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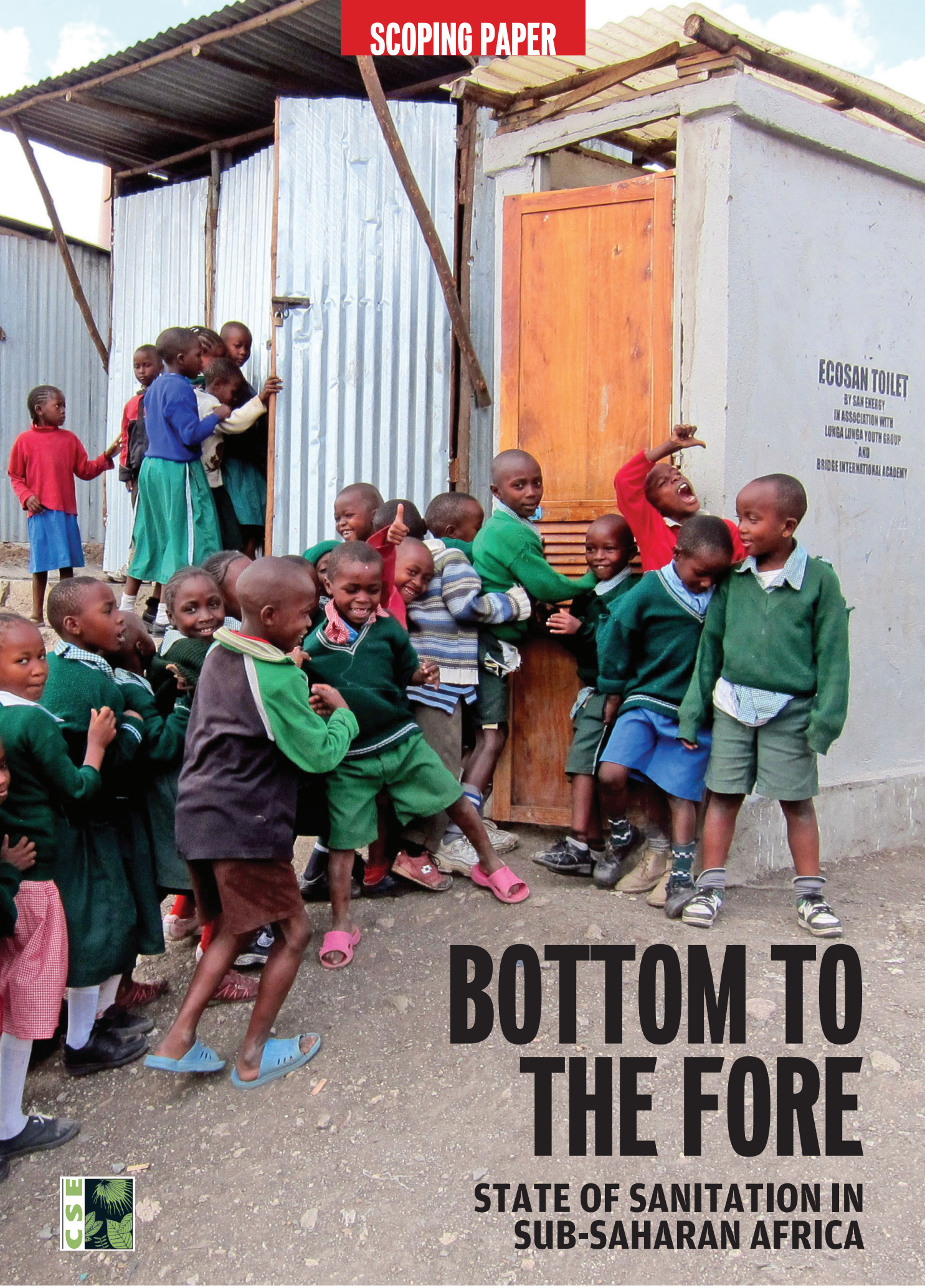

