ2+3 Informal SLP Interview), and the broad areas of inquiry (across sub-RQs) will include the current practices implemented for water safety.

6.3.3 FOR RESILIENCE

We will gather all data for resilience from vendors and utilities through the interviews already mentioned for RQs 2 and 3, and there will be no separate tool developed for the same.

To gather data from community leaders, we will conduct a targeted semi-structured interview to understand the degree, frequency, and reasons for their interaction with utilities and the vendors. The

[24] Note that the sequencing of the questions in the instrument will be different from the areas of inquiry listed in this section, since the instrument combines questions for research questions 2 and 3 (detailed in Section 6.0) for water vendors.

instrument is provided as a supplemental document (titled Appendix 4_RQ2 Community Leader Interview).

The indicators for which we will gather data, and its source (i.e., the interviews) are provided in Table 8.

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, including for marginalized households?*

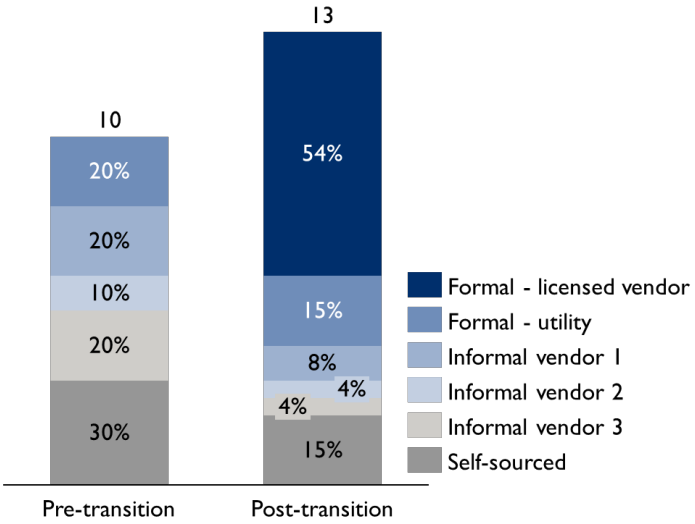
This study defines access as the proportion of a households' total water consumption that is sourced from formalized vendors, and their ability to do so in a timely and reliable manner.

We will measure the change in access within a settlement by comparing households' water consumption portfolio pre- and post-transition, to understand whether there has been a change in consumption from formalized vendors post-transition (refer to Figure 9). The portfolio refers to the split of the volume of water consumed in a month by a household, across the different sources from which the household receives the water:

- "Formal – utility" refers to any utility-owned source, piped or decentralized (e.g., kiosks).
- "Formal – licensed vendor" refers to any vendor who has been licensed by the utility (only applicable post-transition).
- Informal vendors 1–3 refer to any unlicensed vendor selling water informally.
- "Self-sourced" refers to when the household sources the water themselves (e.g., from river, lake, private boreholes, or harvesting rainwater).

We will produce three separate portfolios: one each for total consumption and for drinking water consumption. The sampling will provide a portfolio representative of the settlement's consumption with 95 percent confidence interval and a 6 percent margin of error.

Figure 9: Illustrative pre- and post-transition water consumption portfolio in a settlement (m³ per capita, per month)



We will build this portfolio for each household that we gather data from and then take an average (or median in case there are outliers in the data) across all the households in the settlement to create a single pre- and post-transition consumption portfolio for the entire settlement. The comparison will aim to determine if, and by how much, there is a shift in consumption to formalized vendors post-transition in the settlement.

We will also disaggregate the portfolios for different segments (e.g., by wealth quintiles, for male vs. female-led households) to determine if access to formalized sources varies by segments and understand whether there are seasonal variations to accessing formalized services post-transition.

To build the consumption portfolio for both, pre- and post-transition, for each household, we will carry out the following steps, which have been adapted from the method used for the Indonesia—Urban Water, Sanitation, and Hygiene (or IUWASH) Tangguh impact evaluation baseline conducted by URBAN WASH:

- Identify all sources and corresponding vendors the household uses to purchase water.
- Gather data on the volume they consume from each vendor:
  - For all non-metered sources: Gather total volume collected during the most recent trip based on capacity, frequency of trips, and number of containers used to fill water.
  - For metered sources: Gather data from their most recent water bill.[25]

[25] If the households are not able to produce a bill, we will ask them for the total volume consumed, billing period, and total amount paid in the last instance.

- Across both sources:
    - If water is used for drinking purposes, conduct a visual exercise where the household will be asked to split 10 rocks in the proportion used for drinking and non-drinking purposes.[26]
    - If water from any source is shared with the neighbor, ask the households to state broad proportion (less than half, half, or more than half) shared with neighbors, assuming the three categories as sharing 25 percent, 50 percent, and 75 percent, respectively.[27]

- Determine volume consumed per month from each vendor based on the frequency of sourcing for non-metered sources, and the billing period for metered sources.
- Calculate total volume as sum of volume from each vendor, and identify volume consumed from each vendor as a proportion of the total volume.
- Categorize the vendors as per the categories in Figure 9.

We will conduct this analysis on the data gathered through the household survey for this analysis. We will receive the data, pre-coded in Statistical Package for Social Sciences (SPSS),[28] from the research agency and we will review this every day or every two days (based on the cadence with which we receive the data) to monitor for errors or inconsistencies. Once we have a clean dataset, we will use descriptive statistics and codes in SPSS to conduct the analysis stated above and develop the portfolio as per Figure 9.

