

Case Study (KENYA)



Water and Sanitation Program

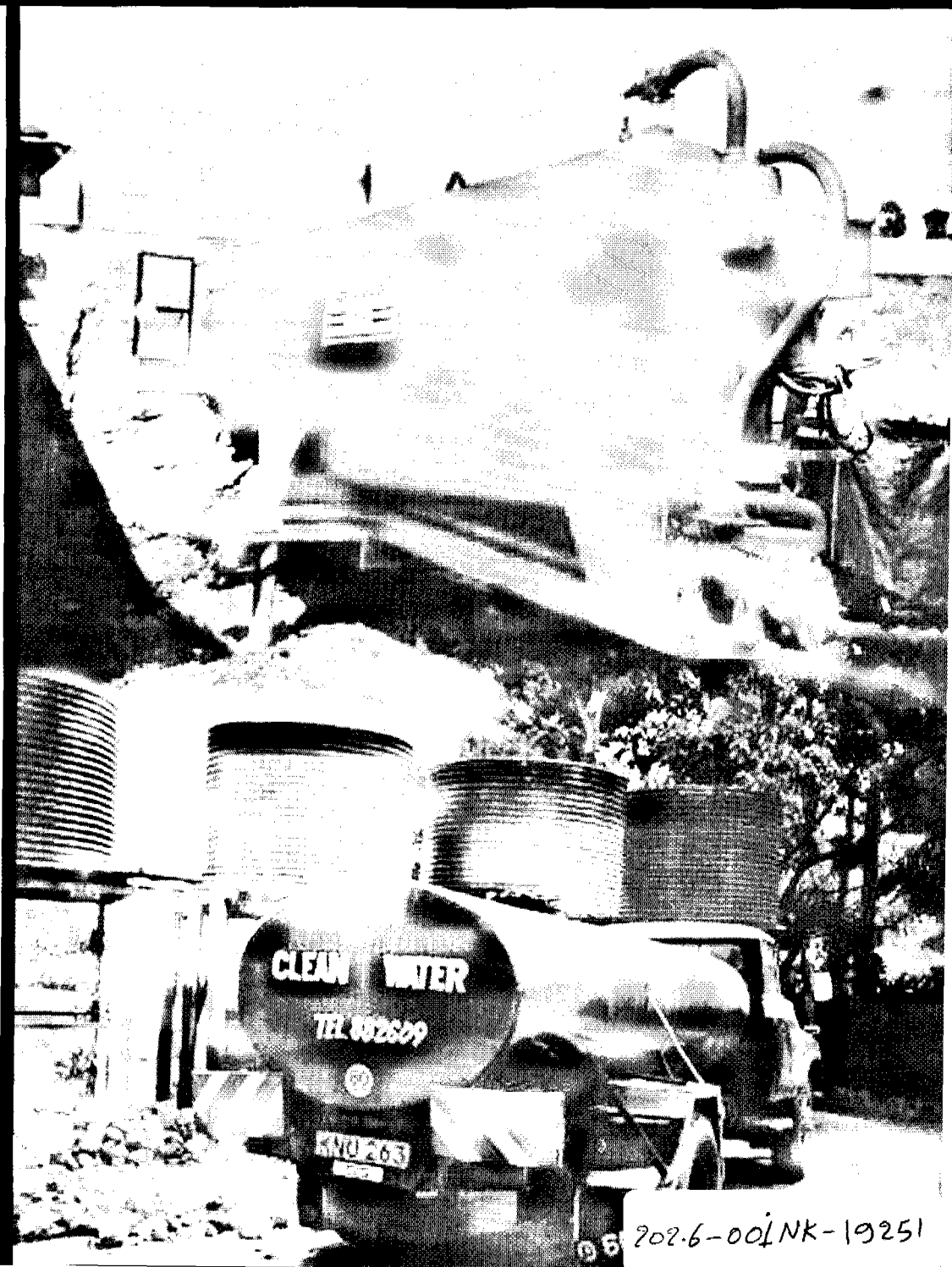
An international partnership to help the poor gain sustained access to improved water supply and sanitation services

Independent Water and Sanitation Providers in Africa

Nairobi KENYA

East and Southern Africa Region

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The importance of private operators in the potable water network

Weak in water production...