BOTTOM TO THE FORE

STATE OF SANITATION IN SUB-SAHARAN AFRICA

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BOTTOM TO THE FORE

STATE OF SANITATION IN SUB-SAHARAN AFRICA

Centre for Science and Environment

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Editor: Arif Ayaz Parrey

Design: Ajit Singh

Cover photo: USAID WASH

Production: Rakesh Shrivastava and Gundhar Das

Citation: Susmita Sengupta, Rashmi Verma and Samya Kazmi 2018, *Bottom to the Fore: Rural sanitation in Sub-Saharan Africa*, Centre for Science and Environment, New Delhi

Published by
Centre for Science and Environment
41, Tughlakabad Institutional Area
New Delhi 110 062
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E-mail: cse@cseindia.org
Website: www.cseindia.org

Printed at Multi Colour Services

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Abbreviations

BMC	-	BioMed Central
CLTS	-	Community-Led Total Sanitation
CLTSH	-	Community-Led Total Sanitation and Hygiene Programme
ESI	-	Economics of Sanitation Initiative
GDP	-	Gross Domestic Product
JMP	-	Joint Monitoring Programme
MDG	-	Millennium Development Goal
OAU	-	Organization of African Unity
ODF	-	Open Defecation-Free
PLOS	-	Public Library of Science
SDGs	-	Sustainable Development Goals
UDDT	-	Urine Diversion Dry Toilets
UNICEF	-	United Nations International Children's Emergency Fund
USAID	-	United States Agency for International Development
WASH	-	Water, Sanitation and Hygiene
WHO	-	World Health Organization
WSP	-	Water and Sanitation Programme

Chapter 1

Introduction

Sub-Saharan Africa is, geographically, the area of Africa that lies south of the Sahara desert. It consists of most of the continent—52 countries and island states, excluding only the northern-most African countries of Algeria, Egypt, Libya, Morocco, Tunisia and Sahrawi Arab Democratic Republic. The population of Sub-Saharan Africa is 1 billion, of which around 63 per cent live in rural areas. The proportion of the population in this region with access to drinking water and sanitation is the worst in the world. Only 28 per cent people have access to basic facilities of sanitation. According to a report by Water Aid,[1] the ten worst countries in terms of access to sanitation are all situated in Sub-Saharan Africa. Children in the region are 14 times more likely to die before the age of five compared to children in developed countries, mainly from diseases like diarrhoea which are caused by unsafe drinking water and poor sanitation. The report also says that one among every ten girls misses school during menstruation in the region.

Sub-Saharan Africa has missed Target C—to halve, by 2015, the proportion of people without sustainable access to safe drinking water and basic sanitation—set under Millennium Development Goal (MDG) No. 7, by a wide margin. According to a 2017 report of the Joint Monitoring Programme (JMP) of the United Nations International Children's Emergency Fund (UNICEF) and the World Health Organization (WHO),[2] 31.9 per cent population in the region practices open defecation and around 62.7 per cent still lacks any facilities of hygiene. The same report further points out that the region rarely shows evidence of safely managed sanitation. The progress of sanitation and hygiene coverage in rural areas is worse than in urban areas. This is despite the fact that there has been substantial national interventions and international assistance in these sectors.[3]

The 2017 JMP for Water Supply and Sanitation by UNICEF and WHO report has adjudged Ethiopia as the best country in the region in terms of progress made to reduce open defecation during the period 2000–15.[4] The worst-ranked country, which has actually shown worrying deterioration in the state of open defecation during this period, is Djibouti. But merely reducing open defecation does not achieve a clean sanitary state. In most countries which have witnessed improvement in the state of open defecation, it has meant more use of unimproved means of sanitation like traditional uncovered pit, bucket and hanging toilets. There is rarely any management of wastewater from these toilets, leading to chemical and biological contamination of groundwater, causing severely adverse health impacts. Poor governance is mainly responsible for the lamentable state of sanitation and hygiene in Sub-Saharan Africa.

African countries lost almost 0.9 per cent of their Gross Domestic Product (GDP) in 2015 to poor sanitation, which is higher than the global average.[5] A study by Water Sanitation Programme in 2012 found that African countries lose around US $5.5 billion annually because of the abject state of sanitation. The report analyzed 18 African countries constituting more than 50 per cent of Africa's population. Open defecation alone costs these countries around US $2 billion. The poorest sections of the society practise open defecation at a higher rate than the richest. Most of the countries studied in this project invest less

than 0.1 per cent of their GDP in sanitation, although African leaders had resolved to spend at least 0.5 per cent of their GDP in this sector as part of the Ngor Declaration adopted at the fourth African Conference on Sanitation and Hygiene in 2015. Another finance brief published in 2016 shows that the situation had hardly improved.[6] The economic burden of poor sanitation falls heavily on the poorest of the poor. Thus, they not only pay for substandard sanitation but also the associated negative health impacts.