We will also determine the reasons for households' choices of vendors and their shifts in portfolios pre- and post-transition. We will do this in by:

- Developing early hypotheses of the reasons for households to choose different vendors through the household surveys. We will do this by asking households to select their reason for selecting a vendor from a pre-populated list of possible reasons (e.g., price, proximity, unavailability of other sources, etc.). We will analyze this data in SPSS using the same method as for the survey data to measure change in access.
- Understanding reasons in a more detail, through facilitated focus group discussions to understand why and how these reasons influence decisions. We will also compare the reasons stated by households that access water from formalized vendors vs. those that do not post-transition. We will do this by de-briefing as a team daily after the focus group discussions and comparing the team's notes (adding detail where needed) with transcripts from the agency.

We will also measure the proportion of households that significantly reduced their consumption from a formalized vendor post-transition, based on the research method employed.

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[26] This method has worked well for applications where households have to split a number into different proportions. For example, NORC conducted a similar activity for a project to estimate split of water consumed by the household vs. their neighbor (Millennium Challenge Corporation 2022), and USAID another project conducted a similar activity in Tanzania to estimate relative contributions of different household activities towards household income (Hess et al. 2017).

[27] Adding questions (like conducting the rock exercise) may give marginally more precision than the assumption of 50 percent but will add significantly more questions and a repetitive exercise for the household.

[28] SPSS is a statistical software platform that allows users to perform data entry and conduct quantitative analysis on the same.

For retrospective and prospective research, we will be able to do a real-time tracking of the reductions, since this is the only method where we will gather data at two points. We will measure this through household surveys by:

- Identifying households who stated a reduction in the volume consumed from a formalized vendor post-transition in the second round of data collection, compared to the first round.
- Calculating differences in their consumption between both rounds of data collection.
- Analyzing the data by coding and using descriptive statistics on the data received from the research agency.

For retrospective and prospective research, we will rely on vendors to share the proportion of households in each settlement that significantly reduced or stopped consuming water from them, since we will collect data from households only once post-transition. We will do this by:

- Capturing whether and how many customers started but eventually stopped or significantly reduced using the vendors' services post-transition, during the IDIs with the water vendors.
- Calculating proportion of the above in the vendors' total customers served, after data collection.

We will also understand the reasons for households reducing consumption. We will do this by understanding reasons (e.g., price levels, reliability of source, availability when needed, etc.) stated by households in the focus group discussions for deciding to stop using water from formalized vendors. We will analyze data gathered from the focus group discussions in the same manner as detailed for the analysis on reasons for households' portfolio choices, i.e., debriefing as a team daily post-focus group discussions and comparing notes with those gathered by research agency.

Finally, we will conduct narrative inquiry with the identified marginalized household groups. The focus will be on uncovering the role of external stigmatization (the negative attitudes, beliefs, and practices that are directed toward them 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) that may affect households' ability to access drinking water services from formalized vendors. We will also draw on from data from the household surveys (e.g., portfolios for women-headed or Muslim households), 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 drinking water service consumption from formalized vendors (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.

During narrative inquiry, we will gather the data through one-on-one interviews with heads of households, asking participants to relate their experiences of transitions (or absence of transitions) in a story-like format. Participants will be asked to describe events and encounters that have shaped their access to drinking water services, especially as they relate to formalization of services. 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, with specific attention to intersectionality, sextortion, discrimination, and stigmatization. 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 identified.

For affordability and perceived water quality

> ***Question:*** *What is the impact of transitions on affordability and perceived quality of water for households served by formalized vendors?*

We will measure the change in affordability and perceived quality within a settlement by comparing the two metrics for drinking water availed from formalized vendors post-transition with the general market prices (i.e., prices charged by other vendors in the market) and perceived quality for drinking water, pre-transition and post-transition. The sample of 50 households per settlement will give us a 95 percent confidence interval with ~6 percent margin of error for the prices and perceived quality of different suppliers for the market of drinking water in the settlement.

This study defines affordability as the price paid by households for formal drinking water services, relative to general market prices for drinking water, and benchmarks such as households' willingness to pay and total monthly expenditure. For changes in affordability, we will compare the price paid to a formal vendor for a typical volume of drinking water (e.g., per m^3, per 20-litre jerry can) to price paid to (a) other informal vendors post-transition; and (b) all vendor pre-transition. We will do the comparisons using averages or medians of prices, depending on the distribution of the data and outliers. We will also account for inflation in the Kenyan economy when comparing the data.

To better understand willingness to pay and change in affordability, we will also compare the price paid to a formalized vendor with two benchmarks:

- Willingness to pay for a typical volume of drinking water from a formal vendor.
- Households' stated monthly expenditure.[29]

Finally, we will disaggregate the data to understand the differential impact for different segments (e.g., top two vs. bottom three wealth quintiles,[30] male vs. female-led households) within each settlement.

This study defines perceived quality as the households' perspective on the taste, odor, and color and clarity of the drinking water they source from different vendors. The study uses this as a proxy for water quality in the absence of being able to conduct actual household-level sample testing. For changes in perceived quality, we will compare households' rating of the quality of water purchased from the formalized vendor to water sourced from other informal vendors post-transition and from any vendor pre-transition. For this analysis, we will gather data on households' rating of the quality of the drinking water along the three parameters: taste, smell, and color and clarity. The rating for each parameter will be done along a three-point scale (e.g., for taste 1 = unpleasant, 2=neutral, and 3 = pleasant).

