



The Sanitation & Hygiene Fund

Sanitation Economy Estimates

**SIERRA
LEONE
2022**

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FOR MORE INFORMATION

SHF Website www.shfund.org

About This Report

Safe sanitation, hygiene and menstrual health are essential to the achievement of health, education, gender equity, economic growth and climate outcomes in Sierra Leone. This report shines a spotlight on why making investments now into a thriving national sanitation economy makes sense for women, entrepreneurs, investors, the environment, climate, social impact and economic growth. These markets focus on products and services, renewable resource flows, and data and information to transform cities, communities and businesses in pursuit of national targets for equitable and sustainable development. In the context of the political, economic, social, and technological landscape and the business environment, this report provides insights into the multiple opportunities for existing partners and new investors.

A Note on the Estimates

The estimates presented in this report are anchored in country planning and budgets, and localized pricing. Baseline estimates for 2022 are projected into the future with the assumption of reaching universal access to generate a realistic picture of the full market potential and opportunity. Data collection and analysis was carried out between August to December 2022, followed by a review, including a consultation workshop with government and other key experts in early 2023.

All calculations use the conversion rate of US\$ 1 equals Sierra Leonean Leone (SLL) 13945 as per the exchange rate on 8 September 2022.

About the Sanitation and Hygiene Fund

The Sanitation and Hygiene Fund (SHF) is a UN fund dedicated to achieving universal access to sanitation, hygiene, and menstrual health through market-based approaches. SHF works with Low- and Middle-Income Countries (LMICs) to build robust and climate-resilient sanitation economies and MHH markets. In Sierra Leone, SHF is supporting the government to enhance market ecosystems and identify investible propositions with a view to channeling investments in conjunction with development finance institutions and investors.

For more information, please visit:
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Introduction

“ There is a growing recognition that a transformative approach is needed to meet global and national targets on sanitation, hygiene and menstrual health, and any such approach must be grounded in evidence and data. By catalyzing and growing national sanitation economies, we can unlock tangible impacts on health, education, gender equality, livelihoods and climate resilience for governments and for investors. ”

Dominic O’Neill, Executive Director of the Sanitation and Hygiene Fund

Only seven years to 2030 and not only is progress on many Sustainable Development Goals (SDGs) lagging, but hopes of attaining the multiple benefits of women’s social and economic empowerment are under threat. In fact, the sanitation and hygiene target, SDG 6.2 related to safe sanitation, will not be reached until the 22nd century under current conditions.¹ The business of development is not working at the pace and scale needed.

Sierra Leone’s development plan centers around human capital development as the fundamental pathway to achieving sustainable development for the country. Alongside this priority, it identifies economic diversification, governance and accountability for results, infrastructure and economic competitiveness as critical towards a positive socio-economic transformation for an inclusive and resilient society. It also seeks to increase access to clean potable water for the population and to improve sanitation through relevant infrastructure.² To realize Sierra Leone’s development ambition, there is an urgent need to ensure the role of women as leaders, entrepreneurs, employees and consumers in society and the economy. This cannot happen without affordable access to menstrual health and hygiene (MHH) products and services, and a strong sanitation economy that benefits all.

Achieving universal access to sanitation is a huge challenge. Access to safe sanitation is a basic human right. However, nearly half of the global population still does not have access to safely-managed sanitation, meaning they have a dirty or unsafe toilet where the waste is not treated, or there is no toilet at all.³ Urgent acceleration of the current rate of progress, with increased investments in the sanitation and hygiene sector, is required if national development priorities and the global 2030 SDGs are to be met.

The world requires an urgent shift on how we tackle sanitation, a challenge that underpins several other SDGs linked to climate, livelihoods, economic growth, gender, global health and education. This report shows that the market economy approach can deliver on accelerating progress in the sanitation and hygiene sectors. The findings present an opportunity for stakeholders to accelerate collective progress towards achieving SDG 6.2.

A Note on Market Drivers and Barriers

The development of any new economy or market encounters drivers and barriers. The development of the sanitation economy in Sierra Leone is no different. As the market is shaped through innovations along the value chain, strong and dynamic capabilities are needed. Sierra Leone is committed to working with its partners to tackle the systemic barriers that prevent entrepreneurs and enterprises from taking action. This includes work on improving financial competitiveness, considering incentives in the supply chain, enhancing infrastructure and supporting the building of capability among small and medium-sized enterprises (SMEs), in addition to public acceptance of new approaches, products and costs.

About the Sanitation Economy

The **Sanitation Economy** is the growing economy of sanitation and hygiene products and services for all, including for the poorest and most vulnerable. It includes:

