

CASE STUDY

Govern what exists

How Kisumu built a working system for pit emptying, and what other counties can take from it.

KISUMU, KENYA • 2026



A Kisumu pit emptying team at the Nyalenda treatment lagoons with a PitVaQ, a Gulper and a PuPu Pump.

PHOTO: OPERO SERVICES, 2026

10 years

FROM FIRST STANDARDS
TO A WORKING SYSTEM

82%

OF HOUSEHOLDS WITH A
FACILITY, ON-SITE

1,939 m³

MANUALLY EMPTIED
IN 2025

1,456

MANUAL EMPTING
JOBS IN 2025

A COLLABORATION BETWEEN



Eleven emptying groups carry sludge to the lagoons every day

Eleven formal pit emptying groups work daily in Kisumu's informal settlements, in areas no vacuum truck can reach. A formal group is one that empties safely and delivers what it collects to the official disposal point. Crews remove sludge from shallow, unlined pits using hand-operated pumps and long-handled scoops, load it into barrels, and carry it by pickup to the Nyalenda treatment lagoons, where KIWASCO, the city's water utility, receives it free of charge.

Private operators have done this work for years, with KIWASCO providing the disposal access, worker facilities, licensing framework and training that make it possible. Every Kenyan city has manual pit emptiers, but in Kisumu they are licensed, trained, equipped and vaccinated, and they have a wash bay and storage facility at the lagoons. Reaching that position took sustained engagement by the utility and the county government over several years.

Women work in the emptying teams alongside men. Pit emptying in Kisumu is treated as a job like any other, without the stigma reported in many other cities. KIWASCO regards this as one of the conditions that made the system possible.

Kisumu's Shit Flow Diagram, which measures how much faecal waste is safely managed, improved from 33% in 2016 to 61% in 2024. Improved containment accounts for most of that gain; emptying volumes account for a small part of it. The governance system extended safe emptying to households where containment alone is not enough, and set up the structure that further gains depend on.



Kenya's national figure for safely managed sanitation is 31.5% (JMP, 2022), but it measures household toilets rather than excreta flows and excludes shared facilities, which serve most of Kisumu's low-income areas. The two should not be read against each other.

"Kisumu works because KIWASCO doesn't try to do everything — it enables others to deliver."

KIWASCO, Majipreneurs Summit 2026

Every county in Kenya already has manual emptiers. Whether to bring them into the formal system is the question Kisumu has answered.

The people who do this work

Who they are

Eleven formal groups operate in the city, alongside 59 informal emptiers counted by KIWASCO. Groups are small private enterprises. Households pay them directly for each job.

The job

A crew empties a pit with hand-operated pumps or long-handled scoops, fills barrels on site, and carries them to a pickup. Around 1.2 m³ per job, with no entry into the pit.

Conditions

Teams are vaccinated and equipped with PPE. The depot at the lagoons provides a wash bay, store and shower. Women work in the teams alongside men.

THE CHALLENGE

A city shaped by water

Kisumu sits on the shore of Lake Victoria. The high water table means pit latrines fill fast, sometimes within weeks in the rainy season. In Nyalenda and Manyatta, houses are built wall to wall along narrow footpaths. Vacuum trucks need to be within 50 metres of a road, and around a quarter of households in low-income areas are further from a road than that.

96% of households in Kisumu have a sanitation facility and 4% practise open defecation. Of households with a facility, 82% use on-site sanitation and 18% have a sewer connection.

60% of the city's population lives in eight major informal settlements, where 85% of toilets are shared with a median of six households per facility and 62% of pits are unlined.

The LVWATSAN programme, at KSh 10.6 billion the largest water and sanitation investment in Kisumu's history, aims to raise sewer coverage from 18% to 45%. Even after that investment, more than half of households will still rely on on-site sanitation. Non-sewered sanitation will remain the main service model for most of Kisumu's population.



A PitVaq in a dense Kisumu settlement. Narrow access, corrugated iron walls, barrels filled on site. This is the reality vacuum trucks cannot serve.