For the analysis on affordability and perceived quality, we will use the data gathered through the household surveys. We will conduct the analysis on the sub-set that sources drinking water from a formalized vendor post-transition. As noted above for access, we will receive this data coded in SPSS

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[29] 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.

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

from the research agency, and we will monitor sub-sets of this data daily/every two days (based on the cadence we receive from the agency), to monitor for inconsistencies or errors. Once we have a clean dataset after data collection, we will use SPSS to conduct the analysis through descriptive statistics.

6.4.2 FOR VENDORS' WATER HANDLING PRACTICES

Question: *What is the impact of transitions on the water handling practices of formalized vendors across water sourcing and provision stages?*

We will understand the change in water handling practices by analyzing vendors' stated response on the degree to which they implement practices for maintaining water safety in each stage of the water service delivery chain. For the sourcing and storing/transportation and distribution stages, we identified practices recommended by WASREB in the water vending guidelines specifically targeted at ensuring water safety (WASREB 2019). For the treatment stage, the guidelines did not state specific practices, so we adapted these practices from WASREB's guidelines on water safety planning for utilities. We assume these practices apply only when vendors don't source water from the utility. Additionally, for the DMM, we have adapted practices from other water vending systems mentioned in WASREB's water vending guideline, given the lack of clarity for this system in the guideline document. These water handling practices are summarized in Figure 10 and a detailed list, by vendor type, is provided in Appendix 4.

Figure 10: Examples of recommended water handling practices by stage

	Sourcing and abstraction	**Treatment**	**Storing/ transportation and distribution**
	Standards for sourcing water and of pipes and pumps for abstraction	*Standards for use of chemicals for treatment, monitoring water quality, and use and maintenance of tanks and pipes*	*Standards for maintaining points-of-sale, frequent sterilization and cleaning of containers for storage/ transport*
For tanker trucks	• *Sourcing from designated spots* • *Cleaning hosepipes*		• *Using bright coloured containers* • *Keeping containers covered*
For borehole operators	• *Disinfecting hosepipes* • *Using casing along borehole length*	• *Use of Kenya Bureau of Standards approved chemicals* • *Replacing leaking tanks and pipes*	• *Cleaning kiosk floors* • *Disinfecting containers*
For delegated management model	• *Separation from animal and their excreta from abstraction points* • *Replacing corroded casings*		• *Using sterile pumps* • *Placing sale points away from contaminated sites*

Note: For the DMM, we will understand during data collection whether the vendors receive bulk, pre-treated water from the utility. If this is the case, we will not ask questions regarding practices during the sourcing an abstraction stage for these vendors.

For the analysis, we will compare vendors' stated response for implementing practices post-transition to pre-transition practices by:

- Capturing post-transition and pre-transition practices in a template, along each guideline, during the IDIs with the water vendor.
- Comparing and identifying whether vendors have stated a change in practice.

- Comparing the practices stated by formal vendors to those stated by informal vendors.

For vendors 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 for changes. We will specifically look for themes such as licensing, training by utilities, and other activities under the transition while capturing data from the interview transcripts. For this analysis, we will use the data captured through IDIs with formalized vendors 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 data collection.

Finally, we will understand the impact of changes in practices on the vendors' viability. We will do this analysis in a similar manner to the viability analysis for guideline implementation under RQ 2. We will do this by:

- Capturing the costs for implementing practices during the IDIs with water vendors. For practices they are implementing, we will understand current processes and costs. For practices they are not implementing, we will understand their projected processes and costs.
- Understand impact of compliance on vendors' viability using P&L statements developed under RQ 2 after data collection by:
  - For guidelines already being implemented: Remove the cost from the current P&L statements and capture the change in the P&L.
  - For guidelines they do not implement: Add the expected cost of complying and capture the change in the P&L.

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 research period. We will measure the impact of transitions on three characteristics of the drinking water services market that indicate resilience:

- **Competition with rule of law**: Markets with lower concentration of power and rules for water vendors' service delivery will be more resilient as they are likely to have more suppliers and hence, a consistent supply of services meeting minimum standards during shocks.
- **Connectivity and cooperation**: Markets with avenues for interaction between, and representation from communities, vendors, and the utility will be more resilient as they allow the various actors to support vendors to continue delivering services during shocks.
- **Strength of business models and supply chain(s)**: Markets with viable vendors, and access to safe drinking water sources, and equipment for sourcing and distributing water will be more resilient due to an increased chance of suppliers remaining in the market and possibly fewer price fluctuations.

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 8. Based on the data, we will define the full range of scores and refine the scoring developed. For example, we will see whether quarterly utility and community association meetings are considered too frequent or too infrequent based on how often it takes place.