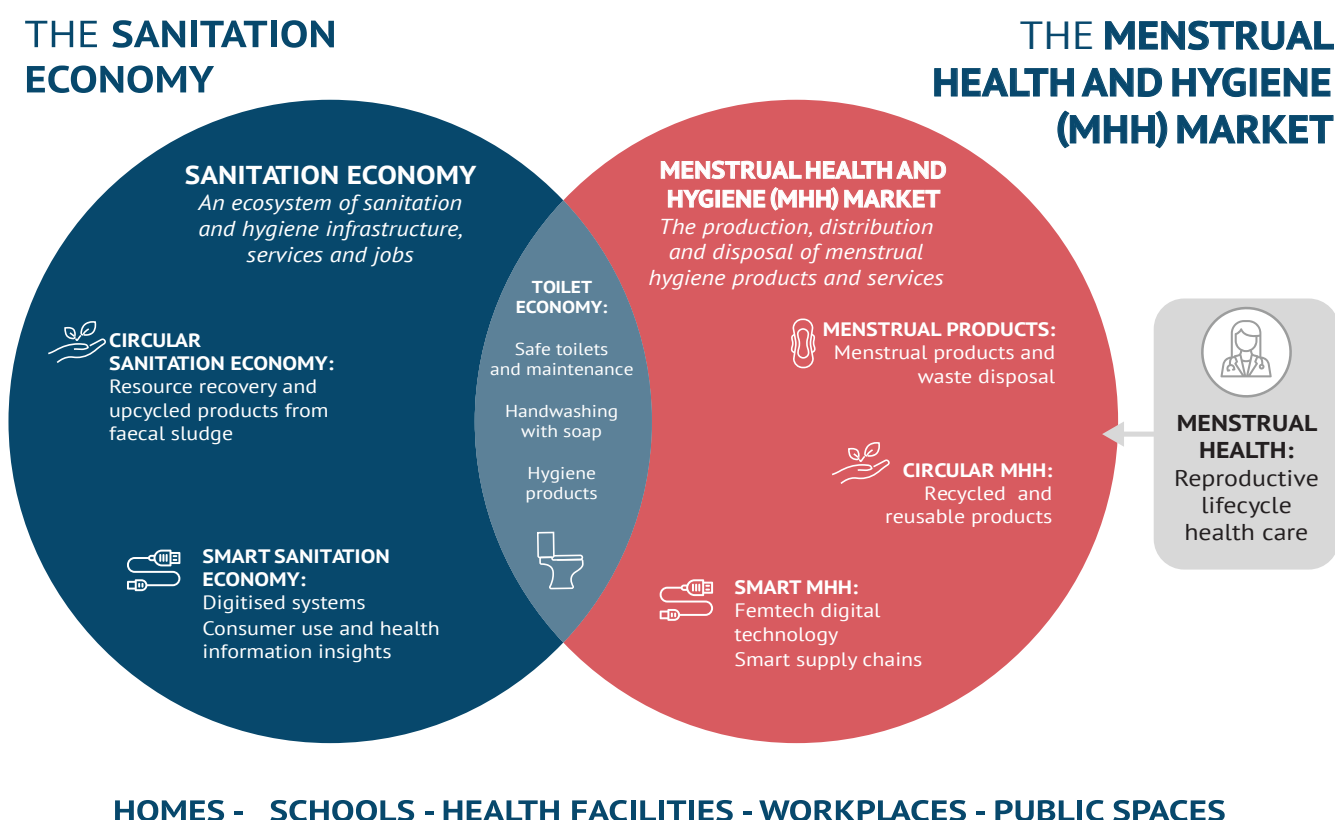
- products and services that provide safe toilet and handwashing access for all, whether public or private (Toilet Economy);
- systems that connect the biocycle, using multiple forms of biological waste, recovering nutrients and water, creating value-adding products such as renewable energy, organic fertilizers, proteins and more (Circular Sanitation Economy); and
- digitized sanitation and hygiene systems that optimize data for operating efficiencies, maintenance, plus consumer use and health information insights (Smart Sanitation Economy).⁴

The **Menstrual Health and Hygiene (MHH) Market** is the marketplace for menstrual hygiene materials, and development of related infrastructure, products and services including disposal and femtech solutions. It includes:

- access to reusable and disposable menstrual materials, as per choice and affordability, gender-responsive facilities and services allowing users to change, clean or dispose of materials safely (Menstrual Products);
- new and innovative technology including recycling and reuse to reduce the impact on the environment (Circular MHH); and
- smart supply chains to extend reach (Smart MHH).

These markets are closely connected as menstruating women and girls require access to safe toilets, handwashing and hygiene products, in addition to MHH.

Figure 1. The Sanitation Economy and Menstrual Health and Hygiene (MHH) Market



Methodology

This report estimates the size of the sanitation economy, its products and services, renewable resource flows, data and information at a country level. The estimates were generated from verified data from published government and other available sources, and cross-validated by interviews with sector experts (see Figure 2). Estimates are provided for a baseline year (2022), and projected into the future on the assumption that universal access will be reached.

Figure 2: Data Sources and Methodology

THE SANITATION ECONOMY POTENTIAL FRAMEWORK					
Objectives	Methods and Tools	Data			
Country-level Analysis	Desk Research: PEST Analysis	Economic (GDP, Employment)		Social (Population, Gender, Urbanization)	
Market Projection	Desk Research and Calculation: Sanitation Economy Estimates Model	Sanitation Economy (Toilet, Circular Sanitation and Smart Sanitation Economies)			
Market Insights	Interviews, Consultation, and Desk Research: SWOT Analysis	Current Market	Market Drivers	Market Barriers	Market Opportunities
Solutions Showcase	Interviews, Consultation Group, and Desk Research	Investible Sanitation			

PEST = Political, economic, social and technological | **SWOT** = Strengths, weaknesses, opportunities and threats

The country's potential was assessed at both macro and micro levels. Starting at the macro level, the economic, social and technological landscape was examined, using available reports, research and statistics. Each data source was assessed in terms of validity, integrity, precision, reliability and timeliness. Additional market insights were gathered through a series of interviews with key experts in the sanitation and hygiene spaces in the country. Interviewees included key government officials working on sanitation and hygiene, and private sector and civil society representatives. The interview data was triangulated with the secondary information sources.

The sanitation economy estimates were calculated based on the most recent population estimates and growth projections, available macroeconomic data and data on current access to sanitation and hygiene, existing estimates of the market value of products and services, and available data on the national context and consumer behaviors. Data collection and analysis was carried out between August to December 2022, followed by a review, including a consultation workshop with government and other key experts in early 2023. The received feedback and comments were integrated and estimates and narrative were subsequently finalized.

As with all research, the estimates presented in this report are subject to some assumptions and limitations. While care was taken to only use the best and most recent available data and to address data gaps, including through the involvement of experts, some gaps remain and not all expert opinions have been independently verified. The projections assume steady progress towards universal access; however, these emerging markets are subject to long-term political, social and economic trends and developments, and may experience unexpected shocks, which could impact the outcomes.

Country Context

Sierra Leone remains off-track in delivering safely managed sanitation for all by 2030. In 2020, only 16% of the population had access to basic sanitation services.⁵ To achieve the national sanitation targets by 2030, investments in sanitation, including menstrual health, need to be prioritized. The country is characterized by a number of strong features that could attract investments in sanitation:



Growing population especially in urban areas: with an average annual growth rate estimated at 2.1% between 2020 and 2030, the Sierra Leonean population is estimated to reach 9.1 million in 2025 and 10.4 million in 2030.⁶ In 2021, about 57% of the population still lived in rural areas.⁷ Urban population is, however, expected to increase as a result of the rural-to-urban migration and national development plan.⁸



Modestly booming economy: disruptions in production and trade induced by the COVID-19 pandemic led to a contraction of the economy by 2% in 2020⁹ and the recovery in 2021 has been modest (+3.2%).¹⁰ The IMF projected Sierra Leone's GDP to grow consistently at 2.4% in 2022, doubling to 5% in 2025.¹¹



Active Small and Medium Enterprises (SMEs) and micro-enterprises space: the World Bank reports that approximately 70% of the population in Sierra Leone is employed by SMEs, which also represent over 90% of the domestic private sector.¹² The Sierra Leone government has also implemented a number of pro-business policies, including tax incentives for investors and efforts to streamline business registration and licensing procedures.



