



The Sanitation & Hygiene Fund

Sanitation
Economy
and
Menstrual
Hygiene
Marketplace
Assessment

NIGERIA
2022

End Open D

This report has been developed for Nigeria's
Federal Ministry of Water Resources.



© The Sanitation & Hygiene Fund 2023

All rights reserved. The reproduction of any materials from this publication must be accompanied by a full citation.

The views expressed in this publication are those of the authors and do not necessarily reflect those of the United Nations. The designations employed and the presentation of the material in this publication do not imply the expression of any opinion whatsoever on the part of UNOPS.

All reasonable precautions have been taken by UNOPS to verify the information contained in this publication. However, the published material is being distributed without warranty of any kind, either expressed or implied. The responsibility for the interpretation and use of the material lies with the reader. In no event shall the UNOPS be liable for damages arising from its use.

This report may be cited as follows: The Sanitation & Hygiene Fund. 2023. Sanitation Economy and Menstrual Hygiene Marketplace Assessment: Nigeria 2022. UNOPS, Geneva, Switzerland.

The Sanitation & Hygiene Fund would like to thank the Toilet Board Coalition for their contributions.

FOR MORE INFORMATION

SHF Website www.shfund.org

About This Report

Safe sanitation, hygiene and menstrual health are essential to achievement of health, education, gender equity, economic growth and climate outcomes in Nigeria. This report shines a spotlight on why making investments now into a thriving national sanitation economy and menstrual hygiene marketplace 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 report builds on earlier estimates, commissioned in 2020. The new estimates reflect a significant evolution and are increasingly anchored in country planning and budgets, and localized pricing. Where, in the past, a thriving sanitation economy was assumed in the baseline year, the updated estimates start with an estimate of the current reality. The baseline estimates are projected into the future, with the assumption of reaching universal access, to generate a realistic picture of the full market potential and opportunity. With the addition of separate menstrual hygiene marketplace estimates, menstrual products and services were moved out of the sanitation economy. Across the report, updated data, research and assumptions were used. Data collection and analysis were carried out between August and December 2022, followed by a review, including a consultation workshop with government and other key experts in early 2023.

The valuation is made at the US\$/NAIRA conversion rate of 9 September 2022: 1/427.35

About the Sanitation and Hygiene Fund

The Sanitation and Hygiene Fund (SHF) is 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 sanitation economies and menstrual hygiene marketplaces. In Nigeria, 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:
www.shfund.org.



© WSSCC

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.

Nigeria’s development priorities focus on issues of poverty, the need for an inclusive economy, health and wellbeing, education, gender equality and the enabling environment of peace, security and partnerships. To realize Nigeria’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 population² still does not have access to safely-managed sanitation, meaning they have a dirty or unsafe toilet where the waste is not treated – or no toilet at all. It requires a quadrupling of the current rate of progress and a tripling of current investments in the sector if the global 2030 sustainable development goals are to be met.³

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, hygiene and menstrual health 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 and the menstrual hygiene marketplace in Nigeria is no different. As the market is shaped through innovations along the value chain, strong and dynamic capabilities are needed. Nigeria 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 SMEs, in addition to public acceptance of new approaches, products and costs.

About the Sanitation Economy and Menstrual Hygiene Marketplace

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:

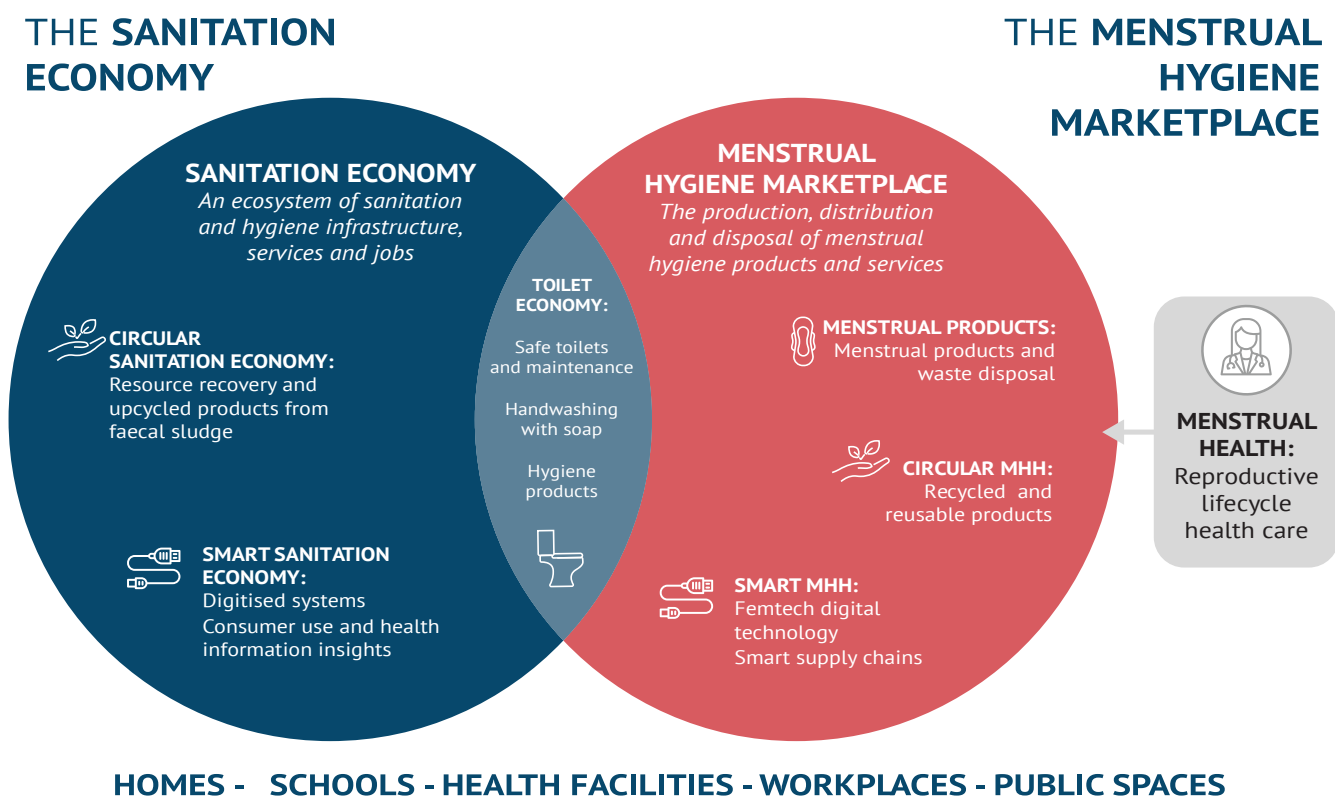
- products and services that provide safe toilet and handwashing access for all, whether public or private (Toilet Economy);
- systems that connect the biocycle, using multiple forms of biological waste, recovering nutrients and water, creating value-adding products such as renewable energy, organic 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 Hygiene Marketplace** 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); and
- 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 the Menstrual Hygiene Marketplace



Methodology

This report estimates the size of the sanitation economy and menstrual hygiene marketplace, their 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. (A detailed description of the methodology and indicators used is available as a separate document.)

Figure 2: Data Sources and Methodology

THE SANITATION ECONOMY AND MENSTRUAL HYGIENE MARKETPLACE 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 and Menstrual Hygiene Marketplace Estimates Model	Sanitation Economy (Toilet, Circular Sanitation and Smart Sanitation Economy)		Menstrual Hygiene Marketplace (Menstrual Products, Circular MHH and Smart MH)	
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	Investable Sanitation and Menstrual Hygiene Solutions			

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 and the menstrual hygiene spaces in the country. Interviewees included key government officials working on sanitation, hygiene and MHH, and private sector and civil society representatives. The interview data were triangulated with the secondary information sources.

