Innovative Sanitation Technologies: A promising market in Africa

April 2023

STUDY REPORT

Spotlight on Burkina Faso, Côte d’Ivoire, Kenya, Nigeria and Senegal
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As part of its effort to support innovation and industrialization and develop a thriving local economy, particularly in African countries, the Faecal Sludge Management Alliance (FSMA), with support from the Bill & Melinda Gates Foundation (Foundation), has commissioned Haskè Conseil to conduct a market study on the potential of innovative sanitation technologies (ISTs) in African with a focus on five countries Burkina Faso, Côte d’Ivoire, Kenya, Nigeria, and Senegal.

This publication is produced to accelerate innovation, investment, and entrepreneurship in non-sewered sanitation technology and service delivery and to inform the Foundation’s efforts to support the market development of the Reinvented Toilets (RTs). It has also highlighted opportunities to develop the IST value chain and interventions needed to build the capacity for local manufacturing and associated services including distribution, management and repair of ISTs.

The findings, interpretations, and conclusions expressed in this report are those of the author (Haskè Conseil) and do not necessarily reflect the views of the Foundation or FSMA.

We would like to thank all the stakeholders who have contributed to this report. We are particularly grateful to the experts for their valuable inputs in the country assessments: Dr. Joseph WETHE, Lecturer and Researcher at the International Institute for Water and Environmental Engineering (2iE), Burkina Faso; Pr. Théophile GNAGNE, Lecturer and Researcher at the Nangui Abrogoua University (UNA), Côte d’Ivoire; Mr. Peter KIRIGUA, Chairman of Ruji Africa (Kenya), Mr. Emmanuel AMADI, Sanitation Expert (Nigeria) and Dr. Moustapha SENE, CEO of SenEngineering (Senegal).
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<th>Acronym</th>
<th>Full Form</th>
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</thead>
<tbody>
<tr>
<td>2iE</td>
<td>International Institute for Water and Environmental Engineering</td>
</tr>
<tr>
<td>CAPEX</td>
<td>Capital expenditure</td>
</tr>
<tr>
<td>FSMA</td>
<td>Faecal Sludge Management Alliance</td>
</tr>
<tr>
<td>HNWI</td>
<td>High Net-Worth Individuals</td>
</tr>
<tr>
<td>ISO</td>
<td>International Organization for Standardization</td>
</tr>
<tr>
<td>ISTs</td>
<td>Innovative sanitation technologies</td>
</tr>
<tr>
<td>MURT</td>
<td>Multi-User Reinvented Toilet</td>
</tr>
<tr>
<td>OPEX</td>
<td>Operating expense</td>
</tr>
<tr>
<td>RT</td>
<td>Reinvented Toilet</td>
</tr>
<tr>
<td>SDGs</td>
<td>Sustainable Development Goals</td>
</tr>
<tr>
<td>SSO</td>
<td>Service Station Operator</td>
</tr>
<tr>
<td>SSP</td>
<td>Sanitation Service Provider</td>
</tr>
<tr>
<td>SURT</td>
<td>Single-User Reinvented Toilet</td>
</tr>
<tr>
<td>UDDT</td>
<td>Urine Diverting Dry Toilet</td>
</tr>
<tr>
<td>UNA</td>
<td>Nangui Abrogoua University (Côte d'Ivoire)</td>
</tr>
<tr>
<td>USD</td>
<td>United States Dollar</td>
</tr>
<tr>
<td>WASH</td>
<td>Water Sanitation and Hygiene</td>
</tr>
<tr>
<td>WSP</td>
<td>Water Service Provider</td>
</tr>
<tr>
<td>RED</td>
<td>Real Estate Developer</td>
</tr>
</tbody>
</table>
EXECUTIVE SUMMARY

Emerging innovative sanitation technologies (ISTs) have the potential to serve millions of Africans in need of improved sanitation services in Africa. ISTs can offer more affordable and environmentally friendly sanitation options for the over 254 million people in West Africa and 67% of the Kenyan population (36 million people) without access to basic sanitation services. Latrines and septic tanks are the most common facilities, but more effective sanitation solutions are needed. ISTs are based on the need to reduce waste and/or a paradigm shift to ‘treatment for re-use' instead of ‘treatment for disposal', enabling productive use of water and/or facilitating recovery of nutrients and organic matter from waste resources. Available models of ISTs include decentralized treatment solutions at the household or compound levels, low- or no-flushing toilets and non-sewered systems (NSS) separating waste flows or converting fecal sludge to energy and other by-products.