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Value of the Sanitation Economy

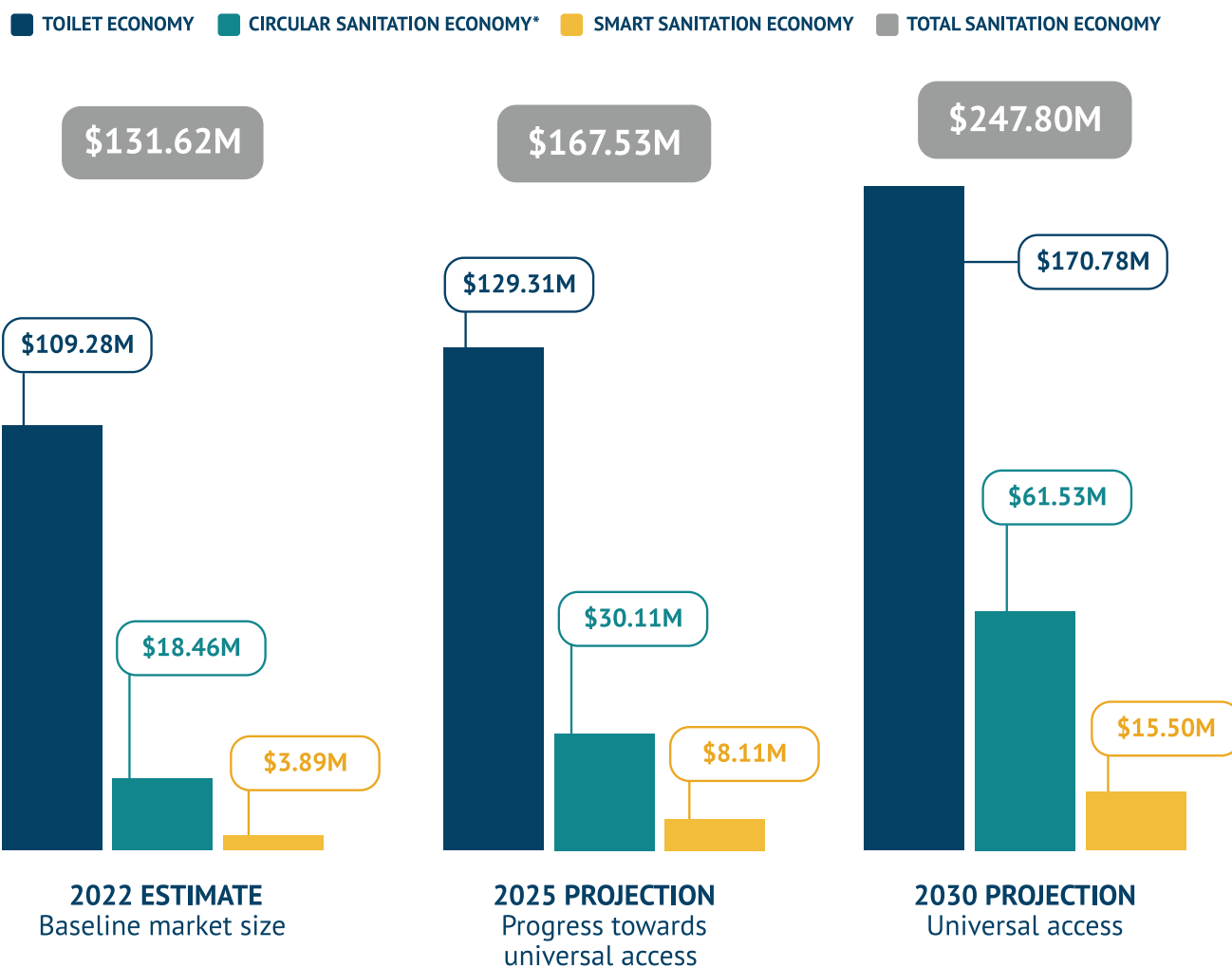
The current total value of the sanitation economy in Sierra Leone is US\$ 131.6 million. Potentially it can exceed US\$ 247.8 million once universal access has been achieved.

KEY POINTS

- At present, the toilet economy accounts for 83% of the total sanitation economy.
- The circular sanitation economy and the smart sanitation economy are expected to grow.
- The potential for economic, environmental, and social return is significant.

When toilet, circular sanitation and smart sanitation economies are thriving, businesses can deliver new and alternative toilet and waste management solutions at a lower cost. They generate revenue and become net producers of valuable resources, such as water, energy, nutrients, proteins, data and information, presenting a new development pathway of opportunities for governments and the business sector to achieve SDG 6.

MARKET ESTIMATE FOR SANITATION ECONOMY (IN US\$ MILLION)



*While biogas has the highest financial potential, it breaks the nutrient cycle as the compounds from food consumption are burned rather than returned to the food system. For the overall sanitation economy estimate, and given that only one product can be produced from a volume of waste, Protein Meal product is selected as it promises financial returns while contributing back to the food system.

Toilet Economy

The **toilet economy** has the potential to grow from an estimated value of US\$ 109.3 million in 2022 to almost US\$ 170.8 million, once universal access has been achieved. Within this category, the household toilet market is valued at US\$ 95.8 million in 2022 and has the potential to reach US\$ 144.2 million, whilst the public toilet market is valued at US\$ 13.5 million in 2022 and may reach US\$ 26.6 million.