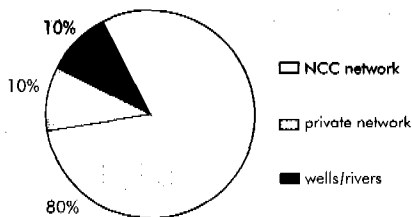
In Kenya, Nairobi City Council's (NCC) Water and Sanitation Department (WSD), produces water for the majority of Nairobi residents.

Numerous private boreholes exist, however, built and used by the privileged sector, for state or private organizations (restaurants, hotels, sports clubs). Some private operators sell water from their boreholes. In 1985, 3,500 to 4,000 m³ of water produced by these boreholes was consumed daily.

Other sources of non-commercial water supply complement production: collected rain-water, springs and wells.

In 1998, officially, approximately 97% of the non-poor population had access to potable water (treated surface water, untreated collected rain-water, spring and protected well water, piped water) against 93% of the poor population.

Population serviced by source



...but important in water distribution to the urban fringe

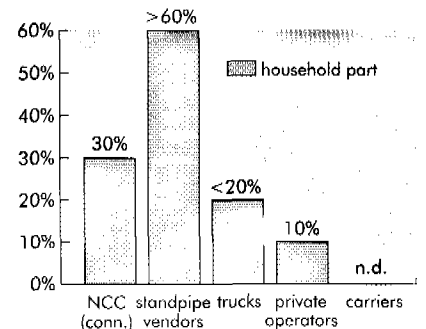
Middle- and high-income people are mainly supplied by the NCC. Wealthier residents, in the districts of Karen and Langata, not serviced by the NCC, are supplied by private boreholes from mini-water supply systems or water trucks.

Sixty percent to 70% of Nairobi residents, however, live in the suburbs and 70% to 80% of them receive their water from independent operators. Standpipe vendors supply water to the majority of poorer residents who live in informal districts. Connected landlords provide water to their tenants.

Standpipe vendors and resellers of

household tap water are predominant in informal districts. In the majority of cases, kiosk owners have requested connections for their own use. Many connected residents sell water to their neighbors.

Population serviced by type of distributor



The importance of private operators in sanitation

Important in the construction and maintenance of sanitation facilities...

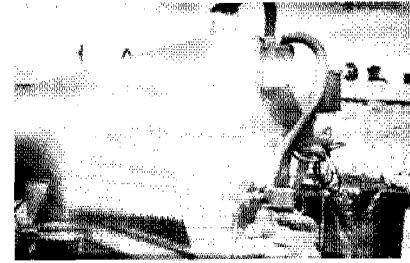
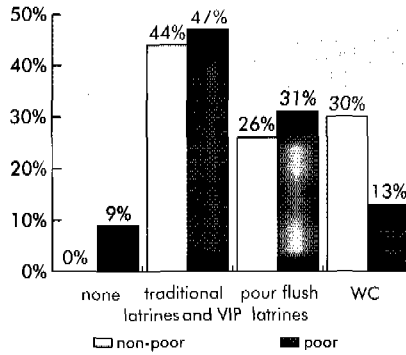


The sewerage system, only basic and incomplete, is for the large part non-effective. Most sanitary installations found in Nairobi, and especially in the urban fringe, are still latrines built either by the families themselves or by masons. The family itself or manual cleaners have to maintain them.

...especially in peri-urban areas...

According to official sources, more than 90% of the poor population has access

Population serviced by equipment and level of revenue



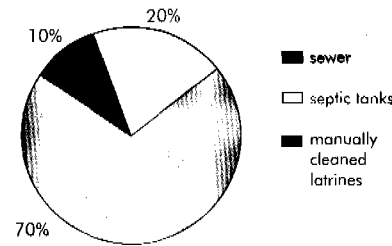
Equipment is insufficient in these precarious districts inhabited by the poor. There are 260 latrines in Pumwani for an average of 450 persons per latrine. Many residents, especially children, do not have access to sanitary facilities.

...but weaker in sludge treatment

Most installations that treat waste belong to the NCC that processes almost 70,000 m³ daily. Some private installations exist in Nairobi's outskirts that treat a combined 1,500 m³ daily.