PHOTO: OPERO SERVICES, 2026



The PuPu Pump at the Nyalenda treatment lagoons. Portable and petrol-powered, it can push sludge up to 70 metres through a hose, which allows a team to work at a distance from the nearest road. PHOTO: OPERO SERVICES, 2026

How the system was built

Kisumu's non-sewered sanitation system was not designed as a single programme. It developed from 2016 onwards through a series of regulatory, institutional and infrastructure decisions taken by KIWASCO and the County Government, each one building on what was already in place.

2016-17

Wrote the standards

WSUP worked with the County Public Health Office to develop the first Standard Operating Procedures for pit emptying, covering practices, equipment, transport, PPE and disposal. Practical Action trained two community-based teams and introduced the Gulper pump.

2018

Licensed the first operator

Gasia Poa, an existing solid waste company supported by WSUP, became Kisumu's first fully licensed FSM company. For the first time the city had both a written standard and a company licensed to work to it.

2019

Changed the mandate, and meant it

KIWASCO renamed itself from "Kisumu Water and Sewerage Company" to "Kisumu Water and Sanitation Company." The change of name was followed by operational steps: KIWASCO acquired two vacuum trucks, opened the Nyalenda disposal facility to manual emptiers free of charge, admitted research partners to its sites, and began coordinating with the County Public Health Office on emptier licensing.

2023

Began testing emptying technologies

The Gates-funded FSM Action Research Project started field trials in Kisumu, comparing the PuPu Pump, PitVaq, Gulper and Trash Pump against manual methods and vacuum trucks under working conditions. The trials recorded time taken, volumes emptied and the risks each method presented to workers.

2025

Built the worker depot and wash bay

A depot at the Nyalenda lagoons with an equipment store, wash bay, shower and toilet gave emptying teams somewhere to clean and store their equipment and wash themselves before going home. Teams were vaccinated and issued with personal protective equipment through the research project.

2026

Secured funding for treatment planning

KIWASCO obtained a grant of EUR 800,000 from the AfDB covering a feasibility study for a faecal sludge treatment plant, a climate vulnerability assessment for the city's sanitation infrastructure, and a sanitation zoning map. A truck was also bought for the emptying groups as a shared asset and is now in testing, with income from hire retained in a fund for its repair and maintenance. The remaining question for the emptying technologies tested since 2023 is how to embed them in routine operations.

None of this required large capital investment. The SOPs used existing county drafting processes and the licensing used existing regulatory channels. Disposal access was a policy decision rather than a construction project, and the depot is a modest structure.

What the 2025 data shows

KIWASCO's disposal site records for 2025 provide the clearest operational data available.

1,456

Manual and semi-mechanised jobs
delivered to disposal site

1,939 m³

Volume safely disposed
approximately 1.2 m³ per job

17,759

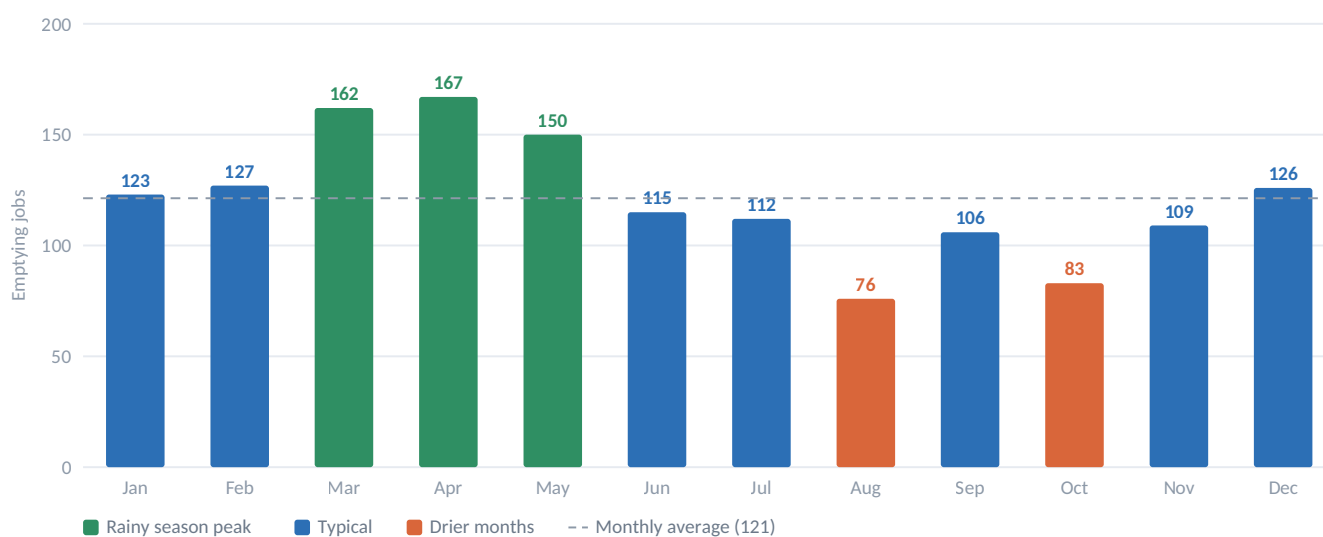
Vacuum truck jobs
146,592 m³, mostly septage