MARKET ESTIMATE FOR 2030 TOILET ECONOMY (IN US\$ MILLION) PROJECTION Universal Access

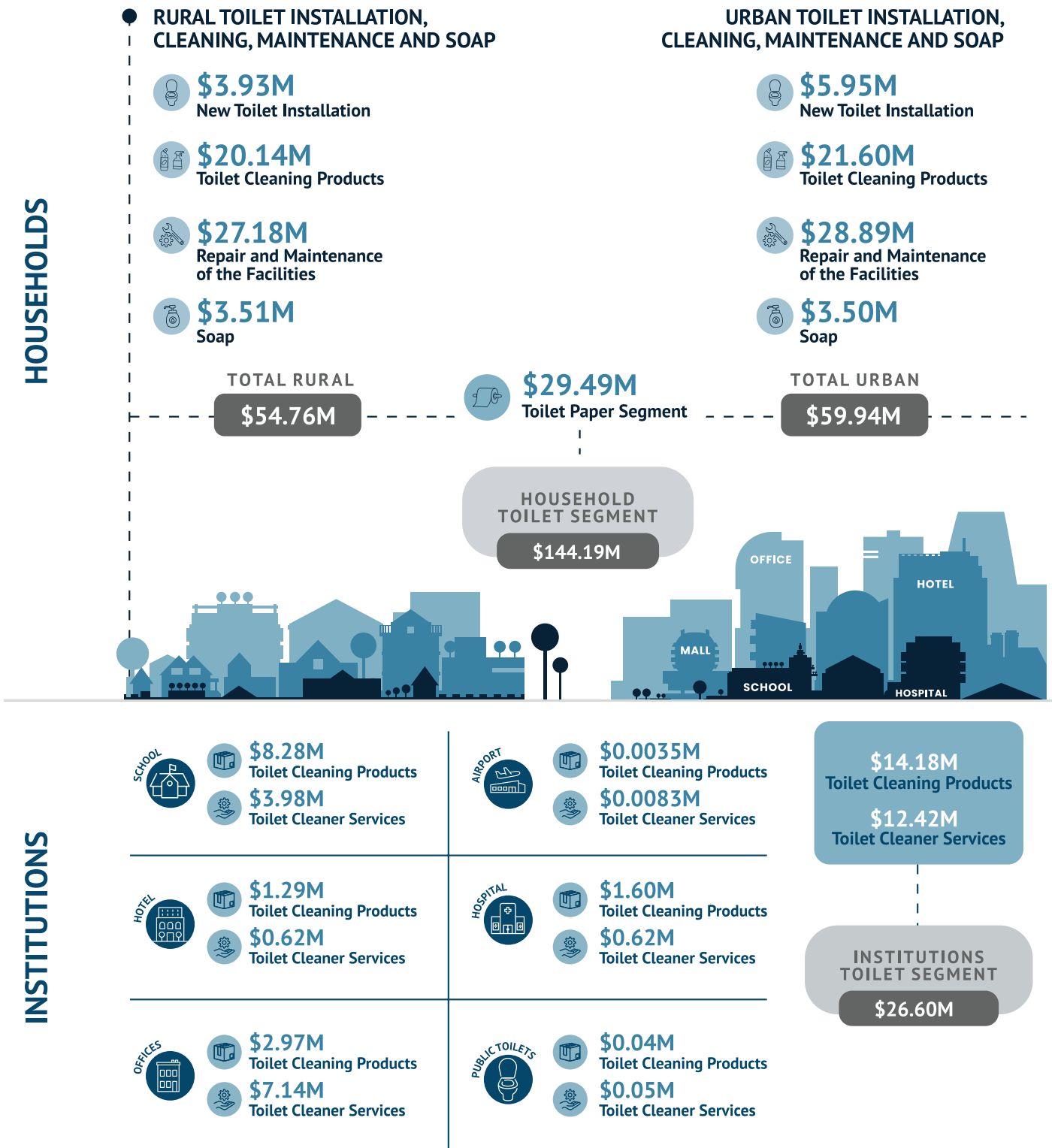


Table 1: Sierra Leone Household Toilet Market

MARKET ESTIMATES FOR TOILET ECONOMY - Households (in US\$ million)	Baseline: Estimate of 2022 market size	Projection: 2025 progress towards universal access	Projection: Universal access in 2030
Urban			
New Toilet Installation	-	2.82	5.95
Toilet Cleaning Products	17.41	18.88	21.60
Repair and Maintenance of the Facilities	20.35	22.89	28.89
Soap	2.21	2.68	3.50
Total Urban	39.97	47.26	59.94
Rural			
New Toilet Installation	-	1.61	3.93
Toilet Cleaning Products	16.24	17.60	20.14
Repair and Maintenance of the Facilities	15.23	18.39	27.18
Soap	1.49	2.21	3.51
Total Rural	32.96	39.81	54.76
Toilet Paper Segment	22.87	25.16	29.49
Household Toilet Segment	95.80	112.23	144.19

Table 2: Sierra Leone Institutions Toilet Market

MARKET ESTIMATES FOR TOILET ECONOMY - Institutions (in US\$ million)	Baseline: Estimate of 2022 market size	Projection: 2025 progress towards universal access	Projection: Universal access in 2030	
School	Toilet Cleaning Products	5.94	6.82	8.28
	Toilet Cleaner Services	2.65	3.16	3.98
Hotel	Toilet Cleaning Products	0.92	1.06	1.29
	Toilet Cleaner Services	0.41	0.49	0.62
Offices	Toilet Cleaning Products	0.55	1.07	2.97
	Toilet Cleaner Services	1.24	2.48	7.14
Airport	Toilet Cleaning Products	0.0031	0.0033	0.0035
	Toilet Cleaner Services	0.0069	0.0075	0.0083
Hospital	Toilet Cleaning Products	1.23	1.38	1.60
	Toilet Cleaner Services	0.44	0.51	0.62
Public Toilets	Toilet Cleaning Products	0.04	0.04	0.04
	Toilet Cleaner Services	0.04	0.05	0.05
Subtotal Toilet Cleaning Products		8.69	10.38	14.18
Subtotal Toilet Cleaner Services		4.79	6.70	12.42
Institutions Toilet Segment		13.48	17.08	26.60

Toilet Economy Market Insights

Current Market Situation

- 1. Dry latrines are the most used sanitation facility.** Dry latrines are used by 71.5% of the population. People without access to these facilities turn to bushes or fields. Others use flush, pour-flush or composting toilets.¹³ In 2019, 8.1% of the households reported having a toilet facility inside their house, while 72% reported having it in their yard. The remaining 19.8% have it elsewhere.¹⁴
- 2. Household expenditure on toilet construction is around SLL 1.6M.** In a 2018 study by GOAL and Athena Infonomics, it was reported that the average expense on toilet construction by households is SLL 1.6M (US\$ 81.2) with the household head usually deciding on such expenditure.¹⁵ Female household heads are more inclined to pay higher (SLL 1.7M / US\$ 86.2) for toilet construction than male household heads (SLL 1.6M / US\$ 81.2).¹⁶ In a more recent study,¹⁷ respondents estimated that hanging toilets cost less than SLL 500,000 (US\$ 46.93), while flush or pour-flush toilets and septic tanks cost more than SLL 2M (US\$ 187.73).
- 3. The market is dominated by imports.** One of the issues raised during the interviews is that most sanitation products are not locally available and require importation. Tariff and taxes for these items range from 25-35%, driving up the cost for the consumer.