Use cases are already emerging across the continent, including the five target countries, yet uptake is far from reaching its full potential as the market is relatively new. An example is a Nigeria-based company, T-Whyte Equipment & Mobile Toilets Company Ltd, with a network of public toilets that use a chemical combination to decompose the fecal waste into liquid form for onward transfer to the treatment plant. Fresh Life—a Kenya-based venture—is another example of this trend. They provide a full value chain approach for low income, urban areas: (i) building and distributing sanitation products delivered in cities, including dry container-based, urine-diverting technology; (ii) setting up an extensive, professional logistics team that safely collects waste generated on a regular basis and guarantees that 100% of the waste generated is safely removed for treatment; and (iii) partnering with utilities and other organizations to treat sanitation waste and convert it to valuable agricultural inputs. Market-based approaches are also being tested in Burkina Faso, Côte d’Ivoire and Senegal for Urine Diverting Dry toilets (UDDTs), which separate urine and feces. UDDTs accelerate access to improved sanitation services and make it possible to turn feces into compost and urine into liquid fertilizer.

But there are many fertile opportunities in this emerging industry for companies who get involved as early adopters. There are early signs of commercialization of ISTs including recent developments on the Reinvented Toilet (RT) initiative—a set of ISTs supported by the Bill & Melinda Gates Foundation that are accelerating the revolution in the sanitation economy, creating opportunities for private sector investment. Over 25 breakthrough waste-processing core technologies have been developed under the RT initiative and are being licensed to more than two dozen companies for production, testing, and commercialization, including in Africa. RTs transform wastewater into clean water for flushing and kill pathogens without the need for connections to sewers, treatment plants, water supply, or continuous electricity. Progress made in South Africa, manufacturing and installing ISTs in local communities, schools, and apartment buildings, shows how these technologies can significantly contribute to industrialization, while accelerating access to quality sanitation services. They open up investment and entrepreneurship opportunities across Africa, from manufacturing to distribution and supply chains to service providers.

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1. Haskè Conseil based on the definition proposed by the Water Science & Technology (WST): WST, Innovative sanitation approaches could address multiple development challenges, 2018
3. Ibid
4. Haskè Conseil consultations
5. Fresh Life, Sanergy brief, 2023
6. Doulaye Koné, Deputy Director, Water, Sanitation, & Hygiene, Bill & Melinda Gates Foundation, The future of sanitation: 10 years of reinventing the toilet, 2018
In the five countries, two main segments have emerged as potential early adopters of ISTs: (1) housing and real estate developments; and (2) businesses with high incentives to reduce water bills—case of service stations.

- **Housing and other real estate developments:** All target countries have programs to promote social housing, with the aim to build anywhere between 50,000 and 100,000 houses units per year. To capture this market, the proposed solution is to use a cluster approach connecting many households to one single decentralized wastewater treatment unit, with the capacity to process fecal sludge from 100 to 120 housing units. Market size is estimated at 100-200 IST units per year in each country for the social housing segment alone. This model has the potential to provide basic sanitation services to more than 3.5 million people in the first five years and reduce households’ water and sanitation bills: up to 30% on water bills and up to 70% on sanitation spending over ten years.
• Beyond the housing segment, there is a strong business case to adopt these technologies in other real estate segments including offices, malls, and industrial parks. For example, the potential demand for IST back-ends is estimated at 15-25 for key flagship office development projects and malls in Kenya alone. Key incentives are potential cost savings on water bills and sustainability. An integrated wastewater processing unit in Kenya has allowed a mall to reuse 80% of treated water for irrigation of its green spaces as well as a reserve for firefighting. This represents a business opportunity to explore further in West Africa and the rest of the continent given modern office and mall developments—equipped with water-efficient and sustainable technologies such as ISTs—are expected to play a major role in shaping the future of Africa’s cities.6

• Businesses with high incentives to reduce water bills—case of service stations: The main driver of adoption for service stations is the potential to reduce operating costs, coupled with positive environmental impact. Service stations generally use septic tanks to contain fecal sludge from the toilets and provide water for their car washing services. Car washing is a central activity in the business of service stations, generating more than 40% of the profit made by an average service station.9 Each service station spends on average and on an annual basis up to USD 4,600 for car washing and USD 220 on emptying and transportation.10 ISTs have the capacity to recycle 100% of the water used, with the complete removal of the pathogens. There were more than 1,800 service stations in Kenya and +15,000 in the four West African countries, as of 2022,11 which could all be equipped with at least one IST unit each, with the right incentives. Through the adoption of ISTs, service stations can make a significant step towards reducing their negative impact on the environment.