The sanitation economy and menstrual hygiene marketplace estimates were calculated, based on the most recent population estimates and growth projections, available macroeconomic data and data on current access to sanitation, hygiene and MHH, existing estimates of the market value of products and services, and available data on the national context and consumer behaviors. Data collection and analysis were carried out between August and 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 use only 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

Nigeria remains off-track in reaching access to safely-managed sanitation for all by 2030. In 2021, 48 million people (19%) still practiced open defecation.⁵ 39% still used unimproved and limited sanitation facilities and only 43% had access to basic sanitation.⁶ To reach the national sanitation targets by 2030, increased investment in sanitation, including menstrual health, is imperative. The country has significant potential to attract sanitation economy and menstrual hygiene marketplace investments:



Large and growing population: with a population of 211 million⁷ people spread across 36 states, Nigeria is considered the most populous country in Africa. Estimated to grow annually at 2.62% between 2020 and 2030, Nigeria's population could reach 271 million by 2030.⁸ 53% of the Nigerian population is concentrated in urban areas, while the rest is in rural areas.⁹ In 2025, the number of households is estimated at 49 million and 55.7 million in 2030.¹⁰ The increasing population leads to higher demand for sanitation and menstrual products and facilities, representing an opportunity for the market to grow.



Young and active workforce: the country has a 64.48 million labor force, 57.52 million of whom were employed in 2020.¹¹ Youth employment (ages 15 to 24) accounted for 19.61% of the population.¹² This marks opportunities for sanitation businesses to obtain an active and young workforce, should investments come in the future.



Economic power and largest economy in Africa: with a GDP of US\$ 440 billion, growing annually, Nigeria is ranked as the first economic power in Africa.¹³ Although it experienced recession in 2020 due to the COVID-19 pandemic, it slightly recovered, recording a GDP growth of 3.6% in 2021.¹⁴ A 2014 report projected that Nigeria could enter the top 20 world economies in 2030, with an average annual growth of 7.1%.¹⁵



© Elke de Buhr | SHF

The Combined Sanitation Economy and Menstrual Hygiene Marketplace Potential

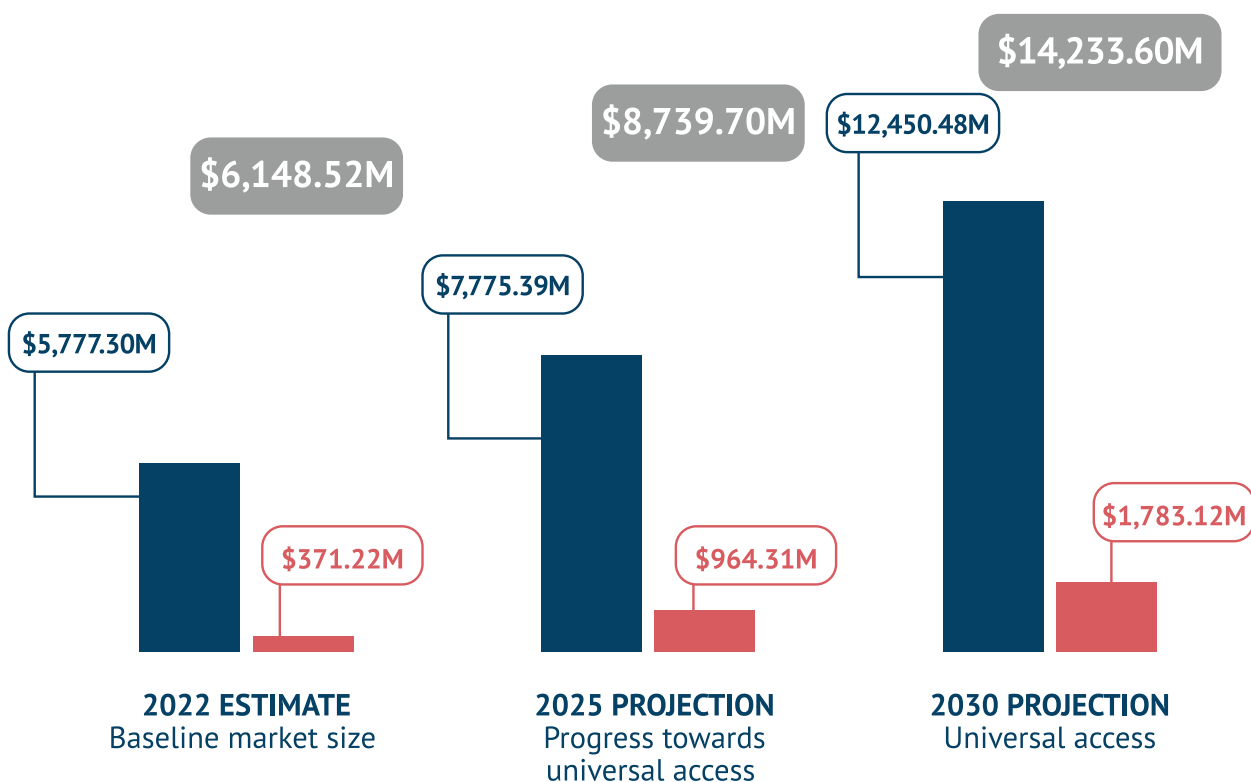


Combined, the sanitation economy and menstrual hygiene marketplace potential in Nigeria is currently estimated at **US\$ 6.1 billion**. This estimate has the potential to more than double to **US\$ 14.2 billion**.

- 2022 ESTIMATE Baseline market size
- 2030 PROJECTION Universal access

MARKET ESTIMATE FOR SANITATION ECONOMY & MENSTRUAL HYGIENE MARKETPLACE (IN US\$ MILLION)

■ SANITATION ECONOMY ■ MENSTRUAL HYGIENE MARKETPLACE ■ TOTAL SANITATION ECONOMY & MENSTRUAL HYGIENE MARKETPLACE



Value of the Sanitation Economy

The current total value of the sanitation economy in Nigeria is US\$5.8 billion. Potentially it can exceed US\$12 billion, once universal access has been achieved.