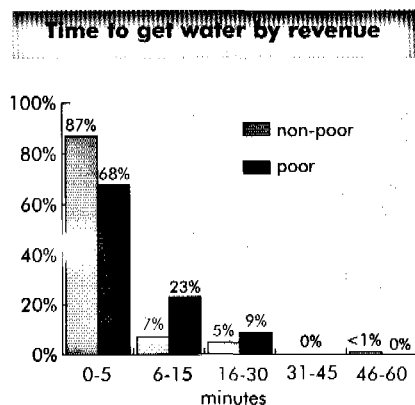
The majority of sanitation services are provided by independent operators, especially in informal districts. Data, however, is not available (global turnover and jobs generated).

Population serviced by equipment



Services offered by independent operators adapted to the specific demand of the population in peri-urban areas

Potable water operators	Types of services and areas of intervention	Price in US\$ (Ksh)/m ³
Private borehole operators	<ul style="list-style-type: none"> • Sale of water from a standpipe connected to a mini-network supplied by a borehole with an electric pump (100-200 m) • Retail potable water supply by people connected to the WS system, and in large quantities to water truckers • Mainly in the affluent districts of Karen and Langata 	2.08 US\$ (125 Ksh) 16.6 US\$ (1,000 Ksh) for 8 m ³
Water truckers	<ul style="list-style-type: none"> • Home water delivery from water truckers equipped with pumps supplied from private standpipe operators independent of the NCC • Regular supply of potable water in large quantities (8 m³ tanks) even when the NCC system is experiencing water shortages • Agents act as mediators between truckers and clients • Price varies according to the distance between the water source and the client • In all paved districts 	3.75-10 US\$ (375-625 Ksh) 30-80 US\$ (3,000-5,000 Ksh) for 8 m ³
Standpipe operators	<ul style="list-style-type: none"> • Retail water sale from taps connected to the NCC system; sometimes corrugated shelters, usually not hard construction; presence of reservoirs according to districts • Retail water supply (20 l. cans) • Especially in informal districts supplied by the NCC 	1-2.5 US\$ (50-150 Ksh) sometimes taxed by 0.02 US\$ (1 Ksh) if standpipe has reservoir
Water carriers	<ul style="list-style-type: none"> • Home water delivery • Retail water sale (20 l. cans) • In informal districts 	standpipe price increased by 0.1 US\$ (5 Ksh)



Using a private operator helps reduce time. Families usually have a standpipe vendor within 40 m. Thus 68% of the poor have water within 5 minutes, and almost a quarter within 15 minutes. Water truckers' service to the poor requires more time.

In some villages in the Pumwani division, water is supplied free to the few communal standpipe vendors by the municipality. Waiting time is long and many consumers prefer to use private standpipe vendors or water carriers.

LAND SECURITY, A DETERMINING ELEMENT FOR PRIVATE OPERATORS' INVESTMENT

Landowners install connections for their own personal use and resell their surplus. Some insured building owners in the Kawagware district have invested in WSS equipment for their tenants.

They have equipped their tenants with taps providing 60 liters per day per family and the price is included in the rent. Tenants are able to purchase extra water from standpipe vendors. In informal districts, standpipe vendors cannot take the risk of installing good, expensive piping. Many of them equip their standpipes with reservoirs in case of water shut-offs so they can provide uninterrupted service. Most kiosks have 2 taps, 1 is directly connected to the NCC and the other to the reservoir in case of water shut-offs. They thus provide approximately 300 liters daily of water from their standpipes.

A LONG-LASTING ALTERNATIVE: COMMERCIALIZATION OF PRIVATE BOREHOLES INDEPENDENT OF THE NCC SYSTEM

Given the problems within the NCC, individuals have installed boreholes equipped with electric pumps and the WS mini-system. Initially meant for personal use, they have sometimes become a true commercial activity.

Thus M., a Karen resident, farmed a small piece of land and raised a few animals for the past 15 years. In 1989, tired of water shortage, she had a borehole installed. Her neighbors quickly solicited her water. Today she owns 3 water trucks, employs 7 people and supplies her neighbors from her mini-system and large clients from her water tankers.