For this analysis, we will use data from multiple sources across RQs 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 8: Market characteristics and indicative scoring of indicators

Characteristic	Indicator	Rationale for indicator	Indicative scoring	Data source
Competition with rule of law	Number of vendors and distribution of market share (quantitative)	More vendors indicate continuity of services during shocks	• 4: Several vendors available with well distributed market shares, with a few formalized vendors • 1: Only 1 vendor available in a settlement.	IDIs with formalized vendors (Appendix 3_RQ2+3 Formalized SLP Interview Q54 for tanker truck; Q59 for borehole/DMM)
	Vendors' degree of involvement in deciding guidelines (qualitative)	Vendors having a say in guidelines improves the level of transparency and ease for formalization, ensuring more vendors formalize (and remain formalized during shocks)	• 4: Active involvement of vendors with some contract rules (other than those defined by WASREB) defined by them. • 1: Vendor having no discussions on the contract.	IDIs with: • Formalized vendors (Appendix 3_RQ2+3 Formalized SLP Interview Q24 for tanker truck and borehole/DMM) • Informal vendors (Appendix 5_RQ2+3 Informal SLP Interview Q10) • Utilities (Appendix 2_RQ2 Utility Interview Q19)
	Degree of implementation of and compliance with the guidelines (qualitative)	High compliance indicates continued supply of better and safer services (i.e., with adherence to set tariffs, and quality standards)	• 4: Vendors stating a high degree of compliance with most guidelines by WASREB. • 1: Vendors stating low compliance with most guidelines by WASREB.	• IDIs with Formalized vendors (Appendix 3_RQ2+3 Formalized SLP Interview Q33 – 51 for tanker truck; Q33 – 56 for borehole/DMM) • Utility logbooks on vendors' compliance
Connectivity and cooperation	Degree of activity within vendor network (qualitative)	A network between vendors provides support from different actors, for vendors to be able to absorb or adapt to shocks	• 4: An organized network of vendors (formal and informal), with activities/ information sharing every quarter. • 1: No interaction between vendors.	IDIs with: • Formalized vendors (Appendix 3_RQ2+3 Formalized SLP Interview Q34 for tanker trucks and borehole/DMM) • Informal vendors (Appendix 5_RQ2+3 Informal SLP Interview Q15)
	Interactions between	Interactions between different	• 4: Interactions at least once a quarter	IDIs with:

Characteristic	Indicator	Rationale for indicator	Indicative scoring	Data source
	vendors, community association and utility (qualitative)	stakeholders also helps with support from different actors, to respond to shocks	between the vendors, community association and utility. • 1: No interactions.	• Formalized vendors (Appendix 3_RQ2+3 Formalized SLP Interview Q34 for tanker truck and borehole/DMM) • Community leaders (Appendix 4_RQ2 Community Leader Interview Q3-7) • Utilities (Appendix 2_RQ2 Utility Interview Q25-27)
Strength of business models and supply chain(s)	Viability of vendors (financial data)	Having drinking water service delivery as a profitable business improves likelihood of them continuing service provision during shocks	• 4: Most vendors being profitable and water service delivery as a significant source of income. • 1: Most vendors unprofitable.	IDIs with formalized vendors (Appendix 3_RQ2+3 Formalized SLP Interview Q55 – 102 for tanker truck; Q65 – 129 for borehole/DMM)
	Sources of water for vendors (qualitative)	Having easy access to clean, utility-approved sources improves likelihood of improved services in shocks	• 4: Easily accessible treated water source, as stated by vendor. • 1: No access to treated water source.	• IDIs with formalized vendors (Appendix 3_RQ2+3 Formalized SLP Interview Q33, 49 for tanker trucks; Q60-123 for borehole/DMM) • Secondary data
	Access to sourcing/storing equipment and repair services, and treatment facilities (qualitative)	Access to equipment and repair services improves likelihood of sourcing required items to continue service delivery during shocks	• 4: High access, as stated by vendor. • 1: Negligible access, as stated by vendor.	IDIs with formalized vendors (Appendix 3_RQ2+3 Formalized SLP Interview Q52 for tanker truck; Q57 for borehole/DMM)

7.0 DATA MANAGEMENT PLAN

7.1 ETHICAL CLEARANCE AND HUMAN SUBJECTS PROTECTION

Kenya requires all research to be cleared by National Commission for Science, Technology & Innovation (or NACOSTI). Our local research agency has confirmed that they have the required permit for any data collection activity they conduct. We can use this permit since they will conduct the household surveys and focus group discussions, and they will accompany us for all the in-person IDIs.

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 the contract with them 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 RQs 2 and 3), we will seek Institutional Review Board (IRB) approval in Kenya 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 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 differently across the two broad types of data collection activities planned:

- Household surveys conducted by the research agency.
- In-depth interviews 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):[31]
  - Explain the research instruments along with the purpose of each section.

[31] 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.

  - Conduct simulated surveys for different kinds of research methods for settlements.
  - Run pilots of surveys and refine the survey question (including updating wording in translated versions) based on learnings from the field.

- 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 of transition).
  - 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 WORKING GROUPS AND RESEARCH PARTNERS

We have created two working groups at the national and regional levels to provide input into this implementation research. Table 9 lists the organizations that are part of the groups. The objective of creating these groups is to:

- Integrate the perspectives of diverse stakeholders that play a key role in decision-making in the water sector to ensure the relevance of the research.
- Build ongoing buy-in from local stakeholders who can help ensure uptake of the findings from the research.