148,531 m³

Total volume received at the disposal site
faecal sludge and septage, all methods

Monthly pattern

Manual emptying jobs peak from March to May, when rain raises the water table and pits fill faster, and fall away in drier months. The pattern follows demand rather than the capacity of the emptying groups, which does not vary through the year.



Source: KIWASCO disposal site records, 2025. Total 1,456 jobs.

A note on the volume figures

By volume, formal manual emptying is 1.3% of what is delivered to the disposal site. The share is small because these are households vacuum trucks do not serve. Before the groups were registered, equipped and given disposal access, sludge from these settlements was buried on site, tipped into open drains, or discharged into waterways feeding Lake Victoria. Each of the 1,456 jobs took waste out of a dense, low-income neighbourhood and delivered it to a treatment site.

Informal emptying continues alongside the formal system, and KIWASCO counts 59 informal emptiers working beside the 11 formal groups. In a 2019 survey of Kisumu's low-income areas, 62% of households that had emptied their containment used an informal

emptier and 4% used a formal group, and none of that sludge reached the disposal site. The market has moved since 2019 and the formal share has grown, but it remains the minority share. The difference now is that a formal structure exists, so extending coverage means scaling a system that already works.

What has changed since 2019

The 2019 Aquaya study recorded the market while the system was still being built. Conditions have changed since, so the figures below are a starting point rather than a current picture.

	2018-19	2025-26
Formal emptying groups	3	11
Vacuum truck operators	8 trucks, 4 NEMA-licensed	17 companies, all NEMA-registered
Worker depot at the lagoons	None	Store, wash bay, shower, toilet

The same study found that households had not used formal manual emptiers mainly because they did not know the service existed. Of those who used one through the study, 84% said they would use it again and none intended to go back to an informal emptier, which suggests that awareness and price were the barriers rather than any objection to the service itself.



Exhauster trucks discharging at the disposal site. Vacuum trucks handle most of the volume; the manual teams serve the households they cannot reach.
PHOTO: OPERO SERVICES, 2026



A truck bought in 2026 for the emptying groups and held as a shared asset. It is in testing, and income from hire is retained in a fund for its repair and maintenance.
PHOTO: FSM ACTION RESEARCH PROJECT, 2026

The utility governs. It does not deliver

KIWASCO manages the system without employing most of the emptiers. Private enterprises do the emptying; the utility provides the regulatory and infrastructure conditions that let them do it safely.

The sludge journey



What KIWASCO provides

Standards and licensing

SOPs developed with the county. The Public Health Office enforces them. Workers vaccinated, PPE at 100%.

Disposal access

Treatment facilities open to manual emptiers free of charge. This is an in-kind subsidy, and the decision the rest of the system rests on.

Worker facilities

A depot at the Nyalenda lagoons with a wash bay, equipment store and shower.

Capacity strengthening

Solid waste training at the lagoons so operators do not clog the intake. KIWASCO staff attend operator safety and operations trainings. Communication with the groups is direct and continuous.