Sanitation operators	Types of services and areas of intervention	Tariff in US\$ (Ksh)
Manual cleaners with handcarts	<ul style="list-style-type: none"> • Complete latrine cleaning (including dried sludge) • Sludge removal by handcart equipped with 200 l. barrels (transfer by 20 l. buckets) and discharged into the sewer or nearest river • Price varies according to the distance from the discharge area • Immediate service as operators work within their area of residence • In informal districts where the cleaners live 	2.5-5 US\$ (150-300 Ksh) per barrel approx. 1,125 Ksh/m ³
Operators of tractors with sludge suction pumps	<ul style="list-style-type: none"> • Cleaning of liquids from septic tanks and latrines by tractor pulling a 500 l. reservoir equipped with a suction pump • Waste disposal in the sewers • Price varies according to the distance from the discharge area • Possible to use in all areas as it is adapted to all terrain, but its introduction is recent and limited 	42-84 US\$ (2,500-5,000 Ksh) per trip approx. 7,500 Ksh/m ³
Community organizations/public latrine managers	<ul style="list-style-type: none"> • Provision of public sanitary installations managed by area residents • Monthly forfeit for residents: payment per utilization for visitors • In informal districts 	0.5 US\$ (30 Ksh)/ per month for residents 0.03 US\$ (2 Ksh)/for visitors



SANITARY INSTALLATIONS MANAGED BY COMMUNITY ORGANIZATIONS

In the Makarada district, a community organization manages 2 blocks of latrines with flushes built with the help of a local NGO. The monthly forfeit paid by residents and contribution from visitors is enough to pay for operating costs and maintenance by local inhabitants. These installations are connected to the NCC.

In the Kasarani division, another communal organization uses more than a thousand members of the community to maintain water points and sanitary blocks, thoroughly cleaned every Friday by volunteers.

AN INNOVATIVE TREATMENT FOR WATER WASTE

Ten km from Nairobi's center, the owner of a large restaurant and sports complex, confronted with the absence of a municipal sanitation system, invested in the construction of an autonomous system for the treatment of water waste in 1994.

The installation is able to treat 80,000 liters of waste daily and only takes up a half hectare of land. The treatment procedure is entirely natural and utilizes bacteria from aquatic plants. Clean water is produced that is to be consumed after a small supplementary purification treatment.

Maintenance is much cheaper than for chemical treatment or for septic tanks and could be considered in informal districts.

Types of services and the NCC's areas of intervention

Water sales mainly in regular districts:

- by private connection to households, administrations, businesses, industries: tariff at 4 levels, members, monthly billing
- by standpipe to standpipe operators: 1 tariff, monthly billing

Connection cost in US\$ (Ksh)

Installation forfeit according to use:

- 25 US\$ (1,500 Ksh) by connection
- 67 US\$ (4,000 Ksh) by standpipe
- +Connection forfeit 42 US\$ (2,500 Ksh)
- +Forfeit per meter according to use:
 - private connection 20 US\$ (1,200 Ksh)/m
 - standpipe 40 US\$ (2,400 Ksh)/m
 - Business 100 US\$ (6,000 Ksh)/m
 - Industry 250 US\$ (15,000 Ksh)/m

Monthly sale price in US\$ (Ksh)/m³

- To the private connection:
 - 0.2 (12 Ksh): 0-10 m³/month
 - 0.3 (18 Ksh): 10-30 m³/month
 - 0.46 (27.5 Ksh): 30-60 m³/month
 - 0.58 (34.5 Ksh): >60 m³/month
- To the standpipe:
 - 0.17 (10 Ksh)

Facing insufficient public services

A limited market for the municipality...



The Water and Sanitation Department (WSD) of the Nairobi City Council (NCC) is responsible for the city's water and sanitation services.

The NCC thus manages 90% of water services, directly or indirectly. As it is unable to supply the required amount of water, especially in the precarious districts, it uses various supply sources.

The municipality, divided between elected officials and appointed Government officials, is quite inefficient, especially as its administrators' mission areas sometimes overlap with those of provincial administrators. The scope of responsibility is therefore unclear and the services rendered are mediocre.

...and insufficient water service...

In the majority of the districts, standpipe operators are dissatisfied with the NCC's services: slow reaction to leaks, irregular meter readings, haphazard billing and high connection prices.