The national-level steering committee[32] has representation from government agencies, ministries, research organizations, and sector funders. The regional-level advisory group has representation from water service providers, county governments, water vendors, community leaders, government agencies, and local implementation programs in the western Kenya region (primarily from Homa Bay and Kisumu). The members of the two groups were identified during the scoping trip conducted in April 2023 through recommendations from WASREB, the national regulator, the water service providers, and USAID / Kenya and East Africa (KEA).

Table 9: National and regional group members

Category	Organization
National-level steering committee	
Government	WASREB
	Ministry of Water, Sanitation, and Irrigation
	Water Resources Authority
	Council of Governors
	Water Sector Trust Fund
Local, non-government	Water Service Providers Association
	Kenya Water Institute
	Kenya Water and Sanitation Civil Society Network
Funders	USAID/Kenya and East Africa
Regional-level advisory group	
Water services providers	HOMAWASCO (in Homa Bay)
	KIWASCO (in Kisumu)
Government	Homa Bay County Government
	Kisumu County Government
	Lake Victoria North Water Works Development Agency
	Lake Victoria South Water Works Development Agency
Programs	Water and Sanitation for the Urban Poor – Kisumu

[32] In Kenya, URBAN WASH is calling the Technical Working Groups as "national level steering committee" and "regional-level advisory group" based on local input on terminology.

Category	Organization
	USAID Western Kenya Water Project
Household representatives	From Homa Bay
	From Kisumu
Water vendor representatives	From Homa Bay
	From Kisumu

We convened the national and regional groups for co-design workshops on July 25 and 27, 2023, respectively. Their inputs on the research design were incorporated while finalizing the analytical and research approaches for each of the three RQs.

Going forward, an engagement manager from Nairobi will be leading the formal and informal interactions with the working groups' stakeholders, with support and guidance from the research teams. Based on inputs from the engagement manager, we will develop dissemination materials in formats most suited to generate interest and uptake from local stakeholders.

We will formally engage the members (through the engagement manager) quarterly during the research through in-person meetings in Nairobi for the national-level steering committee members and in western Kenya for the regional-level advisory group members. We have spread out each engagement over multiple months to provide flexibility in scheduling meetings with the members (refer to Table 10).

The members will also have access to a WhatsApp group for informal engagement, shorter updates, and updates on changes in local context or policy affecting research design or queries, which will be answered by the engagement manager. We will also supplement this with shorter messages/e-mails for those who may not be allowed to communicate regarding work over WhatsApp.

Additionally, the engagement manager will help prepare our research partners for the research. These partners will also include utilities that are only part of the sample for RQ 1, and as such, are not part of the working groups. The first such engagement is scheduled for October/November 2023.

Table 10: Engagement with working group members and research partners

Quarterly meeting date	Key content to present	Key inputs required
Research partners		
Engagement 1 – October/ November for all six utilities that are a part of RQ 1 (refer to Section 4.2)	Updates on the research plan and preparing them for RQ1 data collection activities	Respondents to sample and availability for RQ1 interviews and workshop.
Working group members		
Engagement 1 – January/ February 2024	Updates on the kick-start of research and broad research timelines	Recommendations on subsequent phases of data collection
Engagement 2 – April/May 2024	Early findings on the utilities' choice of transitions	Recommendations on support needed by utilities to implement transitions
Engagement 3 – July/ August 2024	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 RQs 2 and 3

Quarterly meeting date	Key content to present	Key inputs required
Engagement 4 – November/ December 2024	Early synthesis of the research	Generate recommendations on operationalizing transitions for utilities and ensuring buy-in from local stakeholders

8.2 ENGAGEMENT WITH NON-WORKING GROUP STAKEHOLDERS

The engagement manager will also use appropriate channels for enhancing buy-in of findings from local stakeholders who are not part of the working groups. This will include attending and presenting the research at various events. We have included an indicative list below of events or conferences we might consider:

- National WASH conferences/events, like:
  - Kenya Water and Sanitation Civil Societies Network forums.
  - Water and Sanitation Conference, organized by Water Service Providers Association.
  - Jomo Kenyatta University of Agriculture and Technology Scientific Conference.
- County level committee/ local government authority quarterly meetings, like:
  - County Budget and Economic Forums.
  - Lake Region Economic Bloc summit in member counties relevant for the study, including Homa Bay and Kisumu.
  - Quarterly County WASH Forums.
- Annual events with political leadership/ utility leadership, like:
  - Bi-monthly Managing Directors' for all water utilities in Kenya meeting.
  - Water Sector Working Group meetings.
  - County Water Ministers Caucus every two months.

The dates of the quarterly meetings with regional working group members in western Kenya may change marginally according to the dates of the conferences/ meetings (mentioned above), to ensure that both can happen during a single trip. In addition to the above, we will consider disseminating final findings through local partners who can present them over local community radio channels in the local language to increase the scope of informal/ community members also learning of it.

9.0 MONITORING AND EVALUATION

The research will employ monitoring, evaluation, and learning 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 11) to measure the results of the research and dissemination.

Table 11. 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 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

10.0 DELIVERABLES AND TIMELINE

10.1 DELIVERABLES

This research will lead to two categories of deliverables:

- **Cross-country reports:** Two cross-country reports that will integrate the analysis from Kenya with the implementation research in other countries. The two reports will focus on:
  - The choice of transitions (RQ 1).
  - The implementation and impact of transitions (RQs 2 and 3).[33]
- **Country-specific briefs:**
  - Study brief describing the overall research at the outset.
  - Research brief on the choice of transitions (RQ 1).
  - Research brief on the implementation and impact of transitions (RQs 2 and 3).