The utility works through partners

KIWASCO treats partner organisations as its delivery mechanism. The current partnership map covers containment (Sanergy/Fresh Life, Finish Mondial, Saniwise), emptying and transport (Gasia Poa, KIWIIP, Opero Services), and treatment and enabling support (Sanivation, WSUP, VEI, PSI, SDI, Waterworx). This has drawn investment and technical support to Kisumu over many years, and it has allowed external programmes to test their work and hand it over instead of running parallel operations.

THE INVISIBLE MAJORITY

Informal emptiers, unregistered and working at night, still serve a substantial share of households that empty their pits, and their sludge does not reach the disposal site. Bringing them into the formal system is the next stage of the work.

What the system costs the utility

KIWASCO's governance costs are modest: licensing coordination with the county, running the worker depot, training operators and leading CWIS planning. The utility does not subsidise emptying, which households pay for directly. Vacuum truck operators pay KSh 15,000 a month under the WASREB tariff. Manual and semi-mechanised emptiers dispose free of charge, which represents an in-kind subsidy from the utility rather than an absence of cost.

The treatment cost is larger and harder to see, because the Nyalenda ponds and the Kisat plant were built for sewage. Faecal sludge arrives thicker and more concentrated than they were designed for, and it carries solid waste that clogs the intake. Solids build up faster than they are removed, which cuts the working volume of the ponds and the quality of the effluent. At present this sits inside existing operations and is not budgeted as a subsidy. Putting a figure on it would let the utility and the county decide whether to keep carrying it, recover part of it, or fund it from elsewhere. It is also the strongest operational argument for a purpose-built faecal sludge treatment plant.

Who pays for what

	WHO PAYS	RECORDED AS A COST?
Emptying service	Household, directly	Not a utility cost
Licensing coordination	KIWASCO and county	Yes, staff time
Worker depot	KIWASCO	Yes, operating cost
Vacuum truck disposal	Operator, KSh 15,000 / month	Revenue to KIWASCO
Manual and semi-mechanised disposal	KIWASCO, free to emptiers	No, in-kind subsidy
Treatment of received sludge	KIWASCO	Absorbed, not separated

Setting the costs out in this way allows a county considering the same role to see what it would be committing to: a small recurring administrative cost, a bounded disposal subsidy, and a treatment cost that rises as collection improves.

Seven things Kisumu did that you can do

Kisumu's demand conditions are not universal. A high water table fills pits within weeks in parts of the city, which sustains an emptying market that other counties may not have. What transfers is not the market but the way it is governed, and these seven steps apply wherever emptiers are already working.

1 Start with standards, not infrastructure

The SOPs developed in 2017 cost very little and created the regulatory foundation. A county can set standards for safe emptying without capital expenditure.

2 Legitimise existing operators

Register, train, equip and vaccinate the workers already doing the job informally. This is faster and cheaper than creating new enterprises.

3 Open the disposal site

Free disposal for manual emptiers is the decision the rest of the system rests on. Without it there is no incentive to dispose safely. Treat it as an in-kind subsidy and budget for it: the cost moves to the receiving facility, and ponds not designed for faecal sludge will accumulate solids and clog unless solid waste is screened out. Pair the policy with operator training and an honest assessment of treatment capacity.

4 Work through an association, not with individuals

Kisumu's operators formed KIWIPI, a registered community-based organisation, which gives the utility and the county one counterpart to deal with rather than dozens of separate businesses. It also makes collective obligations workable: the emptiers manage their own discharge point at the lagoons and are jointly responsible for keeping it clear of solid waste, which protects the pond intake. An association is also the most practical route to informal emptiers, who are easier to bring into the system as a group than one at a time.

5 Provide basic worker facilities

A wash bay, storage room and shower cost a fraction of a vacuum truck and directly reduce occupational health risk.

6 Govern the system, let others deliver

Manage disposal access, coordinate licensing, maintain worker facilities, train operators, keep the door open to partners. Any Kenyan water service provider has the capacity to do this.

7 Plan non-sewered sanitation as permanent

Kenya's NAWASIP (2021) acknowledges that 60% of the population needs safely managed non-sewered sanitation. What Kisumu has built is what national policy now expects of every county.