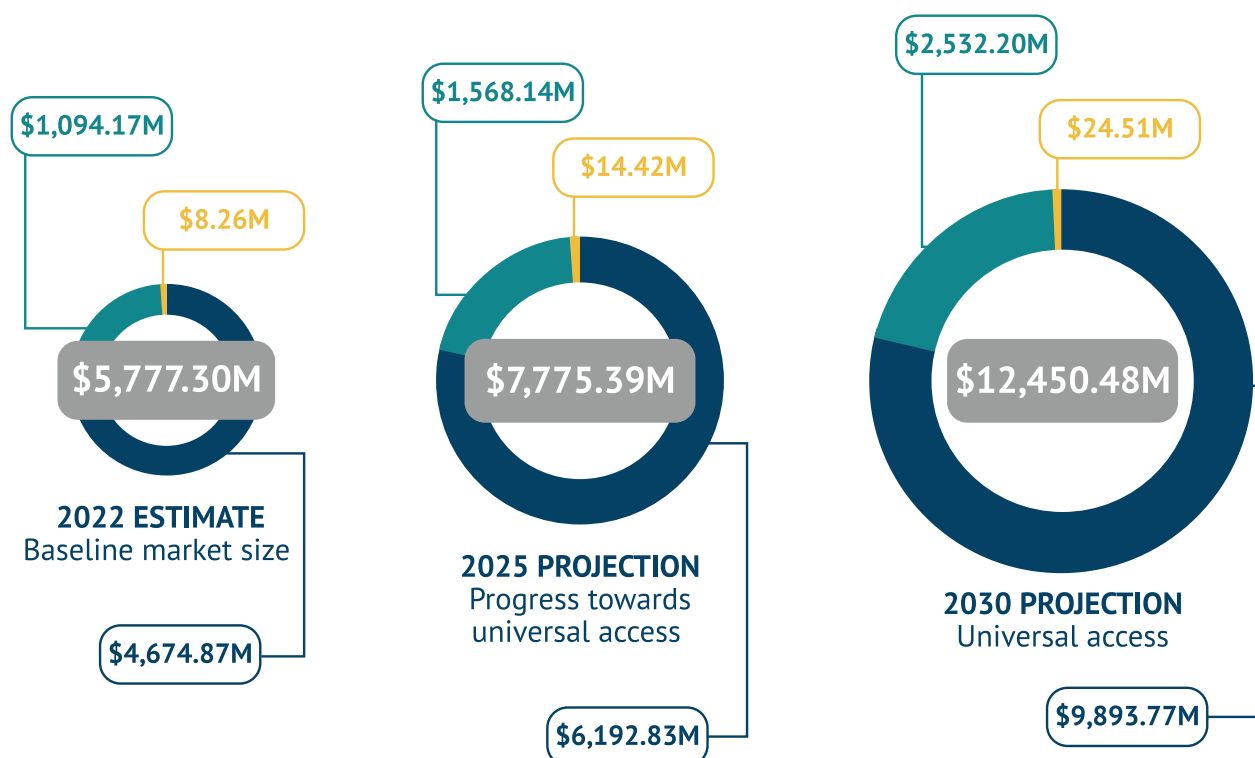
KEY POINTS

- The toilet economy accounts for over 80% 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)

■ TOILET ECONOMY ■ CIRCULAR SANITATION ECONOMY* ■ SMART SANITATION ECONOMY ■ TOTAL SANITATION ECONOMY



*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\$4.7 billion in 2022 to almost US\$10 billion, once universal access has been achieved. Within this category, the household toilet market is valued at US\$4.4 billion in 2022 and has the potential to reach US\$9.6 billion, and the public toilet market is valued at US\$225.7 million in 2022 and may reach US\$320.6 million.

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

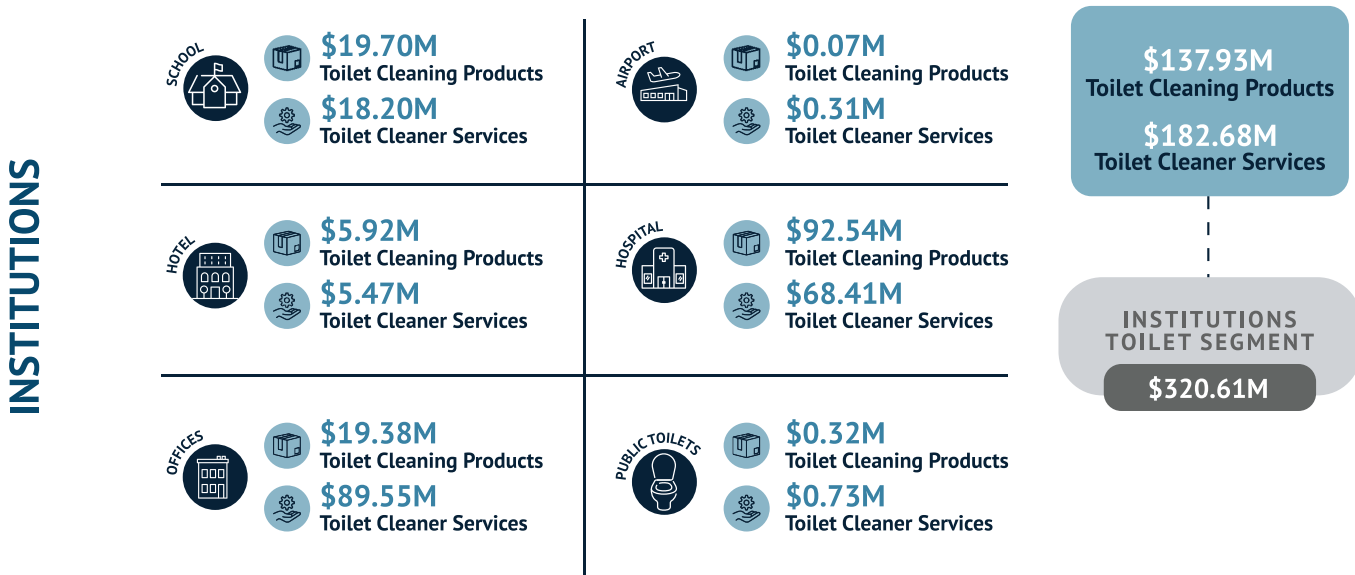


Table 1: Nigeria Household Toilet Market

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			113.87	150.09
Toilet Cleaning Products		573.04	619.77	705.60
Repair and Maintenance of the Facilities		794.38	905.78	1,169.97
Soap		51.51	66.33	100.32
Total Urban		1,418.92	1,705.75	2,125.98
Rural				
New Toilet Installation			66.39	165.18
Toilet Cleaning Products		513.37	555.24	632.13
Repair and Maintenance of the Facilities		460.75	567.04	838.36
Soap		46.15	59.42	89.87
Total Rural		1,020.28	1,248.12	1,725.54
Toilet Paper Segment		2,010.00	2,975.55	5,721.64
Household Toilet Segment		4,449.20	5,929.39	9,573.16

Table 2: Nigeria Establishments 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	13.98	16.32	19.70
	Toilet Cleaner Services	12.00	14.54	18.20
Hotel	Toilet Cleaning Products	4.28	4.91	5.92
	Toilet Cleaner Services	3.67	4.37	5.47
Offices	Toilet Cleaning Products	11.69	14.60	19.38
	Toilet Cleaner Services	50.15	65.01	89.55
Airport	Toilet Cleaning Products	0.06	0.06	0.07
	Toilet Cleaner Services	0.26	0.28	0.31
Hospital	Toilet Cleaning Products	76.33	83.17	92.54
	Toilet Cleaner Services	52.40	59.25	68.41
Public Toilets	Toilet Cleaning Products	0.27	0.29	0.32
	Toilet Cleaner Services	0.58	0.64	0.73
Subtotal Toilet Cleaning Products		106.61	119.35	137.93
Subtotal Toilet Cleaner Services		119.06	144.09	182.68
Institutions Toilet Segment		225.67	263.44	320.61

Toilet Economy Market Insights

Current Market Situation

- 1. Construction and emptying are the largest household expenditures.** According to the 2021 WASH NORM report, households are reported to have spent a total of NGN 66 billion or US\$166 million¹⁶ on sanitation services in 2021: 9% was spent on bills and levies, 35% on toilet emptying, 33% on construction and 23% on toilet maintenance.¹⁷ A total of NGN2.3 trillion or US\$5.9 billion was spent on hygiene services: 30% on bath and laundry soaps and 25% on washing materials and equipment.¹⁸
- 2. Shared toilets/latrines are an alternative solution.** Up to 22% of households use latrines that are shared by more than one household.¹⁹ Although cost is one of the main reasons for the use of shared facilities, housing structure is also a consideration.²⁰ Some live in a compound where there are four or five houses with the members sharing one or two facilities.²¹
- 3. There is an established market for toilet papers, soaps and cleaning products.**
 - A total of NGN 212.7 billion (US\$484.69 million) was spent on toilet paper, NGN 157 billion (US\$358 million) of that by households themselves.²²
 - NGN 6.7 billion (US\$15.3 million) toilet care products were sold in 2021, mostly from store-based retailers and grocery retailers.²³
- 4. Groundwork is laid through toilet business owners (TBOs).** TBOs are enterprises involved in the construction of toilets, offering toilet superstructure options that include interlocking blocks, burnt bricks and cement blocks; a platform that includes pour flush water tap with ceramic pan; and substructures constructed using rings, cement blocks and burnt bricks.²⁴
- 4. Existing sanitation financing for households.** Sanitation financing through microfinance institutions, community savings, loan schemes and government pool funds enable households to borrow money to construct improved latrines.