Market Drivers

- 1. The government is committed to supporting sanitation initiatives.** The Sierra Leone government has expressed a strong commitment to accelerate access to sanitation. The Ministry of Health & Sanitation is developing strategies, policies, and regulatory frameworks to develop a multi-sector approach to tackling sanitation. The government has also collaborated with the private sector through public-private partnerships to provide financial support and technical assistance for sanitation services. This is a positive step towards more private sector participation. It is important that these efforts are sustained over the long-term, and that they are integrated into broader strategies for poverty reduction, health promotion and sustainable development.
- 2. Households are willing to pay SLL 1 to 1.5M for toilet construction.** In a 2018 study by GOAL and Athena Infonomics in Kenema City, Sierra Leone, it was reported that households are willing to pay SLL 1 to 1.5M (US\$ 50.75 to 76,12) for toilet construction.¹⁸ This is slightly lower than the average expense on toilet construction of SLL 1.6M (US\$ 81.20). Those using their neighbor's toilet also exhibited willingness to pay for a higher amount (SLL 2.25M / US\$ 81.20).
- 3. There is an existing legal framework for Public Private Partnerships (PPPs).** The government has established a regulatory framework for PPPs namely the PPP Policy, PPP Act 2014 and PPP Regulations, demonstrating the intent to create an enabling environment for the private sector. A specialised PPP unit is also housed under the Office of the President, though it still requires better implementation and stronger technical capacity to deliver projects.

Market Barriers

- 1. Household income dictates aspirations.** The purchasing capacity of individuals in Sierra Leone is relatively low compared to other countries around the world. Poverty (earning less than US\$ 2.15 a day) remains a major problem in the country, with 26.1% of the population living below the poverty line.¹⁹ According to the 2018 Sierra Leone Integrated Household Survey, the national average household income is SLL 18.9M (around US\$ 1,000).²⁰ Urban areas have higher average income (SLL 7M / US\$ 355.24) than rural areas (SLL 4.8M / US\$ 243.29).²¹ Men have predominantly higher average income (SLL 9.5M / US\$ 482.11) than women (SLL 2.4M i.e US\$ 121.80).²² Data suggests that the Western region and urban areas may be a potential market for aspirational sanitation products, while the rest are for basic sanitation.
- 2. Sanitation is not an explicit part of household purchase priorities.** Food items comprise 46.75% of household consumption expenditure.²³ Sanitation may form part of either household maintenance with an average expenditure of SLL 1,233 (US\$ 0.063), health with SLL 1,695 (US\$ 0.086), or miscellaneous goods and services with SLL 852.²⁴ This shows that annual spending on sanitation may be limited to only between SLL 800 to SLL 1,600 (US\$ 0.041 to US\$ 0.081) annually.
- 3. Market data is unavailable.** Market data plays a crucial role in the decision-making process of the private sector, particularly investors. Lack of data on the sanitation market can lead to an unattractive investment climate and missed opportunities. Government and other stakeholders can help improve data availability by facilitating consumer and business surveys as well as regular assessment of the sanitation market.

Market Opportunities

- 1. There is a need for local production of sanitation products.** One major challenge in access to sanitation is the high cost of sanitation products. This is further exacerbated by limited local manufacturing, high importation costs, inadequate distribution channels that limit access to sanitation in remote areas. To address these, increased investment in local manufacturing of sanitation products and improved distribution channels are needed. Interviews reveal that the country is open to local production of sanitation products to minimize the cost of these products.
- 2. There is a demand for toilet paper by tourists.** Although toilet paper is not a common household item in Sierra Leone, a potential market is seen in Freetown, Sierra Leone, as it houses tourists in the country.²⁵ Tourist arrivals in the country reached 71,000 in 2019, which could be a potential market.²⁶
- 3. Hygiene practices are present in dominant religious groups.** Sierra Leone has a blend of primarily Muslims (77%) and Christians (21.9%) in the country.²⁷ Washing or ablution is particularly important for Muslims, especially before entering mosques, so mosques have water and hygiene practices are socialised among the population. Sanitation behaviour change can be built on these practices.

4. Access to affordable sanitation products is needed. Sierra Leone presents a market opportunity for affordable sanitation products given its significant sanitation challenges and an increased demand potential for affordable products. Businesses need to focus on developing products that are affordable, accessible, and culturally appropriate, as well as investing in education and awareness campaigns to increase demand for these products.

5. Awareness campaigns and education programs are crucial. There is a need for awareness campaigns and education programs to promote the importance of sanitation and hygiene practices. Private sector companies can invest in these programs and work with government and non-governmental organizations to promote awareness and behavior change.

Case Study

Opportunities for Sanitation Marketing in Sierra Leone

In 2011, UNICEF engaged NestBuilders International (NBI) to conduct a sanitation marketing study²⁸ in Sierra Leone looking at the demand and supply side of sanitation in the country. Some notable findings are:

DEMAND

Challenges	<ul style="list-style-type: none"> Limited finances constrain ability to purchase or improve sanitation facilities. In urban areas, limited space and tenancy were a challenge. For rural areas, lack of attractive low-cost sanitation technology was identified as a hurdle.
Drivers	<ul style="list-style-type: none"> Social pressure, disgust, and shame