However, for the creation of a viable market for ISTs in Africa, government and development partners need to intervene in four critical pillars:

• **Demand creation:** Creation of the necessary conditions to optimize absorption capacity of new technologies by identified early adopters, through addressing the existing challenges towards adoption and the implementing incentive mechanisms.

• **Investment mobilization:** Promotion of a favorable framework for investment in the IST sector through identifying all potential risks inherent to the market and designing clear and sustainable mitigation strategies.

• **Development of supply:** Enhancement of the capacities of potential RT suppliers in the market and strengthening of the supply chain for the creation of a smooth market meeting the specific needs of demand.

• **Enabling environment:** Creating an enabling environment for the growth of demand, supply and capital flows in the sanitation market.

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6- Knight Frank, Africa Reports, 2017-2022
9- Haskè Conseil, stakeholder interviews notes, 2021
10- *Ibid*
11- Haskè Conseil estimates based on research on key service station businesses present in country
SANITATION IN AFRICA: AN UNTAPPED MARKET POTENTIAL

There is a significant untapped demand for improved sanitation solutions in Africa, which is unlikely to be fully met with existing facilities. SDG 6.2 on universal access to safely managed sanitation; and SDG 6.3 on improved water quality, wastewater treatment and safe re-use are far from being attained in the priority countries, despite being high priority areas for governments. In West Africa alone, over 254 million people in the region did not have access to basic sanitation services in 2020. This number is likely to trend upward, driven by population growth (3.11% in 2020) and urbanization (3.74% in 2020). In Kenya, an estimated 67% of the population (36 million Kenyans) still do not have access to basic sanitation services. Over 36% of the population in urban areas are using facilities connected to septic tanks, or sewage systems, indicating a higher adoption of most advanced sanitation technologies in these settlements, compared to rural areas (only 2%). On the supply side, more effective sanitation solutions are needed. Some estimates indicate that USD 200 per capita would be required to expand and sustain a proper sewage system, compared to USD 50 per capita for some RTs. Latrines and septic tanks are the most common facilities in the five countries with at least 85% of people with improved sanitation technologies served by them (see figure 1).

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**Figure 1:** Utilization of sanitation services by containment facility (% of improved facilities)

<table>
<thead>
<tr>
<th>Country</th>
<th>Latrine</th>
<th>Septic tanks</th>
<th>Sewage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Burkina Faso</td>
<td>1%</td>
<td>4%</td>
<td>95%</td>
</tr>
<tr>
<td>Côte d’Ivoire</td>
<td>12%</td>
<td>30%</td>
<td>58%</td>
</tr>
<tr>
<td>Kenya</td>
<td>10%</td>
<td>81%</td>
<td>34%</td>
</tr>
<tr>
<td>Nigeria</td>
<td>14%</td>
<td>51%</td>
<td>50%</td>
</tr>
<tr>
<td>Senegal</td>
<td>11%</td>
<td>40%</td>
<td>51%</td>
</tr>
</tbody>
</table>


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12- The study focused on five countries: Burkina Faso, Côte d’Ivoire, Nigeria, Kenya, and Senegal
14- Comsat Data Hub, ECOWAS - Urban population growth (annual %), 2020
15- Ibid.
16- Ibid.
17- Estimates based on Toilet Board Coalition, Scaling up the Sanitation Economy, 2019
18- Haské Conseil estimates based on the analyses of sample models
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Theoretically, these decentralized systems are affordable (costing USD 1,000-1,500 to set up a septic tank)\(^2\), but these costs mask other high hidden macroeconomic and environmental effects.

On the environmental side, poor management of fecal sludge leads to leakages, contaminating groundwater. Low capacity of treatment (only 2% in Côte d’Ivoire and less than 1% in Kenya) results in discharge of sludge in nature and waterways (see figures 2 and 3). On the macroeconomic level, incumbent sanitation technologies have hidden costs.