Market Drivers

- 1. Government strongly supports private sector engagement in sanitation.** In 2018, the government of Nigeria, through President Muhammadu Buhari, declared a State of Emergency and launched the National Action Plan (NAP), a 13-year strategy for the revitalization of Nigeria's WASH Sector. A national sanitation campaign tagged 'Clean Nigeria: Use the Toilet' was also launched to address the lingering sanitation crisis in the country.
- 2. Government calls for private sector investment in sanitation.** The Nigerian government has been strong in its efforts to address the sanitation crisis in the country – particularly in driving private sector engagements. In 2015, the Federal Ministry of Water Resources estimated an investment requirement of NGN 959 billion (US\$2.2 billion) to make Nigeria open defecation-free by 2025 – that is NGN 24 billion (US\$150 million) per year of investments.²⁵ The investments needed are: (a) construction of household latrines; (b) school toilets with separate provisions for boys and girls and handwashing facilities; (c) toilet complexes in market centers, motor parks, highway eateries and health centers; (d) triggering exercises; and (e) advocacy, capacity development, and IEC materials.²⁶

3. People are willing to pay for construction of their toilets. A UNICEF study in 2013 reported that 42% of respondents stated that they were willing to pay NGN2,000 (US\$4.5) to NGN5,000 (US\$11.4) for the construction of their toilets. One-third of the respondents, nonetheless, claimed to have spent NGN 10,000 (US\$22) to NGN 15,000 (US\$34.2) to construct their latrines. A more recent UNICEF survey, conducted in August 2016, revealed that more than 81% of the respondents desired to improve their existing toilets and 55% were willing to spend between NGN 10,000 (US\$22) to 40,000 (US\$91.3) for such improvement.

Market Barriers

1. Persistent poverty implies weak purchasing power for toilets. Without any support, the financial burden of acquiring latrines or toilets is on the households. World Bank data, however, shows that 10.2% of the Nigerian population is living on less than \$2.15 a day.²⁷ In the WASH NORM 2021 report, only 12% and 18% of the poorest and poor households respectively had access to basic sanitation and hygiene services.²⁸ Thus, although there is willingness, the public's capacity to pay is limited by low income and limited financial resources.

2. Sanitation taboos remain in some ethnic and religious groups. Nigeria has over 270 ethnic groups but is primarily divided between Muslims and Christians, with a few (2%) belonging to other or no religious groups.²⁹ Interviews revealed that some ethnic and religious groups in Nigeria believe that toilets should not be inside the house as a person should not live in the "building where the excreta is". The wife is also not supposed to defecate where her father-in-law or her husband defecates. This limits the market development of sanitation solutions that may naturally thrive in other contexts.

Market Opportunities

1. A huge need for more toilets and sanitation facilities is identified. Considering the current gap in access to sanitation, the addressable market in toilets and sanitation facilities is huge. Based on current JMP data, 58% of the population requires either new or improved sanitation facilities.³⁰ Muslims may also be a unique potential market as they prefer water-operated facilities for ablution, an important part of their prayers and religious ceremonies.

2. Demand for toilet paper is higher in urban areas. Interviews reveal that demand for toilet paper is higher in urban areas compared to rural areas, given the number of tourists and higher purchasing power in urban areas.

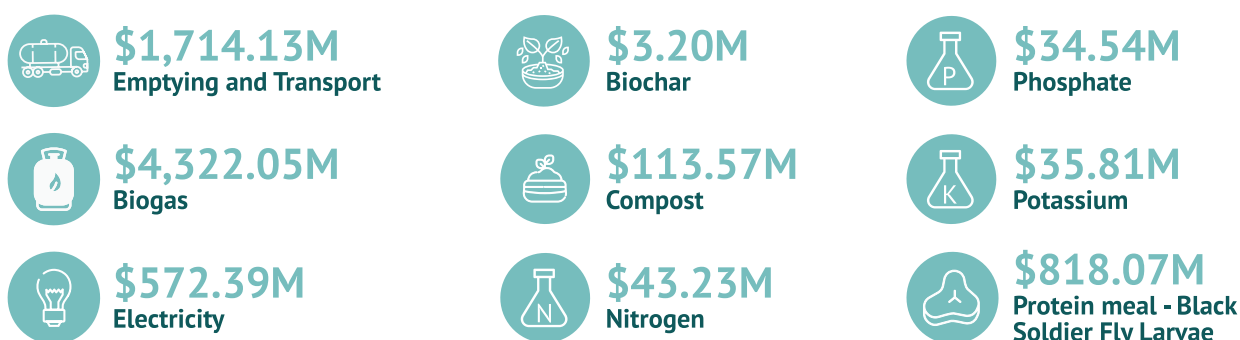
3. Government is pushing for public toilet PPPs. Though there are public toilets around the country, there is now a bigger push for the establishment of toilet facilities in public places. The Federal Capital Territory Administration (FCTA) has announced its plans to construct 10,000 public toilets in strategic locations across the territory.³¹ PPPs are viable options for providing public toilets in the country. Based on the Infrastructure Concession Regulatory Commission's 2021 Annual Report, a Memorandum of Understanding was signed to provide public toilets nationwide through PPPs.³² Pilots to be in FCT public schools, motor parks and marketplaces, and extended to the 36 States.³³ In terms of willingness to pay, a 2013 UNICEF study showed that 92% were willing to pay for using public toilets, with 87% willing to pay NGN 10 (US\$0.02) to NGN 20 (US\$0.04) per use.³⁴

4. Financial aid for TBOs is needed. Interviews revealed that a lot of the TBOs in the country are still not formally incorporated. Financing is also a huge challenge. Financial institutions do not consider TBOs as core and viable businesses and thus do not grant them loans. Microfinance institutions were engaged to provide microloans for TBOs; however, they remain expensive, opening the need for cheaper loans.

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, further triggers the demand for locally-produced fertilizers. The market for emptying and transport is relatively strong, with an estimated value of US\$735.33 million in 2022 and the potential to reach US\$ 1.7 billion by 2030. In terms of resource recovery, biogas shows the largest potential, with an estimated value of US\$1.9 billion in 2022 and the potential to grow to almost 2.5 times that size, eventually reaching US\$4.3 billion.

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



*Note that this report does not total the estimates in the Circular Sanitation Market 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. Biogas is the significant leader in financial potential but 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, Protein Meal product is selected as it promises financial returns while contributing back to the food system.

Table 3: Nigeria Circular Sanitation Market

MARKET ESTIMATE FOR CIRCULAR SANITATION ECONOMY (in US\$ million) ³⁵	Baseline: Estimate of 2022 market size	Projection: 2025 progress towards universal access	Projection: Universal access in 2030
Emptying and Transport	735.33	977.18	1,714.13
Biogas	1,895.83	3,122.13	4,322.05
Electricity	251.07	413.48	572.39
Biochar	1.40	2.31	3.20
Compost created	49.82	82.04	113.57
Total nitrogen	18.96	31.22	43.23
Total phosphate	15.15	24.95	34.54
Total potassium	15.71	25.87	35.81
Protein meal/black soldier fly larvae	358.84	590.95	818.07

Circular Sanitation Economy

Market Insights

Current Market Situation

- 1. Robust industry of faecal sludge exhauster trucks in Port Harcourt:** according to a 2017 study, there is a relatively big market of private faecal sludge exhauster trucks (sewage trucks) that empty containment facilities at residences, businesses and government buildings in Port Harcourt.³⁶ The Association of Exhauster Truck Operators (ASTO) reportedly has 57 members who manage over 100 trucks.³⁷
- 2. Toilet emptying services:** the 2021 WASH Norm Report revealed that most (60%) households' pit or septic tank latrines were never emptied; 12% also reported wastewater leakage from their latrine or septic tank overflow.³⁸ 11% said that their faecal sludge was emptied into water bodies, open pits and ground, 25% were buried in covered pits, while only 17% was taken to a treatment facility.³⁹ Additionally, only 4% of schools safely emptied their toilets of faecal sludge.⁴⁰