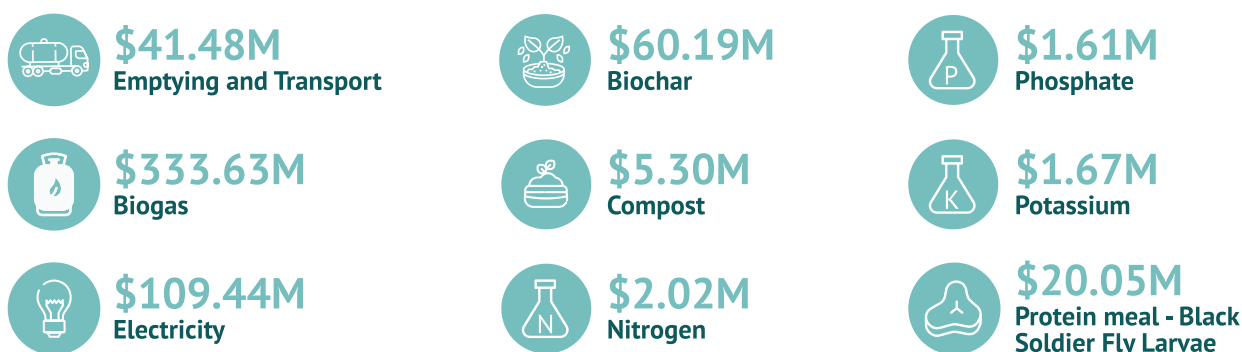
SUPPLY

Characteristic	<ul style="list-style-type: none"> Dominated by imports with little product diversity
Challenges for businesses	<ul style="list-style-type: none"> Lack of capital for businesses Inadequate sanitation trainings, materials, and tools Government taxes Poor infrastructure High transportation cost Lack of marketing and business capability

Circular Sanitation Economy

The **circular sanitation economy** appears to be on a favorable track due to the country's immense need for faecal sludge management services, energy and agricultural products. The surge in the price of agricultural products, due to the current Ukraine-Russia conflict has further triggered the demand for locally-produced fertilizers. The market for emptying and transport is relatively strong, with an estimated value of US\$ 18 million in 2022 and the potential to reach US\$ 41.5 million by 2030. In terms of resource recovery, biogas shows the largest potential, with an estimated value of US\$ 44 million in 2022 and the potential to grow to almost 7.5 times that size, eventually reaching US\$ 333.6 million.

MARKET ESTIMATE FOR 2030 CIRCULAR SANITATION ECONOMY* (IN US\$ MILLION)



*Note that this report does not total the estimates in the Circular Sanitation Economy as only one product can be produced from a volume of waste. Stakeholders are encouraged to look not only at the potential revenue of products but also, from a circular economy perspective, at retaining the value of the product. For example, biogas is a significant leader in financial potential, enables greener cooking and produces a liquid fertiliser. For the overall sanitation economy estimate, Protein Meal product is selected as it promises moderate financial returns while also contributing back to the food system.

Table 3: Sierra Leone Circular Sanitation Market

MARKET ESTIMATE FOR CIRCULAR SANITATION ECONOMY (in US\$ million) ²⁹	Baseline: Estimate of 2022 market size	Projection: 2025 progress towards universal access	Projection: Universal access in 2030
Emptying and Transport	18.02	26.75	41.48
Biogas	44.01	127.50	333.63
Electricity	0.17	8.17	109.44
Biochar	7.67	1.96	60.19
Compost created	0.70	2.03	5.30
Total nitrogen	0.27	0.77	2.02
Total phosphate	0.21	0.62	1.61
Total potassium	0.22	0.64	1.67
Protein meal/black soldier fly larvae	0.43	3.35	20.05

Circular Sanitation Economy

Market Insights

Current Market Situation

- 1. There is an underdeveloped market for faecal sludge emptying and transport.** Freetown is the capital and largest city in Sierra Leone. Up to 90% of its 1.2 million inhabitants rely on on-site sanitation facilities, such as pit latrines and septic tanks.³⁰ GOAL reported that at least 100,000 m³ of raw faecal sludge is produced annually in the city.³¹ However, only 10% of this amount is disposed of in official sites, while the rest is dumped illegally in drains or natural waterways.³² Currently, faecal sludge emptying and transport in Freetown are done through vacuum trucks, Gulper (a manual latrine/ drain pit pump operated by one or two pit emptying operators) operators and manual emptiers.³³
- 2. Additional Faecal Sludge Treatment Plants (FSTPs) are needed in the country.** The country's first and only liquid waste treatment plant in was constructed in 2021. The facility uses innovative Geobag technology (dewatering bags or tubes that act as filters that expel non-toxic water from slurry) and processes approximately 11 trucks per day, an equivalent of 11% of Freetown's waste from septic tanks and latrines. GOAL reported that as of June 2022, the plant had processed 1,500 truckloads of faecal sludge (over 11KT of sludge), which is 15% of Freetown's liquid waste.³⁴

Market Drivers

- 1. There is a willingness to pay.** A 2016 study in Freetown Sierra Leone showed that 60% of households are willing to pay for US\$ 23-70 for faecal sludge services.³⁵

Market Barriers

- 1. The country lacks national guidelines for faecal sludge management (FSM).** Although there are local guidelines in place, a national FSM guideline is lacking, which could solidify the need for better FSM technologies.
- 2. High registration fees limit market growth.** A 2022 study revealed that emptiers are required to pay SLL 200,000 (US\$ 10.15) annually as registration fees and SLL 100,000 (US\$ 5.07) for every trip to Kingtom disposal site.³⁶ Fees are high, unfixed and even vary from one client to another.
- 3. People lack knowledge on FSM and output products.** It is crucial to invest in educating the public about the proper use of faecal output products.
- 4. Accessibility constraints plague some households.** Poor road networks and narrow spaces make more than 40% of households inaccessible to mechanized emptying. Households, therefore, have to resort to manual emptying, which could be dangerous and unhygienic. Accessibility and inclusivity could be considered in the design and planning of the emptying technologies.

Market Opportunities

1. There is potential for mechanized emptying. According to GOAL, manual pit emptiers serve about 36% of Freetown's population. The other 63% of the population reported using vacuum trucks (mechanical emptiers),³⁷ which are still insufficient in the city, resulting in low-level and irregular pit emptying. There is a huge market potential for trucks, since 73% of Freetown households are accessible to trucks.³⁸ The projection reveals a massive market for motorized emptying and transport (i.e. vacuum trucks) services in Sierra Leone.

2. The country has a massive need for FSTPs. Using the country's urban population and estimated waste generation, a simple projection of the required FSTPs in Sierra Leone is shown below.³⁹

Estimated FSTPs needed	2022	2025	2030
Freetown	10	11	13
Bo	5	6	7
Kenema	5	5	6
Koidu	4	4	5
Makeni	6	6	7
Waterloo	3	4	4
Other 78 Towns	141	153	175
Total	174	189	217

3. Circular sanitation could provide a solution to renewable energy needs. Sierra Leone is reported to suffer from energy poverty, with only 26.2% of the population having electricity access,⁴⁰ one of the lowest rates in the world. The Ministry of Energy has been mapping out strategies to improve this by tapping into renewable energy sources. Estimates show there is significant energy production potential from the country's Sanitation Economy in the form of biogas, electricity, and biochar.