The municipality receives payment for less than 25% of water sold to standpipe operators because of billing litigation. Added to these losses are those incurred by leaks that are not the responsibility of standpipe vendors. Poor distribution of standpipes and the fact that

Services and the NCC's areas of intervention Tariff

- Wastewater collection using the sewer system in regular districts 17 US\$ (1,000 Ksh)/cleaning
- Liquid cleaning of latrines by sludge suction trucks in paved road areas
- Processing in treatment plants



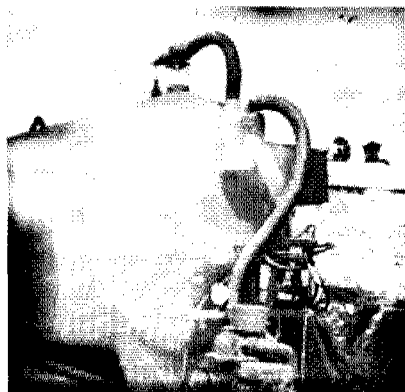
some communes give free water from standpipes do not help profitability either.

When demand is high, the NCC cuts supply, and some areas experience water shortages for 3 to 5 months, which sharply increases prices (up to 10 times). Vendors usually increase their prices by US\$ 0.34 (20 Ksh) per 20 liter can. These cuts also alter water quality.

...and sanitation

The sewer system is only basic and incomplete. Most inhabitants empty their sludge in sewers, thus clogging the pipes. Ensuing floods during the rainy season pose serious health problems, as does sludge disposal in now polluted rivers.

The NCC uses trucks to clean latrines, but they are unable to access many districts because of unpaved roads. When they are able to do so, intervention time is too long (1 to 3 months from the client's request to the truck's intervention!).



Development perspectives for independent operators

Nairobi, a city in full expansion...

In 1998, Nairobi had 2,000,000 inhabitants, 60% of whom lived in heavily populated informal districts. Population increased by 7% to 12% per annum (compared to 3% for the rest of the country) due to demographic expansion and rural exodus.

Poverty, however, is on the increase (10% per annum). The poor inhabitants are mainly tenants living in a single room. Their monthly average income

is less than US\$ 40 (2,500 Ksh), a third of the national average. The lowest poverty level is estimated at US\$ 25 per month (1,490 Ksh).

...planning is difficult...

Urban land planning is still marked by the early 20th century's segregation policies. The white population owned the vast majority of land, whereas the autochthones were not allowed to own land. They settled illegally on public and private land of various sizes (from 15 to 1,035 hectares) that were heavily populated (300 to 2,500 inhabitants per hectare). These hazardous terrains have no roads and are full of ravines giving into the Nairobi river. Small households (an average of 4 persons) and numerous tenants live in shanty style homes.

These informal districts are unknown to local and central authorities: the municipality is incapable of developing

...BUT LACKING WATER IN SPITE OF SIGNIFICANT AVAILABILITY

The NCC has a significant amount of water available (439,776 m³/d) that could respond to the city's increasing demand:

- Kikuyu sources
- Ruiru, Sasuma and Thika dams
- Chania river

But water loss reduces this capacity by 50%.

Rivers and their effluents (Nairobi, Mbaghati, Athi) drain the city, but provide surface water that is polluted by sludge.

Even though boreholes could be commercialized close to the city from this surface water, fluoride content (3 mg/l.) limits development.



any basic services. Today's policy is to empty these districts, but planning is problematical because of the land question. The city therefore has inhabitants who have temporary rights to state land, inhabitants in legally recognized districts that are not built-up and are on private land and people illegally residing on land belonging to the state or private owners.

...and private operators who adapt restrictions

Dissatisfaction over the NCC's services (shortages, leaks) from standpipe vendors who depend upon these services for water supply results in unpaid bills and the installation of reservoirs. Due to land insecurity, they choose to limit their investments — resulting in canalization and reservoirs that do not always correspond to quality standards.

Private borehole commercialization is likely to expand due to the NCC's incapacity in responding to an increasing demand. Water truckers are

the main users, along with standpipe vendors: they do not serve exactly the same neighborhoods and clients. Disloyal competition comes from municipal water trucks used by NCC employees.

Due to the unavailability of sanitation in informal districts, 3 or 4 men invest in the purchase of a handcart, barrel and bucket and work as a team as manual cleaners. As the discharge points are so far away, they empty the sludge into the nearest river. The recently introduced sludge suction tractors have a wider scope of operation, greater volume collection and better hygiene conditions.

The dynamism of private water and sanitation operators is in relation to the situation in which different sections of Nairobi's population find themselves. There is a type of service, open to improvement, for each type of resident. In this context, NGOs and community organizations work together in the social domain and as mediators between residents and the municipality.

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