Market Drivers

- 1. Promising market for toilet emptying services:** an interview noted that, from the sanitation value chain perspective, Nigeria is fairly developed in terms of "capture" but is still lacking in containment to safe reuse or disposal. A 2021 study estimated that 45% of the sanitation facilities in Nigeria were emptiable using non-mechanized⁴¹ means, while 5% were through mechanized⁴² means.⁴³ Around 21%, however, were un-emptiable⁴⁴ due to the low quality of the super- or substructure, making emptying unsafe or impossible.⁴⁵ In 2021, a total of NGN 23 billion (US\$52.5 million) (or 34.93% of their sanitation expenses) was spent by households on toilet emptying.⁴⁶

Market Barriers

- 1. No regulatory framework for FSM:** despite a plethora of waste management laws and policies in the country, there is still no framework for FSM in Nigeria. In a study by WaterAid Nigeria in three (3) cities in Nigeria, it was revealed that, while there are national and state policies on sanitation and solid waste management, there is no specific provision on FSM.⁴⁷ Standards that help choose and promote technologies that can contribute back to Nigerian society will be important for this market to thrive.
- 2. Capital outlay for FSM is misunderstood.** Sanitation is usually bundled with the water sector but is overshadowed by the latter in terms of targets and budgets. Much like other infrastructure projects, there is an upfront capital outlay for FSM but the benefits are spread over 15-20 years.

Market Opportunities

1. Establishment of faecal sludge treatment facilities: using the country's urban population and estimated waste generation, a simple projection of the required FSTPs in Nigeria is carried out.⁴⁸

Estimated FSTPs needed	2022	2025	2030
Kampala	300	325	370
Nansana, Kira, Ssabagabo	502	543	619
Town Class 1 (9 Towns)	78	84	96
Town Class 2 (7 Towns)	28	30	34

2. Solution to renewable energy needs: renewable power generation from toilet resources could be revolutionary to cater to the apparent demand for renewable energy. Currently, innovations around turning waste to energy have been explored in Nigeria but are yet to develop. Nigeria's electricity supply is inadequate for its 200 million population. Reports say that the country has 12,500 megawatts' capacity, but only a fraction of it works.⁴⁹ As of 2020, 55.4% of the population in Nigeria has access to electricity.⁵⁰ Diversification of its electricity is needed.

3. Solution to fertilizer shortage: toilet resources provide new reservoirs of renewable resources, such as water, fertilizer energy, nutrients and protein for animal feed. Agriculture remains the largest sector in Nigeria, contributing an average of 24% to the nation's GDP (2013 – 2019) and 36% of employment.⁵¹ However, the sector has been dealing with very low yields per hectare due to a shortage of seedlings and fertilizers. Nigeria has long been dependent on imported fertilizers (829 tons in 2019) but, in 2020, restricted importation of nitrogen, phosphorus and potassium (NPK) fertilisers to 154 tons, to allow local production to grow.⁵² Clear standards that permit human waste to be treated and transformed into soil conditioners and fertilizers would aid this market's development.

Smart Sanitation Economy

The **smart sanitation economy** is valued at US\$8.26 million in 2022, with the potential to triple to US\$24.51 million. Growth is likely to accelerate as internet connectivity improves.

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

\$3.37M
Government investment
in smart sanitation

\$13.54M
Sensor and Smart
technologies for toilets

\$1.92M
Sensor and Smart
technologies for FSTPs

TOTAL PRODUCTS

\$18.83M

\$1.50M
Data Analytics
Services

\$4.19M
Mobile Application
Services

TOTAL SERVICES

\$5.68M

SMART SANITATION
ECONOMY

\$24.51M



Table 4: Nigeria 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			
Government investment in smart sanitation	1.73	1.94	3.37
Sensor and smart technologies for toilets	3.33	7.12	13.54
Sensor and smart technologies for FSTPs	0.49	1.39	1.92
Total Product	5.55	10.44	18.83
Services			
Data Analytics Services	0.42	0.89	1.50
Mobile Application Services	2.28	3.09	4.19
Total Services	2.70	3.98	5.68
Smart Sanitation Economy	8.26	14.42	24.51

Smart Sanitation Economy Market Insights

Current Market Situation

1. Existing smart sanitation technologies: some smart sanitation technologies have been introduced in Nigeria: an application to call for emptying services and an application to locate public toilets.⁵³

Market Drivers

1. Government's commitment to increase the level of digitization and digitalization in Nigeria: the National Information Technology Development Agency (NITDA) has expressed its commitment to transform the country into a sustainable digital economy. Based on NITDA's Strategic Roadmap and Action Plan, the government aims to improve the fixed and mobile infrastructure to deepen broadband penetration across the country.⁵⁴ It also aims to increase digital literacy and support innovation-driven enterprises and MSMEs. This initiative may facilitate support for smart sanitation enterprises and solutions.

Market Barriers

1. Underdeveloped technological infrastructure: as highlighted in the country context, internet connection and electricity remain poor in Nigeria. Nonetheless, NITDA's digitalization plan may help improve and facilitate better infrastructure.

2. High upfront costs: smart sanitation technologies are relatively expensive, posing issues with feasibility and return on investments. Sensors, for example, are not yet available in the country and would require importation, entailing additional costs.

3. Smart sanitation is not yet a priority. Although smart sanitation technologies are acknowledged as laudable innovations, a few interviewees shared that it might still be too early to introduce them in Nigeria. Access to sanitation facilities is of top priority before introducing any technological advancements in sanitation.

4. Lack of regulatory framework: data brings issues related to privacy, ownership and confidentiality. A clear regulatory framework that permits businesses and governments to harness the insights and value from smart sanitation systems, while protecting and empowering citizens, will permit this marketplace to thrive.

5. Poor internet connection: the technological landscape in the country remains an issue. As of August 2022, Nigeria ranks 150th out of 182 countries in fixed internet connection speed, with a median speed of 9.70 Mbps, and 108th of 140 countries in mobile internet connection speed, with a median speed of 16.67 Mbps.⁵⁵

6. Unreliable electricity supply: smart sanitation technologies, except those using renewable energy, require electricity to run. Nigeria, however, has been struggling with poor electricity supply due to fuel shortages and the national grid collapsing, causing widespread blackouts. In the last nine years, the national electricity grid has collapsed more than 200 times, and at least five times in 2022 alone.⁵⁶