For instance, poor sanitation costs the Kenyan economy up to USD 324 million a year.\(^{21}\) This is the equivalent of USD 8 per person in Kenya per year or 0.9% of the national GDP.\(^{22}\) The figure is likely to underestimate the true cost of the current sanitation situation in Kenya. Some related costs are likely to be significant, but are more difficult and expensive to estimate, and therefore have not been precisely valued: such as epidemic outbreak costs and water pollution. The potential cost savings represent a strong value proposition for IST adoption.\(^{23}\)

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**Figure 2: Current sanitation value chain**

![Current sanitation value chain](image)

**Figure 3: Overview of existing improved sanitation technologies in target countries**

<table>
<thead>
<tr>
<th>Latrine</th>
<th>Septic tank</th>
<th>Sewer</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Maturity</strong></td>
<td>Available and easily scalable (used by at least 40% of people with access to improved facilities in each country).</td>
<td>Available and easily scalable.</td>
</tr>
<tr>
<td><strong>Quality</strong></td>
<td>Little reliability with just a pit dug into the ground to collect the sludge and frequent leakages observed.</td>
<td>Built with little to no expertise by agents in the informal sector, leading to frequent leakages.</td>
</tr>
<tr>
<td><strong>Affordability</strong></td>
<td>Low cost of installation compared to other existing facilities (USD~40 on average per capita) and no maintenance required.</td>
<td>Affordable price of acquisition for medium and high-income owners (USD<del>120 on average per capita) and high cost of maintenance (USD</del>370 per household per year).</td>
</tr>
<tr>
<td><strong>Environmental friendliness</strong></td>
<td>Absence of maintenance leading to the infiltration of water into the ground contaminating the groundwater.</td>
<td>Prone to leakages leading to contamination of groundwater, and low capacity of treatment (only 2% in Côte d’Ivoire) resulting in discharge in nature.</td>
</tr>
</tbody>
</table>

Source: Haské Conseil analysis, 2022

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\(^2\) Haské Conseil estimates based on consultations
\(^21\) Devex, When are sewers the best option for improved sanitation?, 2020; Toilet Board Coalition, Sanitation economy markets: Kenya, 2021
\(^22\) Ibid
\(^23\) Ibid
The IST market is emerging in target countries and across the continent and has the potential to fill the gap in the sanitation sector. ISTs optimize treatment costs or propose more affordable and environmentally friendly sanitation systems which enable productive use of water and/or facilitate recovery of nutrients and organic matter from waste resources. Use cases are already emerging across the continent, including the five target countries, yet uptake is far from reaching its full potential. An example is a Nigeria-based company, T-Whyte Equipment & Mobile Toilets Company Ltd, with a network of public toilets that use a chemical combination to decompose the fecal waste into liquid form for onward transfer to the treatment plant. Fresh Life—a Kenya-based venture—is another example of this trend. They provide a full value chain approach for low income, urban areas: (i) building and distributing sanitation products delivered in cities, including dry container-based, urine-diverting technology; (ii) setting up an extensive, professional logistics team that safely collects waste generated on a regular basis and guarantees that 100% of the waste generated is safely removed for treatment; and (iii) partnering with utilities and other organizations to treat sanitation waste and convert it to valuable agricultural inputs. Market-based approaches are also being tested in Burkina Faso, Côte d’Ivoire and Senegal for UDDTs, which separate urine and feces at the toilet seat or squatting pan. UDDTs accelerate access to improved sanitation services and increase value from sanitation waste. The manure drawn from UDDTs is used as fertilizers and has already yielded conclusive results in Côte d’Ivoire where gardeners and corn producers are delighted with their harvest.

The market is expected to further grow and offer alternatives to incumbent given some ongoing initiatives such as the RT initiative. RTs—a set of ISTs supported by the Bill & Melinda Gates Foundation—transform wastewater into clean water for flushing and kill pathogens without the need for connections to sewers, treatment plants, water supply, or continuous electricity (see box 1). Over the last decade, the Foundation has invested more than USD 200 million to support early-stage R&D into reinventing the toilet and other pathbreaking sanitation solutions.

Box 1: About the RT initiative

Since 2011, the Foundation has been supporting the development of supply of ISTs. The portfolio of supported by the foundation includes Reinvented Toilets (RTs) and Omni-processors (OPs).