4. There is a strong demand for compost. A basic market survey for compost from human faecal sludge was conducted by GOAL in Freetown in 2013.⁴¹ The report revealed a strong demand for compost among specific consumer groups, due to its potential nutrient value and affordability.⁴² Mining companies and large agricultural companies expressed the highest interest and need. Other potential customers are formal landscapers, golf clubs, and high-end florists.⁴³

5. Circular sanitation could be a solution to fertilizer needs. The country's agriculture sector accounts for 60% of the GDP and employs two-thirds of the population.⁴⁴ However, the sector currently faces unprecedented price shocks in food, energy, and fertilizers due to the Russia-Ukraine conflict. According to CARE, farmers raised concerns about doubling seed and fertilizer prices.⁴⁵ Farmers reportedly planted only half their field size, thus yielding low production levels of food crops.⁴⁶

6. There is strong potential for onsite treatment technologies. Given the challenges in accessibility in some households, on-site treatment technology such as on-site biogas production can be explored.

Smart Sanitation Economy

The **smart sanitation economy** is valued at US\$ 3.9 million in 2022, with the potential to triple to US\$ 15.5 million. Growth is likely to accelerate as power access and internet connectivity improve.

MARKET ESTIMATE FOR 2030 SMART SANITATION ECONOMY (IN US\$ MILLION) PROJECTION Universal Access

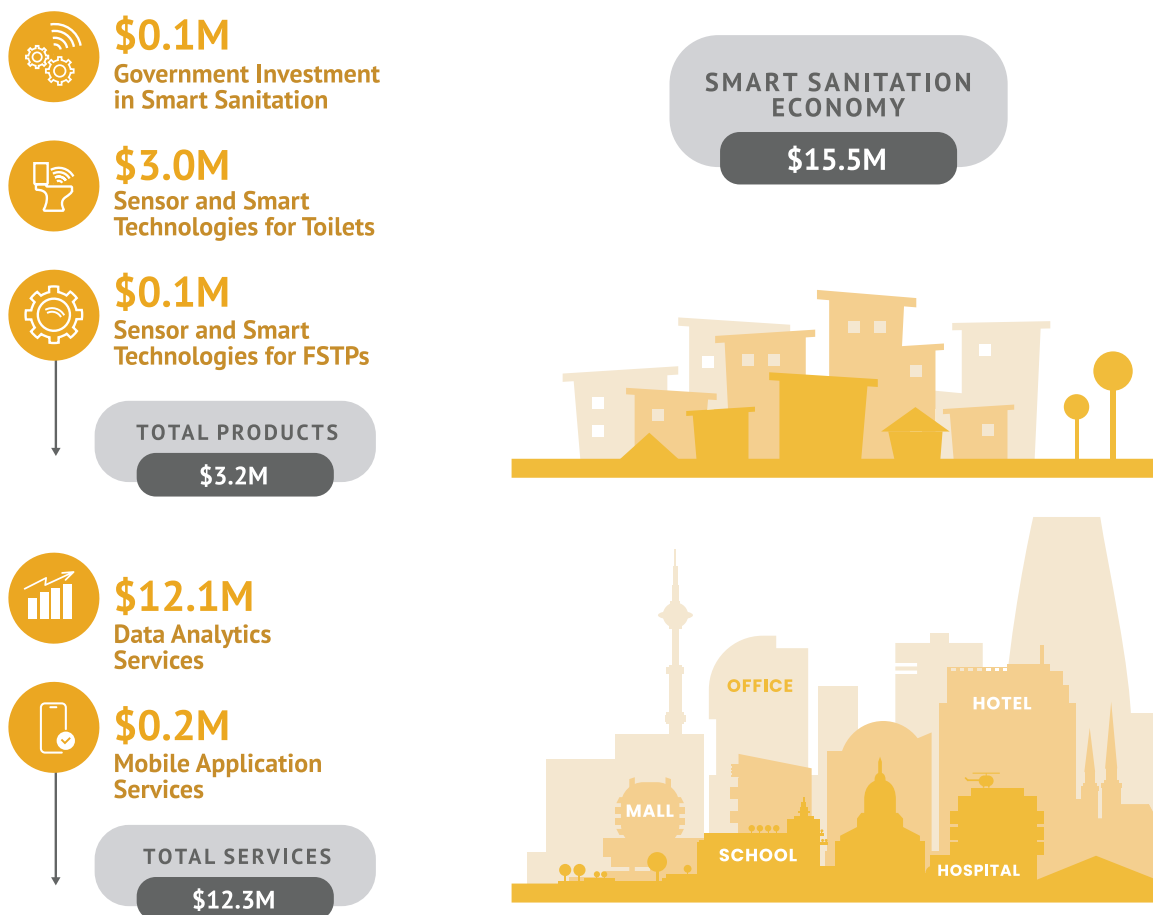


Table 4: Sierra Leone Smart Sanitation Market

MARKET ESTIMATE FOR SMART SANITATION ECONOMY (in US\$ million)	Baseline: Estimate of 2022 market size	Projection: 2025 progress towards universal access	Projection: Universal access in 2030
Product			
Health Data	0.1	0.1	0.1
Sensor and Smart technologies for toilets	0.7	1.5	3.0
Sensor and Smart technologies for waste treatment	0.0	0.1	0.1
Total Product	0.8	1.7	3.2
Services			
Data Analytics Services	3.0	6.3	12.1
App Services	0.1	0.1	0.2
Total Services	3.1	6.5	12.3
Smart Sanitation Economy	3.9	8.1	15.5

Smart Sanitation Economy Market Insights

Current Market Situation

1. **Smart sanitation technologies are yet to develop in Sierra Leone.** Interviews revealed that although there is a smart sanitation boom potential in the country, it is currently unrealistic given the country's technological infrastructure.