The audiences and objectives of these deliverables are summarized in Table 12.

Table 12: Deliverables

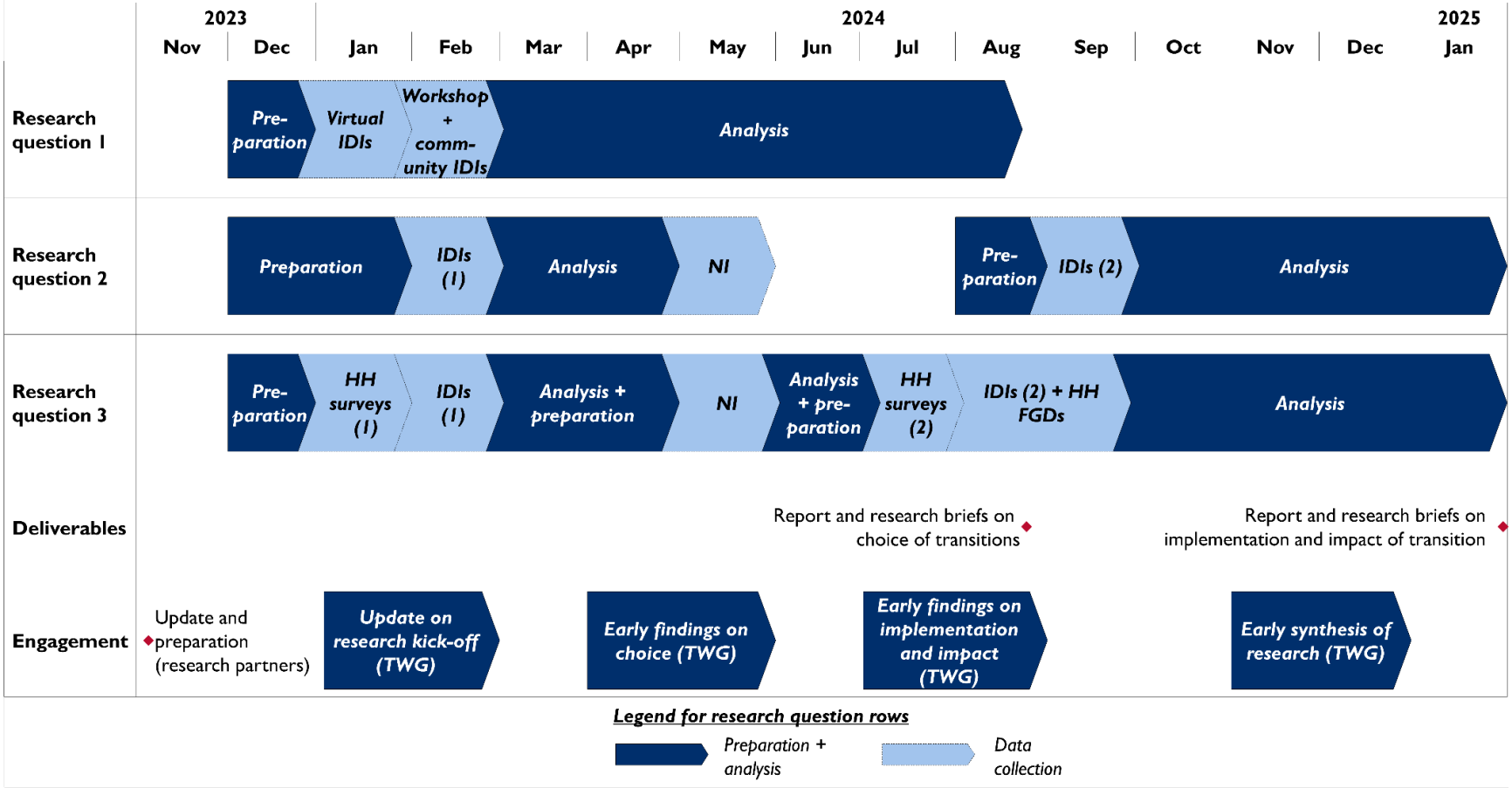
Deliverables	Audience	Objective
Cross-country reports		
Report on choice of transitions	National-level stakeholders in LMICs, including regulators, ministries, and funders	To provide guidance to plan for transitions at a macro level and nudge and support city-level stakeholders
Report on implementation and impact of transitions	Utilities, city-level stakeholders in LMICs, such as water departments in city/county governments	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 Kenya	To inform local stakeholders about the research activity
Research brief on choice of transitions	National-level stakeholders in Kenya, including regulators, ministries, and funders	To provide drivers and barriers to implementing transitions, specific to Kenya
Research brief on implementation and impact of transitions	Utilities, county-level stakeholders in Kenya, such as water departments in county governments	To provide guidance on implementation and impact of transitions, specific to Kenya

10.2 TIMELINE

The timelines of the research, deliverables, travel, and stakeholder engagement are summarized in Figure 11. Each RQ will involve data collection in phases, followed by synthesis and findings summarized in reports.

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

Figure 11: Timeline for research



Graphic acronyms: IDI: In-depth Interviews; HH: Household; FGD: Focus Group Discussions; TWG: Technical Working Group.
Note: The timeline does not include engagements with non-working group 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 Nairobi, we will coordinate events and working group meetings for efficiency and maximizing the value of each trip.