RTs are on-site technologies, which use internal combustion and chemical treatment systems. These toilets can generate by-products including pathogen-free water for re-use, gas, fertilizers, etc.

Available models include Multi-user RTs (MURTs), designed for public or shared toilet facilities that serve communities from few hundreds to thousands/per day. Single-user RTs (SURTs) target single homes.

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24- Haskè Conseil based on the definition proposed by the Water Science & Technology (WST):
WST, Innovative sanitation approaches could address multiple development challenges, 2018
25- Haskè Conseil consultations
26- Fresh Life, Sanergy brief, 2023
27- Water and Sanitation for Africa, World Toilet Day—From traditional latrines to UDDTs (Urine Diverting Dry Toilets): the irreversible step forward, 2018
Over 25 innovative waste-processing core technologies have been developed under the RT initiative and are being licensed to more than two dozen companies for production, testing, and commercialization, including in Africa.\textsuperscript{28} Progress made in South Africa, manufacturing and installing ISTs in local communities, schools, and apartment buildings, shows how these technologies can significantly contribute to industrialization, while accelerating access to quality sanitation services.

They open up investment and entrepreneurship opportunities across Africa: From manufacturing to distribution and supply chains to service providers, there are many fertile opportunities in this emerging industry for companies who get involved as early adopters.
KEY TARGETS FOR INNOVATIVE SANITATION TECHNOLOGIES

Main segments as potential early adopters of ISTs are (1) housing and (new) real estate development; and (2) businesses with high incentives to reduce water bills—case of service stations. An overview of these early adopters is presented below along with the interventions that are needed to build a viable market.

1. Housing and (new) real estate development

Social housing represents a strong opportunity for the immediate adoption of ISTs in the target countries, with more than 700,000 housing units scheduled in the next five years. The governments of the target countries have all launched ambitious social housing programs aiming to provide decent housing to low- and middle-income earners.

*** Figure 4: National social housing programs in target countries: Overview and progress

<table>
<thead>
<tr>
<th>Country</th>
<th>Program Description</th>
<th>Latest progress</th>
</tr>
</thead>
<tbody>
<tr>
<td>Burkina Faso</td>
<td>National Housing Construction Program (PNCL) to build 40,000 houses in the 13 regions through public-private partnerships (PPPs) between 2021 and 2025.</td>
<td>• 5,500 houses already built and delivered.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Financial agreement under review for the construction of 10,000 houses by Sift Ivoire.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 3,000 houses to be built by Shelter Africa.</td>
</tr>
<tr>
<td>Côte d’Ivoire</td>
<td>National Social Housing Program to build 150,000 houses in the next five years. 500,000 additional houses scheduled by 2030.</td>
<td>• Memorandums of Understanding (MOUs) signed with Belgian companies to deliver 30,000 units and 20,000 units by an Ivorian and British company.</td>
</tr>
<tr>
<td>Kenya</td>
<td>Government’s Affordable Housing Program (AHP) to build 500,000 units over 5 years, doubling the number of units built each year.</td>
<td>• Many projects have been launched throughout the country, but overall supply is 98% concentrated in high-end segment.</td>
</tr>
<tr>
<td>Nigeria</td>
<td>National Social Housing Program (NHSP) to provide 300,000 houses to low-income earners over 5 years in every State.</td>
<td>• Existing website to receive applications from owners and producers.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• USD 485 million approved by the Central Bank of Nigeria to launch the program.</td>
</tr>
<tr>
<td>Senegal</td>
<td>National Social Housing Program to provide affordable housing to low and middle-income earners with 100,000 houses.</td>
<td>• The Emirates Gate Investment Group (EGI) has recently been contracted to build 50,000 housing units, including 30,000 units in two years.</td>
</tr>
</tbody>
</table>


29- Haskè Conseil calculations based on desk research and insights from stakeholder consultations
30- Ibid
To capture this market, the proposed solution is to use a cluster approach connecting many households to one single decentralized wastewater treatment unit, with the capacity to process fecal sludge from 100 to 120 housing units. The total cost to install septic tanks for 120 housing units and associated emptying fees over 10 years can be anywhere between USD 380,000 and USD 540,000 in the target countries, which can serve as a reference price range for decentralized ISTs to be competitive (see figures 5 and 6).\textsuperscript{31} The overall cost of production, shipment, clearance, transport, installation, and operation of an IST over ten years is estimated at USD 112,000.\textsuperscript{32}