Market Drivers

1. **Sierra Leone has a high percentage of mobile subscriptions.** In smart sanitation economy, mobile applications are tapped to connect service providers and customers, facilitate remote payment, and track health data.⁴⁷ In Sierra Leone, 86% of the population have mobile cellular subscriptions. If at least 10% of mobile app users subscribe to paid apps related to sanitation, a relatively sizable market may be open to mobile app developers.

Market Barriers

1. **There are high upfront costs.** Smart sanitation technologies are relatively expensive, posing issues to their feasibility and return of investments. Sensors, for example, are not yet available in the country, require importation and entail additional costs.
2. **There is a lack of regulatory framework.** Data brings issues related to privacy, ownership and confidentiality. A clear regulatory framework would permit businesses and governments to harness insights and value from smart sanitation systems, while protecting and empowering citizens to thrive in the market.

Market Opportunities

1. **Smart sanitation technologies are possible in urban and well-developed establishments.** Smart sanitation technologies could be of interest to the private sector, although implementation might not be possible in all areas. Suggested areas are urban areas, as well as universities, airports, hospitals, health centers, schools, offices, and stadiums.

Showcase

Innovations can drive consumer demand for sanitation, but it is more than just the toilets. The Toilet Board Coalition hosts an accelerator program that scales up essential innovations in toilet design, circular recovery of biological resources, smart digital technologies and menstrual hygiene products to ensure safe and sustainable sanitation for all. This section highlights sanitation solutions from the Coalition's portfolio plus Elphrods Services that are scalable, innovative, replicable, commercially viable and responsive to the needs of emerging markets in Asia and Africa.

Toilet Economy

Company name CleanTeam

Year Founded 2010

Country of Operations Ghana

Solution Portable toilets



Problem that you were trying to solve Inadequate sanitation facilities in low-income communities

Description of the Solution CleanTeam offers portable toilets to low-income users in Kumasi, Ghana. CleanTeam uses a product-as-a-service model and charges monthly fees for toilet servicing, rental and waste collection thrice weekly. Waste collected from the toilet facilities is disposed of at the municipal treatment center.

Impact Over 600 toilets were installed, providing access to improved sanitation to 4,500 people.

Contact Information Abigail Aruna

Company name Elphrods Services LLP

Year Founded 2021

Country of Operations Kenya

Solution Affordable and inclusive WASH credits



Problem that you were trying to solve Inaccessible water and sanitation services in low-income areas

Description of the Solution Elphrods Services LLP offers small credits for small and medium-sized businesses and households wanting to improve their WASH facilities and matchmaking with WASH service providers (i.e. manual pit emptiers, exhausters, plumbers, utilities and master operators). The WASH credits enable them to connect their facilities to water piping networks, access formal pit emptying services and upgrade their pits to meet the required standards.

Impact Over 1,000 households have benefitted from the program since its inauguration.

Contact Information Denish Owiti



Circular Sanitation Economy

Company name Pit Vidura

Year Founded 2016

Country of Operations Rwanda

Solution Faecal sludge emptying and transportation



PIT VIDURA



Problem that you were trying to solve Unsafe and unsustainable faecal sludge emptying and transportation



Description of the Solution Pit Vidura is a sanitation logistics company that targets low-income communities with no access to public sewerage systems. It offers a quick and clean waste management solution to poor households and currently maintains over 960 toilets annually.



Impact Pit latrines are emptied annually (as opposed to every seven years prior to Pit Vidura) at a relatively affordable rate of US\$ 8.50 per household annually.



Contact Information Nicolas Kuria

Company name Kaka Cesspool Services

Year Founded 2018

Country of Operations Uganda

Solution Faecal sludge management services



KAKA CESSPOOL SERVICES



Problem that you were trying to solve Inadequate and unsafe faecal sludge emptying services in Uganda



Description of the Solution Kaka Cesspool Services is a faecal sludge emptying and transportation company that serves households in Uganda, including those in congested slums, which were deemed inaccessible. Faecal sludge is safely collected and transported to the treatment plant.



Impact Over 2,262 households were emptied – equivalent to 4,020 m³ volume – in 2022. Employment opportunities, especially for the young, were also created in their respective communities.



Contact Information Derrick Matovu

Smart Sanitation Economy

Company name Garv Toilets

Year Founded 2017

Country of Operations India, Ghana, Nigeria

Solution Smart portable toilet cabins



Problem that you were trying to solve Lack of sustainable toilets for public use, especially for women and the disabled



Description of the Solution Garv Toilets offers a 'Smart toilet' solution, with self-cleaning and automation, requiring no grid power or sewer lines and less capital to maintain. It is also specifically engineered for women and the disabled population.



Impact Serves 170,000 users daily with over 900 toilets deployed in 68 locations.



Contact Information Mayank Midha

A Forward Look

“ The world keeps moving further away from achieving the Global Goals. We know how to get back on track. What we need is unity of purpose, effective leadership from all sectors and urgent, ambitious action. ”

António Guterres, Secretary-General of the United Nations

The sanitation economy provides sustainable and complementary solutions, monetizing toilet provision, products and services, biological resources, health data and information, to provide benefits across business and society. This report shows the unrealized US\$ 120 million potential that exists in the sanitation economy in Sierra Leone today and how opportunities will grow as these services expand to all Sierra Leoneans. The Sanitation & Hygiene Fund (SHF) is committed to realizing this potential and the immense economic, social and environmental benefits.

As we create demand for sanitation and drive gender equality, we call on our development partners, the investment community, philanthropists, the financial sector and private sector to focus also on market-based sanitation, hygiene and menstrual health.

Together we can



1. Build a dynamic pipeline of bankable projects in the sanitation economy. These investment propositions will focus on specific elements of the sanitation economy profiled in this report, and will lay out compelling business plans and clearly show the social, environmental and financial returns for investors.



2. Facilitate flow of investment into the sanitation economy. Together, we can align commercial investors, impact investors and philanthropists with the right type of investment opportunities. We will work with our partners to design innovative finance instruments to de-risk these investments and maximize the impact of funding from Sierra Leone's development partners.



3. Strengthen the enabling environment to attract new and greater investments into the sanitation economy. We know that the economic potential highlighted in this report will only be realized when barriers to investment are removed and new incentives are put in place. We are putting in place concrete plans on various priority public reforms to address these bottlenecks and we invite all partners to support these crucial actions.

Social impact and financial return can co-exist. We can achieve safe sanitation for all, catalyze economic growth, eradicate poverty and ensure women's empowerment and job creation. We look forward to your support.

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