The system works, but it is not finished

Kisumu is further along than most Kenyan cities, but three areas need continued attention.

The financial picture is incomplete

KIWASCO does not have a full accounting of what its non-sewered sanitation role costs, or a financing model for expanding coverage. A 2019 study by the Aquaya Institute surveyed 942 households in eight low-income areas and ran a real-money voucher trial with 646 of them. Fewer than 20% were willing to pay full market prices for formal emptying. The price gap explains why: informal emptiers charged KSh 1,000 to 3,000 per pit, against KSh 9,000 to 12,000 for a formal manual group and KSh 6,000 for a vacuum truck. The study estimated that closing the gap between what households would pay and what formal service costs to run would require a subsidy in the order of 28 to 41 million KSh a year.

Prices and the market have moved since 2019 and current figures would need to be established, but the shape of the problem has not changed. Governance made safe emptying available without making it affordable, and the only subsidy in the system at present is the in-kind one the utility carries at the disposal site. A sanitation surcharge on water bills has been discussed but not implemented.

Treatment capacity is insufficient, and the case for investment is strong

The Nyalenda oxidation ponds and the Kisat plant receive sludge but have limited treatment efficacy, particularly for nutrient removal, and neither was designed for faecal sludge. Kisumu has no purpose-built faecal sludge treatment plant. KIWASCO has secured EUR 800,000 from the AfDB for a feasibility study for a waste-to-value treatment plant, after which it will seek construction financing, and the same grant covers a climate vulnerability assessment for the city's sanitation infrastructure, a climate proofing strategy, and a sanitation zoning map with technical guidelines for service delivery. Implementation work will be put out to tender.

Approximately 12,400 m³ of sludge already arrives at the lagoons each month, so the feedstock exists and the collection system that delivers it is working. Many cities build treatment capacity before establishing collection and end up with underused plants. Kisumu built collection first, which gives the investment a firmer basis. The zoning map matters for the same reason: it determines which areas a county serves by sewer and which by non-sewered sanitation.

The relationship with emptiers needs formalising

The eleven formal groups work under SOPs and licensing arrangements, but the contractual and commercial relationship between the utility, the county and the emptiers is still largely informal. KIWIIP, the Kisumu WASH Impact Partners, is a registered community-based organisation formed by Kisumu's FSM operators to represent their interests and give them a structured channel to KIWASCO, the county and partners. It already functions operationally: the groups manage their own discharge point at the lagoons, hold each other to keeping it clear of solid waste, and now share a truck held on the same collective basis. Service agreements, performance standards and dispute resolution can be built on that foundation.

Kisumu's system is functional but incomplete. It has run long enough and consistently enough to show that the approach works. The next phase is to strengthen what exists.

The workers who bring sludge to the Nyalenda lagoons are the sanitation service for most of Kisumu's residents, and the city has built a governance system that recognises them as such.

Kisumu shows what it takes to formalise the informal.

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SOURCES

- Operational data, job and volume figures: KIWASCO disposal site records, 2025 and 2026.
- Coverage figures, disposal tariff, operator and partner information: KIWASCO, 2026.
- Shit Flow Diagram: SFD report for Kisumu, 2016 (Furlong and Joost) and 2024.
- National safely managed sanitation figure: WHO/UNICEF Joint Monitoring Programme, 2022 estimate.
- Household survey, market prices, willingness to pay and subsidy estimate: Peletz, R., MacLeod, C., Kones, J., Samuel, E., Easthope-Frazer, A., Delaire, C., Khush, R. (2020). When pits fill up: supply and demand for safe pit-emptying services in Kisumu, Kenya. PLoS ONE 15(9): e0238003.
- Emptying technology field trials: FSM Action Research Project, Kisumu, 2023 to 2026.
- Kenya National Water and Sanitation Investment Plan (NAWASIP), 2021.

Figures from the 2019 household survey describe conditions at that time and are used here as a baseline. The Kisumu emptying market has changed substantially since. Current figures should be established before the 2019 values are used for planning.