Market Opportunity

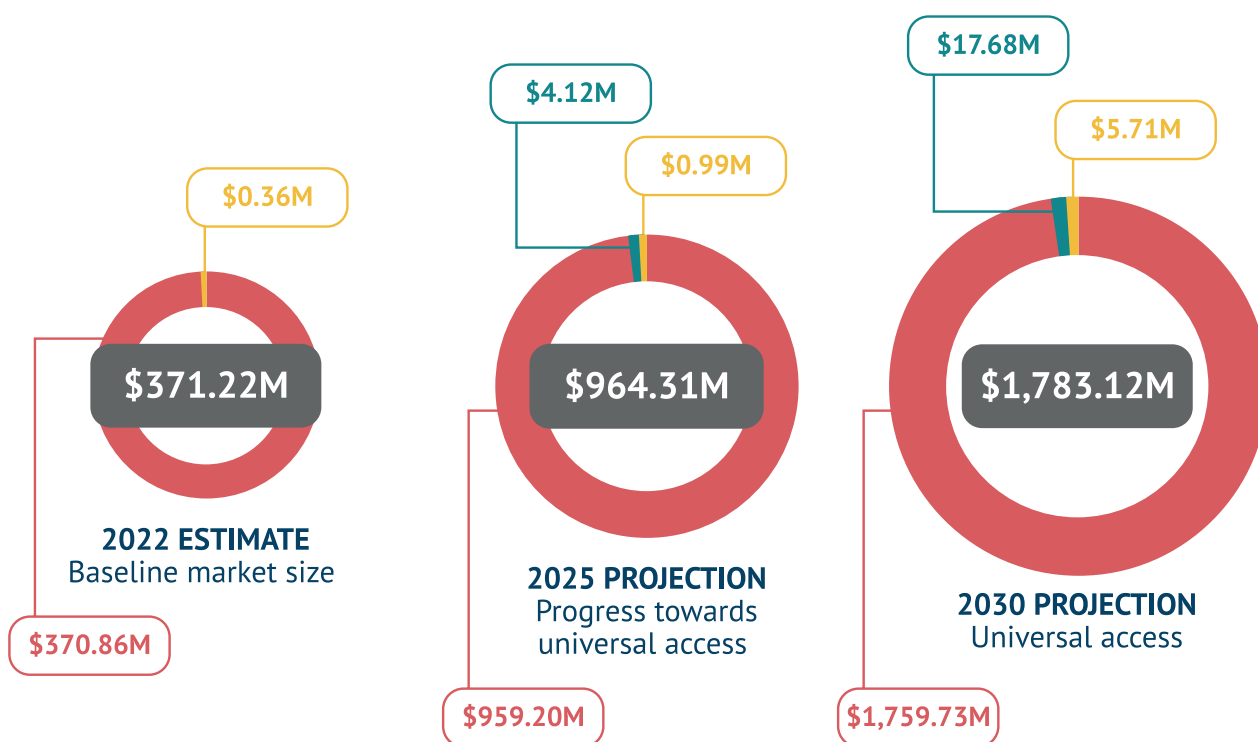
1. Smart sanitation technologies are possible in urban and well-developed establishments. Smart sanitation will be of interest to the private sector, but implementation may not be possible in all areas. Suggested areas are urban areas, universities, airports, hospitals, health centers, schools, offices and stadia.⁵⁷

Value of the Menstrual Hygiene Marketplace

The **menstrual hygiene marketplace** was valued at US\$371.2 million in 2022 and has the potential to grow to US\$1.8 billion. This is based on the expected number of menstruators with a need for products. The much smaller circular MHH and smart MHH economies are also expected to grow.

MARKET ESTIMATES FOR MENSTRUAL HYGIENE MARKETPLACE (IN US\$ MILLION)

■ MENSTRUAL PRODUCTS
 ■ CIRCULAR MHH*
 ■ SMART MHH
 ■ TOTAL MENSTRUAL HYGIENE MARKETPLACE



*Given that the circular economy production of electricity is exclusive to the production of other products, for the overarching market calculations the production of compost, cellulose, plastic and super absorbent materials was selected to represent, combined, the circular menstrual hygiene dimension.

MARKET ESTIMATE FOR 2030 MENSTRUAL HYGIENE MARKETPLACE (IN US\$ MILLION)

PROJECTION Universal Access

MENSTRUAL PRODUCTS

\$1,759.73M

-  **\$1,259.87M**
Menstrual Pads
-  **\$169.11M**
Tampons
-  **\$57.40M**
Menstrual Cups
-  **\$162.61M**
Organic Menstrual Pads
-  **\$72.27M**
Period Underwear
-  **\$38.47M**
Safe Disposal and Collection

CIRCULAR MHH*

\$17.68M

-  **\$0.96M**
Electricity
-  **\$5.73M**
Cellulose
-  **\$5.44M**
Plastic
-  **\$5.93M**
Super-Absorbent
-  **\$0.59M**
Compost

SMART MHH

\$5.71M

-  **\$5.71M**
MHH App services

TOTAL MENSTRUAL HYGIENE MARKETPLACE

\$1,783.12M



*Given that the circular economy production of electricity is exclusive to the production of other products, for the overarching market calculations the production of compost, cellulose, plastic and super absorbent materials was selected to represent, combined, the circular menstrual hygiene dimension.

Menstrual Products Market

The **menstrual products market** is expected to grow in the coming years, as women and girls in Nigeria are likely to access more types of products. These could include reusable menstrual pads, menstrual cups, menstrual organic pads and period underwear. The total market for menstrual products, including their safe disposal and collection, was valued at US\$370.9 million in 2022 and has the potential to grow to US\$1.8 billion.

Table 5: Nigeria Menstrual Product Market

MARKET ESTIMATES FOR MENSTRUAL PRODUCT ECONOMY (in US\$ million)	Baseline: Estimate of 2022 market size	Projection: 2025 progress towards universal access	Projection: Universal access in 2030
Menstrual pads	368.62	833.52	1,259.87
Tampons	2.24	24.39	169.11
Menstrual cups	0.00	17.15	57.40
Organic menstrual pads	0.00	46.90	162.61
Period underwear	0.00	25.01	72.27
Safe disposal and collection	0.00	12.24	38.47
Total Menstrual Products	370.86	959.20	1,759.73

Current Market Situation

- 1. Products:** single-use menstrual pads remain the most common menstrual products used by women in Nigeria. In 2021, NGN184 billion (US\$420.2 million) was spent by households on menstrual pads.⁵⁸ For those who do not have access or ability to purchase, old cloth or rags are used.
- 2. Private place to wash and change:** only 3.4% of schools have improved toilets/latrines, with separate blocks for males and females, while only 8% of schools have compartments with provisions for menstrual hygiene management. Meanwhile, 81.4% of women have reported having a private place to wash and change at home.⁵⁹

Market Drivers

- 1. Government support for menstrual health and hygiene:** the Federal Ministry of Women Affairs (FMWA) has institutionalized menstrual health and hygiene management and has established a technical working group (TWG) for menstrual health and hygiene management (MHHM). It has carried out MHHM interventions across six area councils in the FCT (in schools, communities and IDP camps). The group distributes menstrual kits and hygienic products, and teaches women and girls to make reusable menstrual pads, as well as running advocacy and awareness programs. The group hosts quarterly coordination meetings to review implementation and address bottlenecks. A draft MHHM strategic framework has been developed and the Council of Women Affairs has approved the development of a national policy for MHHM. Some departments and agencies have also opened pad banks in their offices to support staff and visitors.

The Ministry also collaborates with CSOs, NGOs and implementing partners to carry out interventions at the state level. In July 2022, UNICEF announced that it will establish menstrual banks in some schools.

Market Barriers

- 1. Cultural Beliefs and Superstitions:** one issue in menstrual product disposal is cultural beliefs and superstitions. Some women in Nigeria are afraid of throwing away their pads for fear of having them used for witchcraft or sorcery.⁶⁰ Used pads are then kept under their beds which poses a threat to hygiene and health. For others, used pads are buried. In one study, girls shared that they burn their pads since they believe it is the “only method that removes all traces of menstrual blood”.⁶¹

Market Opportunities

1. Potential market for other menstrual products: although menstrual pads account for most of the market, other menstrual products are also available.

Menstrual Products in Nigeria⁶²

Use of Menstrual Products (% of the total)	Urban	Rural	National
Menstrual materials used	95.8	94.6	95.3
Single-use menstrual pads	83.5	41.2	67.1
Reusable menstrual pads	0.0	0.0	0.0
Tampons	0.4	0.4	0.4
Menstrual cup	0.0	0.0	0.0
Cloth	14.6	57.5	31.2
Cotton wool	2.7	1.8	2.4
Toilet paper	8.2	3.3	6.3
Period underwear only	0.3	2.0	1.0
Other	0.3	0.4	0.3
Nothing	0.0	1.0	0.4
Total	110.2	107.6	109.2

Circular MHH Market

In the **circular MHH market**, in addition to preventing waste by using reusable menstrual products, materials from used disposable products can be recovered, including cellulose, plastic and super-absorbent materials, and compost can be created from organic menstrual pads. Electricity can also be generated by safely burning used products. This market is only emerging but has the potential to grow as more commercial menstrual products are being used.