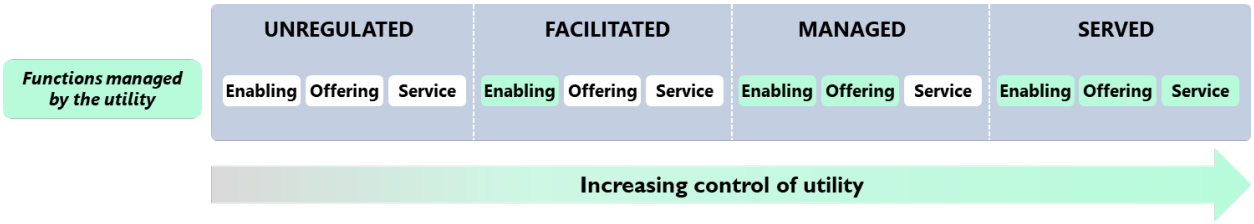
APPENDIX 1: FRAMEWORK FOR TRANSITIONS

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

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 12).

Figure 12: 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 sourcing of water; 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., delegated management models). 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 piped or decentralized systems for water services.[34] Utilities manage all the functions, including last-mile service delivery.

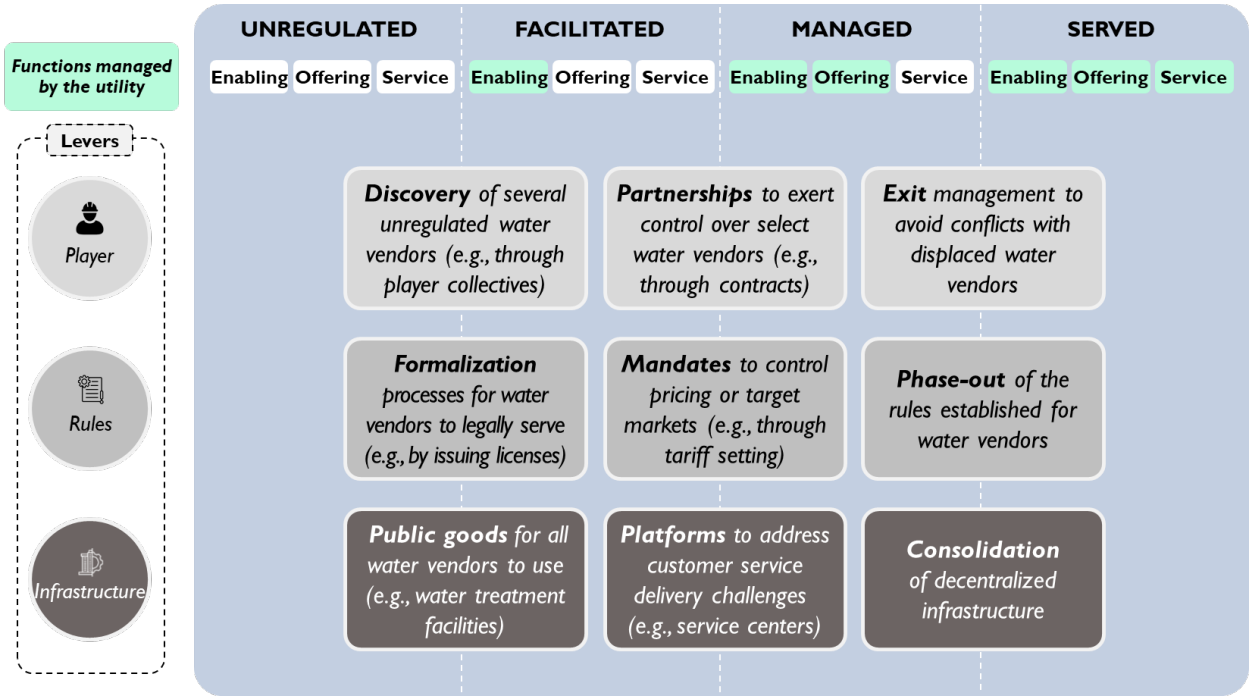
A utility's objective of engaging SLPs and implementing market transitions may not only be limited to expanding services. For example, utilities may want to monitor the activities of water vendors to reduce unsafe sourcing of water.

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 13).

Figure 13: URBAN WASH Market Transitions Framework



[34] Decentralized systems entail utilities providing water through non-piped means such as kiosks, communal standpipes, utility-owned tanker trucks, etc.

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, county, utility, or settlement level.

Table 13, Table 14, and Table 15 provide examples of these conditions mapped to the four administrative levels (where applicable).