Market size is estimated at 100-200 IST units per year in each country for the social housing segment alone.\textsuperscript{33} This model has the potential to provide basic sanitation services to more than 3.5 million people in the five years and reduce households’ water and sanitation bills: \textit{up to 30\% on water bills and up to 70\% on sanitation spending over ten years.}\textsuperscript{34}

\textbf{\textit{Figure 5}}: Cost structure comparison between a sample MURT and septic tank over 10 years (000 USD), 2021

\textbf{\textit{Figure 6}}: Current expenditures for installing and emptying septic tanks over 10 years across the target countries (000 USD), 2021

\textsuperscript{31} Ibid
\textsuperscript{32} Ibid
\textsuperscript{33} Ibid
\textsuperscript{34} Ibid
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Beyond housing, there is a strong business case to adopt these technologies in other real estate segments including offices, malls, and industrial parks.

For example, the potential demand for IST back-ends is estimated at 15-25 units for key flagship office development projects and malls in Kenya alone. Key incentives are potential cost savings on water bills and sustainability. An integrated wastewater processing unit in Kenya has allowed a mall to reuse 80% of treated water for irrigation of its green spaces as well as a reserve for firefighting. This represents a business opportunity to explore further in West Africa and the rest of the continent given modern office and mall developments—equipped with water-efficient and sustainable technologies such as ISTs—are expected to play a major role in shaping the future of Africa’s cities. In drought-prone countries such as Kenya and Burkina Faso, the scarcity of and increasing demand for water, coupled with the high cost of the sewer connection fees are key drivers for the adoption of wastewater treatment technologies across the construction sector.

2. Businesses with high incentives to reduce water bills – case of service stations

The business model of service stations focuses mainly on reducing water consumption. Each service station spends on average up to USD 10,000 for car washing and USD 5,500 to USD 7,500 on emptying and transportation annually (see figure 7). Installing an IST has the potential to eliminate these costs, thereby increasing profits. Service stations also face significant challenges reducing their water bills as well as their negative environmental impact. Existing facilities mostly rely on septic tanks that do not allow for on-site treatment and lead to the disposal of wastewater in nature.

**Figure 7:** Cost of existing sanitation solutions in Kenya (000 USD), 2022

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>USD 6,000-10,000 annual water expenses</td>
<td>5,000-7,000 m³ annual water consumption</td>
<td>USD 5,500-7,500 annual treatment and disposal expenses</td>
<td></td>
</tr>
</tbody>
</table>

- Service stations purchase water from vendors and boreholes at USD 1-1.5 per m³ with a USD 500 storage tank to contain it.
- 5,000-7,000 m³, controlled by a meter, is consumed per station every year, translating to annual water expenditures of USD 6,000-10,000.
- Service stations wash 60-80 cars a day, consuming 200-250 L per car when using high pressure engines.
- 60% of water used in service stations is for car wash, the remaining 40% mainly include toilet water and cleaning of station 3 times a week.
- Sewerage connection fees account for 75% of the country’s water tariff, or 0.55 per m³.
- A Nairobi service station consuming 5,000-7,000 m³ of water per year would spend USD 2,000-3,000 on sewerage fees.
- Service stations are also required to pay USD 700 every year for an effluent discharge license.
- An interceptor filtering oil and sand prior to discharging wastewater is also required. The interceptor costs USD 2,000-3,500 and needs 4 annual emptying sessions for USD 480.

Sources: Haskè Conseil, stakeholder interview notes, Kenya, 2022; Nairobi City Water and Sewerage Company, Water tariffs; Haskè Conseil analysis

35- Knight Frank, Africa Reports, 2017-2022
36- Haskè Conseil, stakeholder interviews notes, 2021
To increase uptake, the design of the ISTs should comply with the standards and norms of service stations. Service stations must comply with national construction, along with design norms specific to each brand. Adoption can only be reached if the IST features adhere to these norms. The IST back-end will be approximately the same size as a septic tank and will include a treatment system that can process water from the toilets and car washing unit. The recycled water will be stored in a separate containment system, ready for reuse. Service station operators (SSOs) also expect that IST systems will not increase their power bills.

RECOMMENDATIONS: INTERVENTION AREAS TO BUILD A Viable SANITATION MARKET

In order to create a viable market, interventions from the government and development partners are necessary in four critical pillars: demand creation, investment mobilization, development of supply, and enabling environment.