Table 6: Nigeria Circular MHH Market

MARKET ESTIMATE FOR CIRCULAR MHH (in US\$ millions) ⁶³	Baseline: Estimate of 2022 market size	Projection: 2025 progress towards universal access	Projection: Universal access in 2030
Electricity	-	0.23	0.96
Cellulose	-	1.37	5.73
Plastic	-	1.28	5.44
Super-absorbent	-	1.40	5.93
Compost	-	0.07	0.59

Current Market Situation

This market is only just emerging and too new to bring specialized insights. The team includes it as a placeholder, with the expectation that it will develop in the coming years.

Smart MHH Market

In the **smart MHH market**, technological innovations on MHH, including mobile application services, exist but they are still scarce. This market had an estimated value of US\$0.4 million in 2022 and has the potential to grow to US\$5.7 million.

Table 7: Nigeria Smart MHH Market

MARKET ESTIMATE FOR SMART MHH (in US\$ millions)	Baseline: Estimate of 2022 market size	Projection: 2025 progress towards universal access	Projection: Universal access in 2030
Menstrual App services	0.36	0.99	5.71

Current Market Situation

Menstruation tracking app: a menstruation tracking app called Femm has been promoted in rural Nigeria to track women’s MHH in order to help address HIV infection, child marriage and sexual violence.⁶⁴ The app was reported to receive support from the Catholic Church but is still deemed unreliable for birth control. A website “Techcaba” ran a survey and found that Flo and My Calendar are the most popular period tracker applications in the country.⁶⁵ Concerns about data privacy were, however, brought up, as some apps were assessed as lacking a strong privacy policy to protect user information.⁶⁶



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 and menstrual hygiene 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 CleanTeam Ghana



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 an 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



© Pit Vidura

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

Menstrual Hygiene Marketplace

Company name Saathi

Year Founded 2013

Country of Operations India

Solution Biodegradable and compostable sanitary pads



Problem that you were trying to solve Demand for sustainable sanitary pads



Description of the Solution Saathi manufactures biodegradable and compostable sanitary pads made from banana tree and bamboo fibers to provide a rash-free sustainable experience and reduce pad and plastic waste. Saathi biodegradable pads degrade within six months of disposal – 1,200 times faster than plastic pads. Each woman purchasing Saathi pads on e-commerce saves 60 kg of pad waste over their lifetime and subsidizes more pads for low income women.



Impact 1,200x faster biodegradation when using Saathi pads with 60kg of pad waste saved per woman.



Contact Information Tarun Bothra



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 and menstrual hygiene marketplace provide sustainable and complementary solutions, monetizing toilet provision, products and services, including access to MHH, biological resources, health data and information, to provide benefits across business and society. This report shows the unrealized US\$8 billion potential that exists in the sanitation economy and menstrual hygiene market in Nigeria today and how opportunities will increase more than 50% as these services expand to all Nigerians. The Sanitation & Hygiene Fund 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 and menstrual hygiene marketplaces. These investment propositions will focus on specific elements of the sanitation economy and menstrual hygiene marketplace 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 and menstrual hygiene marketplace. 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 maximise the impact of funding from Nigeria's development partners.



3. Strengthen the enabling environment to attract new and greater investments into the sanitation economy and the menstrual hygiene marketplace. 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.

References

- ¹UNSDG (2020). Global leaders welcome the Sanitation and Hygiene Fund as key to increasing investment. <https://unsdg.un.org/latest/announcements/global-leaders-welcome-sanitation-and-hygiene-fund-key-increasing-investment>
- ²Only 54% of the world's population has access to safely managed sanitation. [World bank, World Development Indicators (n.d). People using safely managed sanitation services (% of population). <https://data.worldbank.org/country/nigeria>]
- ³United Nations (2022). The Sustainable Development Goals Report 2022. <https://unstats.un.org/sdgs/report/2022/The-Sustainable-Development-Goals-Report-2022.pdf>
- ⁴This definition is based on the sanitation economy concept developed by the Toilet Board Coalition (TBC). See: TBC (2020). Sanitation Economy Markets: Nigeria. Available at: <https://www.toiletboard.org/sanitation-economy-markets-nigeria/>; see also: TBC (2019). Scaling the Sanitation Economy 2020-2025. Available at: <https://www.toiletboard.org/scaling-the-sanitation-economy-2020-2025/>
- ⁵UNICEF and WHO (2021). WHO/UNICEF Joint Monitoring Programme for Water Supply, Sanitation and Hygiene (JMP). <https://washdata.org/data/household#!/nga>
- ⁶Ibid.
- ⁷World Bank, World Development Indicators (2021). Population (2021)[Data file]. <https://data.worldbank.org/country/nigeria>
- ⁸Toilet Board Coalition estimates. Please refer to the Methodology file.
- ⁹World Bank, World Development Indicators (2021). Rural and urban population (2021)(% of total population) - Nigeria. <https://data.worldbank.org/country/nigeria>
- ¹⁰Toilet Board Coalition estimates. Please refer to the Methodology file.
- ¹¹The Global Economy (n.d.). Nigeria Economic Indicators. <https://www.theglobaleconomy.com/Nigeria/>
- ¹²Ibid.
- ¹³World Bank, World Development Indicators (2021). GDP (current US\$) - Nigeria (2021)[Data file]. <https://data.worldbank.org/country/nigeria>
- ¹⁴World Bank, World Development Indicators (2021). GDP growth (annual %) - Nigeria (2021)[Data file]. <https://data.worldbank.org/country/nigeria>
- ¹⁵McKinsey Global Institute (2014). Nigeria's renewal: Delivering inclusive growth. <https://www.mckinsey.com/featured-insights/middle-east-and-africa/nigerias-renewal-delivering-inclusive-growth>
- ¹⁶Federal Ministry of Water Resources (2021). Water, Sanitation, Hygiene National Outcome Routine Mapping 2021. <https://www.unicef.org/nigeria/media/5951/file/2021%20WASHNORM%20Report%20.pdf>
- ¹⁷Ibid.
- ¹⁸Ibid.
- ¹⁹Ibid.
- ²⁰Interviews
- ²¹Interviews
- ²²Federal Ministry of Water Resources (2021). Water, Sanitation, Hygiene National Outcome Routine Mapping 2021. <https://www.unicef.org/nigeria/media/5956/file/2021WASHNORM%20Infographics.pdf>
- ²³Euromonitor International. (n.d). Market sizes [Toilet papers][Data set]. <https://www.euromonitor.com>
- ²⁴Khan, F. et.al(2018). Promoting entrepreneurship and affordable financing for uptake of improved toilets in Nigeria <https://www.unicef.org/nigeria/media/1671/file/Nigeria-WEDC-international-conference-Khan-3051.pdf>.
- ²⁵Federal Ministry of Water Resources (2015). Making Nigeria Open-defecation-free by 2025: A National Road Map. <https://www.unicef.org/nigeria/media/1491/file/Nigeria-making-Nigeria-open-defecation-free-by-2025.pdf.pdf>
- ²⁶Ibid.