Table 13: 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 water service provision • National guidelines defined for private water vendors' participation and formalization	• Between national level ministries for water service provision • Between national level ministries and county governments • Between national agencies and utilities	• Leadership changes through national elections or cabinet reshuffles leading to change in policies • Enforcement of new guidelines or acts	Ability of national level ministries and agencies to incentivize: • County governments to adopt guidelines for water service provision • County governments/ utilities to formalize private water vendors
County	Guidelines assigning jurisdiction and coverage targets for service delivery	• Within county-level water department • Between county-level water department and utilities • Between county-level water department and private water vendors	Leadership changes through county government elections which may lead to changes in capacities and willingness to formalize private water vendors	Ability of county governments to incentivize utilities to formalize private water vendors, and private water vendors to undergo formalization
Utility	Presence of guidelines for formalization of private water vendors	• Within utility administration • Between utility administration and private water vendors	Ownership change of utility due to privatization or change in government structures	Ability of utility to: • Incentivize private water vendors to undergo formalization by ensuring their viability • Identify and incentivize staff to stop engaging one- on-one with private water vendors/ cartels
Settlement	• Legality and the property rights of settlements • Settlement-level guidelines that define roles of community leaders, households, and private water vendors for water service provision	• Between households and utility • Between households and private water vendors • Between community leaders and political leaders	• Community-leadership changes through informal nominations or elections • Advocacy for improvements in water service provision	Ability of settlement leaders to incentivize: • County government/ utility to choose their settlements • Communities to adopt formalized water delivery sources

Table 14: 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		
County	• County government's budget allocated towards water provision as a percentage of total budget • Capital available to discover, engage and monitor private water vendors	• Skills of staff to set guidelines for formalization of private water vendors • Staff available to interact and provide support to utilities for transition • Staff available to discover, engage and monitor private water vendors (e.g., number of public health officers)	• Availability and types of water sources • Prevalent non-revenue water rates
Utility	• Capital available to make investments to extend service delivery • Capital available to discover, engage and monitor private water vendors	• Number of employees available to discover, engage and monitor private water vendors • Skills of staff to engage with private water vendors, define guidelines for them, and monitor their performance	• Availability of water treatment technologies • Availability of piped networks in utility's areas of supply and their safeguarding mechanisms • Prevalent non-revenue water rates
Settlement	• Average monthly household income • Community's payment default rates	• Number of private water vendors serving the settlements • Skills of private water vendors to operate viably (e.g., commercial viability, organizational structure strength, affordability of service)	• Quality of road and pipe networks within settlement • Types of water vending prevalent in the community

Table 15: 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		
County			
Utility	• Preference for specific groups of private water providers (e.g., based on social class) • Perception of private water providers (e.g., based on past experiences)	• Inclination towards environment protection (e.g., drought mitigation policy) • Prevalence of diseases at city-level	• Population levels and density of city • Inclination towards community causes (e.g., gender inclusion, community empowerment)
Settlement	• Presence of cartels in the community • Preference for specific types of private water vendors (e.g., borehole operators vs. tanker truck operator)	• Awareness of health effects of untreated water • Need for climate mitigation in water provision • Prevalence of diseases within settlement	• Population density and demography within settlement • Social characteristics (e.g., language spoken, religion) of households

APPENDIX 3: TRAVEL TIMELINES FOR DATA COLLECTION

Table 16 details the timelines and expected duration of travel for field data collection by the FSG and Iris Group teams.

Table 16: Travel for data collection

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

APPENDIX 4: WATER VENDING PRACTICES BY STAGE AND TYPE OF VENDOR

Stage/ vendor	Sourcing and abstraction	Treatment	Storing/transportation and distribution
Across vendors	Wearing bright-colored clothing		
Tanker truck operators	• Sourcing water from designated spots • Cleansing pumps and hosepipes • Mounting pumps and hosepipes on the vehicle to keep them elevated during water abstraction	• Using Kenya Bureau of Standards approved chemicals • Applying correct doses of water treatment chemicals • Storing treatment chemicals properly • Analyzing the quality of water regularly, before and after treatment • Scouring pipes and washing out in place for scouring the intake • Cleaning of treatment system routinely • Inspecting the treatment system regularly • Replacing leaking tanks and pipes	• Using bright-colored containers, and blue colored tanks with the words "CLEAN WATER" printed on them • Sterilizing pumps and hosepipes • Using containers with proper fitting covers • Keeping containers well-covered always • Cleaning, disinfecting, and inspecting water tankers • Using tanker only for potable water supply
Borehole operators	• Making borehole head work watertight and elevated • Using casing along the entire borehole length during construction • Replacing corroded casings from the borehole after inspection • Disinfecting hosepipes		• Disinfecting water tanks and containers • Keeping storage tanks well-covered always • Placing water kiosks away from contamination sources (e.g., disposal sites) • Cleaning Kiosk's floor and surrounding
Delegated management model	• Sourcing water from designated spots • Cleansing pumps and hosepipes • Mounting pumps and hosepipes on the vehicle to keep them elevated during water abstraction • Maintain separation from animals and their excreta while abstraction • Making borehole head work watertight and elevated • Using casing along the entire borehole length during construction • Replacing corroded casings from the borehole after inspection		• Using bright-colored containers • Sterilizing pumps and hosepipes • Using containers with proper fitting covers • Keeping containers well-covered always • Disinfecting containers • Using containers only for potable water supply • Placing water kiosks away from contamination sources (e.g., disposal sites) • Cleaning kiosk's floor and surrounding

Notes:

1. *We included only the measurable Water Services Regulatory Board (WASREB)-recommended practices/water vending guidelines.*
2. *Since the WASREB water vending guideline does not specify treatment practices for vendors, we have adapted these practices from WASREB's guideline on water safety planning for utilities. We assume these practices apply only when vendors don't source water from the utility.*
3. *Given the lack of clarity regarding the Delegated Management Model transitions' water vending system, we have adapted practices from other water vending systems mentioned in WASREB's water vending guideline.*

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