**Figure 8:** Intervention areas for a viable sanitation market

<table>
<thead>
<tr>
<th>Demand Creation</th>
<th>Creation of the necessary conditions to optimize absorption capacity of new technologies by identifying early adopters, addressing challenges towards adoption and implementing incentive mechanisms.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Investment Mobilization</td>
<td>Promotion of a favorable framework for investment in the IST sector by identifying risks inherent to the market and designing clear and sustainable mitigation strategies.</td>
</tr>
<tr>
<td>Development of Supply</td>
<td>Efforts to develop the IST value chain and build the capacity for local manufacturing and associated services including distribution, management and repair of ISTs.</td>
</tr>
<tr>
<td>Enabling Environment</td>
<td>Interventions aiming at fostering an enabling environment for the growth of demand, supply and capital flows in the IST market.</td>
</tr>
</tbody>
</table>

Source: Haskè Conseil analysis

1. Demand creation

The interventions necessary for demand creation are:

- **Establish funding mechanisms allowing Real Estate Developers (REDS) and Service Station Operators (SSOs) to bear the cost of acquisition of ISTs:**
  REDs bear substantial investments to build an estate (USD +7.5 million for a city of 300 dwellings). The expenses are spread over several years to manage cashflow and lighten the investment. The lump-sum acquisition cost of an IST (up to USD 180,000) constitutes a heavy additional burden for REDs. The same situation of an IST is a significant expense adding to the already high investment cost borne for the installation of a service station.

- **Demonstrate IST functioning to REDs:** Notwithstanding all the related challenges, REDs are already accustomed to existing solutions and are concerned about the operation of ISTs and their compatibility with local needs.

- **Develop partnerships with oil companies for the adoption of ISTs through their networks:** SSOs respond to installation standards set by large companies, common across their network, and doubt the compliance of ISTs with established criteria as they do not have a clear view on the product design and specifications.

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37- Ibid
38- Haskè Conseil calculations based on desk research and insights from stakeholder consultations
2. Investment mobilization

The interventions necessary to mobilize private investment and partnerships are:

- **Use additional communication channels to give investors a broader view of existing opportunities:** The current market structure offers few opportunities for investors, particularly due to the strong dominance of the informal sector. The IST market is not well known by investors, who have little visibility on the opportunities created.

- **Develop a proof of concept to validate financial viability and market potential:** The proposed business model for implementing ISTs is unexplored by companies and therefore does not offer a track record, needed to measure market traction. This can be a deterrent to investors who do not yet have a compelling success story.

- **Establish risk-sharing mechanisms to promote market entry:** Investors, especially funds and banks, tend to position in markets where they have developed expertise and have clearer certainty on return. Significant investment in ISTs is perceived as too risky and will require diverting funds from already more mature/profitable sectors.

- **Retrofit sanitation programs to lending portfolios:** Development banks generally have sanitation support programs, but these are not large in scale since the banks tend to focus more on other sectors. This limits the influence of the existing programs, which could be effective drivers for achieving the SDGs.

- **Develop market-oriented approaches for existing and future programs:** Existing programs focus on social impact, which should be combined with a market-based approach to achieve financially sustainable solutions that can be replicated and scaled. Little consideration is given to the potential impact of the private sector, resulting in a mismatch between supply and demand.

- **Conduct a communication campaign to present existing funding mechanisms to potential beneficiaries:** Actors in the sanitation sector are often unaware of the existing funding mechanisms and application procedures, preventing them from accessing available funds.
3. Development of supply

The current configuration of the supply chain is not adapted to ISTs and must be redesigned.\(^{39}\)