- ²⁷ World Bank, World Development Indicators (2021). Poverty headcount ratio at \$2.15 a day (2017 PPP)(% of population) – Lower middle income, Nigeria (2019). <https://data.worldbank.org/country/nigeria>
- ²⁸ Federal Ministry of Water Resources (2021). Water, Sanitation, Hygiene National Outcome Routine Mapping 2021. <https://www.unicef.org/nigeria/media/5956/file/2021WASHNORM%20Infographics.pdf>
- ²⁹ Harvard Divinity School (n.d.) Religion in Context: Nigeria. <https://rpl.hds.harvard.edu/religion-context/country-profiles/nigeria>
- ³⁰ UNICEF and WHO (2021). WHO/UNICEF Joint Monitoring Programme for Water Supply, Sanitation and Hygiene (JMP). . <https://washdata.org/data/household#!/nga>
- ³¹ Adebayo (2022). ODF: FCTA To Build 10,000 Public Toilets By 2025. <https://independent.ng/odf-fcta-to-build-10000-public-toilets-by-2025/>
- ³² Infrastructure Concession Regulatory Commission (2022). ICRC Annual Report and Accounts 2021. <https://www.icrc.gov.ng/wp-content/uploads/2022/07/ICRC-2021-AGM-report-min.pdf>
- ³³ Ibid.
- ³⁴ Cited in Federal Ministry of Water Resources (2015). Making Nigeria Open-defecation-free by 2025: A National Road Map. <https://www.unicef.org/nigeria/media/1491/file/Nigeria-making-Nigeria-open-defecation-free-by-2025.pdf.pdf>
- ³⁵ Note that this report does not total the estimates in the circular sanitation market 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. Biogas is the significant leader in financial potential but 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, protein meal product is selected, as it promises financial returns while contributing back to the food system.
- ³⁶ World Bank (2017). Assessment Report and Project Development in Selected Pilot Areas. World Bank. <https://documents1.worldbank.org/curated/en/731661522102870635/pdf/Fecal-Sludge-Management-FSM-services-assessment-report-and-project-development-in-selected-pilot-areas.pdf>
- ³⁷ Ibid.
- ³⁸ Federal Ministry of Water Resources (2021). Water, Sanitation, Hygiene National Outcome Routine Mapping 2021. <https://www.unicef.org/nigeria/media/5956/file/2021WASHNORM%20Infographics.pdf>
- ³⁹ Federal Ministry of Water Resources (2021). Water, Sanitation, Hygiene National Outcome Routine Mapping 2021. <https://www.unicef.org/nigeria/media/5956/file/2021WASHNORM%20Infographics.pdf>
- ⁴⁰ Ibid.
- ⁴¹ Described as “Facilities that can readily be served by machine or ‘machine-like’ equipment”
- ⁴² Described as “Remaining wet pits and all dry sanitation facilities that are of improved quality but are not accessible to mechanized emptying due to accessibility constraints or trash in the pit latrine”
- ⁴³ Greene N, Hennessy S, Rogers TW, Tsai J, de Los Reyes III FL. The role of emptying services in provision of safely managed sanitation: A classification and quantification of the needs of LMICs. *J Environ Manage.* 2021 Jul 15;290:112612. doi: 10.1016/j.jenvman.2021.112612. Epub 2021 Apr 24. PMID: 33906118; PMCID: PMC8178437.
- ⁴⁴ Described as “All unimproved facilities that need to be upgraded, due to the low quality of the super- or sub structure, making emptying unsafe or impossible. Some facilities may be serviced with facility upgrades.”
- ⁴⁵ Greene N, Hennessy S, Rogers TW, Tsai J, de Los Reyes III FL. The role of emptying services in provision of safely managed sanitation: A classification and quantification of the needs of LMICs. *J Environ Manage.* 2021 Jul 15;290:112612. doi: 10.1016/j.jenvman.2021.112612. Epub 2021 Apr 24. PMID: 33906118; PMCID: PMC8178437.
- ⁴⁶ Federal Ministry of Water Resources (2021). Water, Sanitation, Hygiene National Outcome Routine Mapping 2021. <https://www.unicef.org/nigeria/media/5956/file/2021WASHNORM%20Infographics.pdf>
- ⁴⁷ Wateraid (2019). On-Site But Out Of Sight: Context analysis of urban sanitation in Enugu, Kano and Warri. <https://www.wateraid.org/ng/a-context-analysis-of-urban-sanitation-in-three-nigerian-cities>

- ⁴⁸ Toilet Board Coalition Estimates. Please refer to the methodology file
- ⁴⁹ BBC (n.d.) Electricity lost in large parts of Nigeria after power blackout. <https://www.bbc.com/news/world-africa-61050345>
- ⁵⁰ World Bank, World Development Indicators (2021). Access to electricity (% of population) – Nigeria (2020). <https://data.worldbank.org/indicator/EG.ELC.ACCS.ZS?locations=NG>
- ⁵¹ African Continental Free Trade Area (2020). Current State of Nigeria Agriculture and Agribusiness Sector (Powerpoint Presentation) <https://www.pwc.com/ng/en/assets/pdf/afcfta-agribusiness-current-state-nigeria-agriculture-sector.pdf>
- ⁵² Ibid.
- ⁵³ Interviews
- ⁵⁴ Federal Ministry of Communications and Digital Economy (n.d). Strategic Roadmap and Action Plan (SRAP 2021 – 2024). <https://nitda.gov.ng/wp-content/uploads/2021/04/NITDA-ROADMAP.pdf>
- ⁵⁵ Speedtest (n.d.) Speedtest Global Index: Nigeria Median Country Speeds September 2022. Available at: <https://www.speedtest.net/global-index/nigeria#mobile>
- ⁵⁶ The Conversation (2022). Why Nigeria’s electricity grid collapses and how to shore it up. <https://theconversation.com/why-nigerias-electricity-grid-collapses-and-how-to-shore-it-up-179705>
- ⁵⁷ Interviews
- ⁵⁸ Federal Ministry of Water Resources (2021). Water, Sanitation, Hygiene National Outcome Routine Mapping 2021. <https://www.unicef.org/nigeria/media/5951/file/2021%20WASHNORM%20Report%20.pdf>
- ⁵⁹ UNICEF and WHO (2021). WHO/UNICEF Joint Monitoring Programme for Water Supply, Sanitation and Hygiene (JMP). . <https://washdata.org/data/country/NGA/household/download>
- ⁶⁰ Interviews
- ⁶¹ Elledge MF, Muralidharan A, Parker A, Ravndal KT, Siddiqui M, Toolaram AP, Woodward KP. Menstrual Hygiene Management and Waste Disposal in Low and Middle Income Countries-A Review of the Literature. *Int J Environ Res Public Health*. 2018 Nov 15;15(11):2562. doi: 10.3390/ijerph15112562. PMID: 30445767; PMCID: PMC6266558. <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC6266558/>
- ⁶² UNICEF and WHO (2021). WHO/UNICEF Joint Monitoring Programme for Water Supply, Sanitation and Hygiene (JMP). <https://washdata.org/data/country/NGA/household/download>
- ⁶³ Given that the production of electricity and compost is mutually exclusive to the production of the other products, a total is not calculated by the circular economy. For the overarching market calculations, the production of cellulose, plastic and super-absorbent materials is selected to represent, combined, circular menstrual hygiene and health.
- ⁶⁴ Glenza J. (2019). US activists promote anti-birth control app in Nigeria’s ‘most vulnerable’ areas. *The Guardian*. <https://www.theguardian.com/society/2019/jul/15/femm-menstruation-tracking-app-nigeria-anti-pill-campaignersus->
- ⁶⁵ Azuh, B. (2021). Flo health app under scrutiny for allegedly leaking users’ information. <https://techcabal.com/2021/01/18/flo-health-app-under-scrutiny-for-allegedly-leaking-users-information/>
- ⁶⁶ Ibid.





The Sanitation and Hygiene Fund (SHF) is a part of UNOPS.



This report has been developed for Nigeria's
Federal Ministry of Water Resources

© WSSCC