**Figure 9:** State of the current sanitation supply chains

<table>
<thead>
<tr>
<th>CAPEX</th>
<th>Current facilities</th>
<th>Requirements for ISTs</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Acquisition</td>
<td>The current facilities require very low technology components and are entirely built on-site.</td>
<td>Knowledge of shipment requirements is necessary to estimate local import costs and regulations.</td>
</tr>
<tr>
<td>2. Installation</td>
<td>The workforce needed is usually provided by the informal sector with very low knowledge of sanitation technologies.</td>
<td>Enhanced knowledge of top-flight sanitation services is needed to be able to perform/guide installation.</td>
</tr>
<tr>
<td>3. Operation</td>
<td>No specific daily operation is required for existing facilities.</td>
<td>IST, especially in a semi-collective configuration, will require well-trained operators closely overseeing the functioning to avoid breakdowns.</td>
</tr>
<tr>
<td>4. Maintenance and repair</td>
<td>Maintenance and repair are performed by masons and plumbers in the informal sector.</td>
<td>Specific knowledge and skills are required to be able to maintain and repair the ISTs and flag any major malfunctioning to engineers.</td>
</tr>
<tr>
<td>5. Re-use</td>
<td>Treatment is realized off-site at a regional level, with a low margin for re-use and commercialization of by-products.</td>
<td>A clear business model must be elaborated around the by-products and articulated with the rest of the supply chain to allow revenue generation.</td>
</tr>
</tbody>
</table>

Therefore, to develop supply, interventions are expected to:

- **Build local capacity and associated IST services across the value chain:** Significant investment is needed to develop local capacity to manufacture ISTs and build the supply chain. Most players currently working in sanitation do not have the capacity to bear these costs and need support. Most existing SSPs are only accustomed to traditional technologies. The introduction of ISTs will require the development of new skills in the distribution, management, and repair.

- **Build a supply chain conducive to the smooth acquisition and distribution of ISTs:** The current market configuration requires the importation of all necessary parts since production is centralized in South Africa, as of 2022. This can represent a major hindrance to the fluidity of the market due to the challenges related to supply, storage, and especially the availability of replacement parts.

- **Set up mechanisms to provide SSPs with a better understanding of the market:** Potential SSPs have little understanding of the social housing and service station sectors and lack a comprehensive view of the market to make accurate forecasts and informed business plans.

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4. Enabling environment

The interventions necessary for the creation of an enabling environment are:

- **Raise awareness on ISTs:**
  Sustained effort is needed in promoting ISTs to potential users, local manufacturers, distributors, SSPs and key stakeholders within the IST industry ecosystem to generate demand, create interest for businesses to get involved as early adopters, and build the knowledge base for IST industrialization. Promotion materials should be available in various languages to increase the potential for uptake.

- **Develop suitable financial schemes:**
  In the budget of infrastructure-building sectors that require toilets (education, health, mining, construction, etc.), include a share dedicated to the acquisition of ISTs each year and establish a sanitation fund dedicated to actors wishing to purchase or distribute ISO-compliant sanitation technologies.

- **Adopt conducive regulations:**
  Conducive regulatory framework is needed for IST adoption, including disseminating and enforcing the ISO standards and defining quotas for ISTs in relevant infrastructure development projects when constructing or renovating schools, healthcare facilities, ports and airports, stadiums, and other amenities. It is also important to nudge potential early adopters to invest in ISTs. REDs and SSOs are not typically held accountable for the disposal of the wastewater produced in their estates and service stations.
About Haskè Conseil

(Haskè = To shine, in Hausa language)

Haskè Conseil (formerly Dalberg Senegal) is a strategy advisory and initiative-building firm. Since 2008, Haskè Conseil has been providing development consulting services, working with governments, businesses, development partners, NGOs and universities on various sectors and topics across the globe. In addition, Haskè Conseil designs, incubates and implements initiatives to accelerate development impact and entrepreneurship. We have supported the establishment of the Women’s Investment Club (WIC) in Senegal. We are incubating TAARAL, which puts in place concrete interventions for the development of the circular economy of plastics in Senegal through a multi-actor alliance involving the entire plastics ecosystem. We are committed at all levels to the development of the private sector, from sector analysis and policy-making, to sector strategies and investment research, paving the way for Africa’s upcoming business champions. Haskè Conseil is part of a group of companies which also includes Haskè Ventures – specialized in building and co-creating companies from ideation to Series A financing, and ignite.E, dedicated to supporting the ecosystem for venture-building in educational institutions.

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and follow us on social media (LinkedIn et Twitter).

About FSMA

FSMA is a member-based network created to support organizations and individuals working in FSM. FSMA is a collaborative, responsive, and collective platform that advocates for the adoption and implementation of FSM to support inclusive sanitation planning as a public service. We set the agenda, champion and promote the development of inclusive sanitation approaches, particularly FSM and non-sewered sanitation (NSS), to ensure human health and dignity, and the health of urban ecosystems.

For more information, please visit www.fsm-alliance.org.