MDGs have now been replaced by Sustainable Development Goals (SDGs), setting a goal to ensure 'availability and sustainable management of water and sanitation for all' by 2030. But will the region meet this goal?

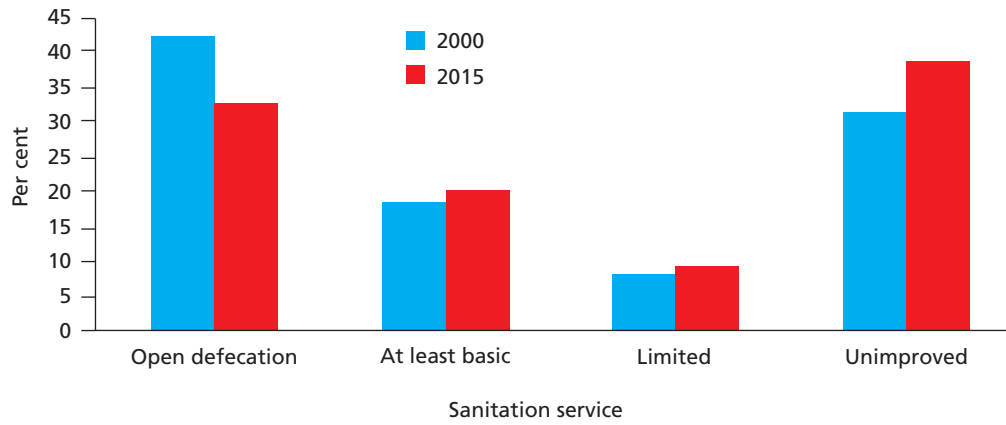
Today, about one-fourth of the 892 million people defecating in the open around the world live in Sub-Saharan Africa. The challenge of sanitation in Sub-Saharan Africa is, therefore, a global rather than a regional problem. To kickstart the process, a dialogue between public and private stakeholders must commence immediately, to develop an understanding of the existing issues and the expectation. Priorities need to be managed and implementation improved.

Chapter 2

How many Africans have toilets?

The 2017 JMP report put the number of people practising open defecation in Sub-Saharan Africa at 22.9 per cent (in 2015). Another report by the same programme in 2000 had reported that 31.9 per cent people in the region practised open defecation. This implies that around 9 per cent people had moved away from open defection in 15 years. Data suggests that this percentage is around 10 per cent in rural areas (see *Figure 1: State of sanitation in rural areas of Sub-Saharan Africa*).

Figure 1: State of sanitation in rural areas of Sub-Saharan Africa

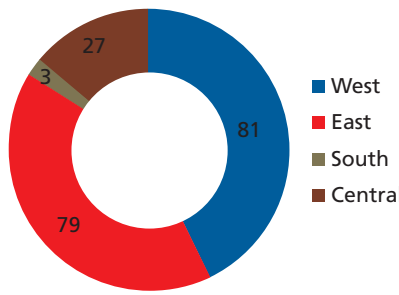


Source: JMP report, 2017

BEST AND WORST PERFORMANCE IN RURAL AREAS

Between 2000 and 2015, around 18 per cent of the countries in western Africa, 31 per cent in eastern Africa, 25 per cent in southern Africa and a whopping 66 per cent in central Africa showed deterioration in the state of open defecation (see *Figure 2: Region-wise state of open defecation in Sub-Saharan Africa*).

Figure 2: Region-wise state of open defecation in Sub-Saharan Africa



Per cent practising open defecation in 2015

Sub-regions of Sub-Saharan Africa:[7]

Eastern: Burundi, Comoros, Djibouti, Eritrea, Ethiopia, Kenya, Rwanda, Somalia, South Sudan, Tanzania and Uganda

Western: Benin, Burkina Faso, Cape Verde, Côte d'Ivoire, Gambia, Ghana, Guinea, Bissau Guinea, Liberia, Mali, Niger, Nigeria, Senegal, Sierra Leone and Togo

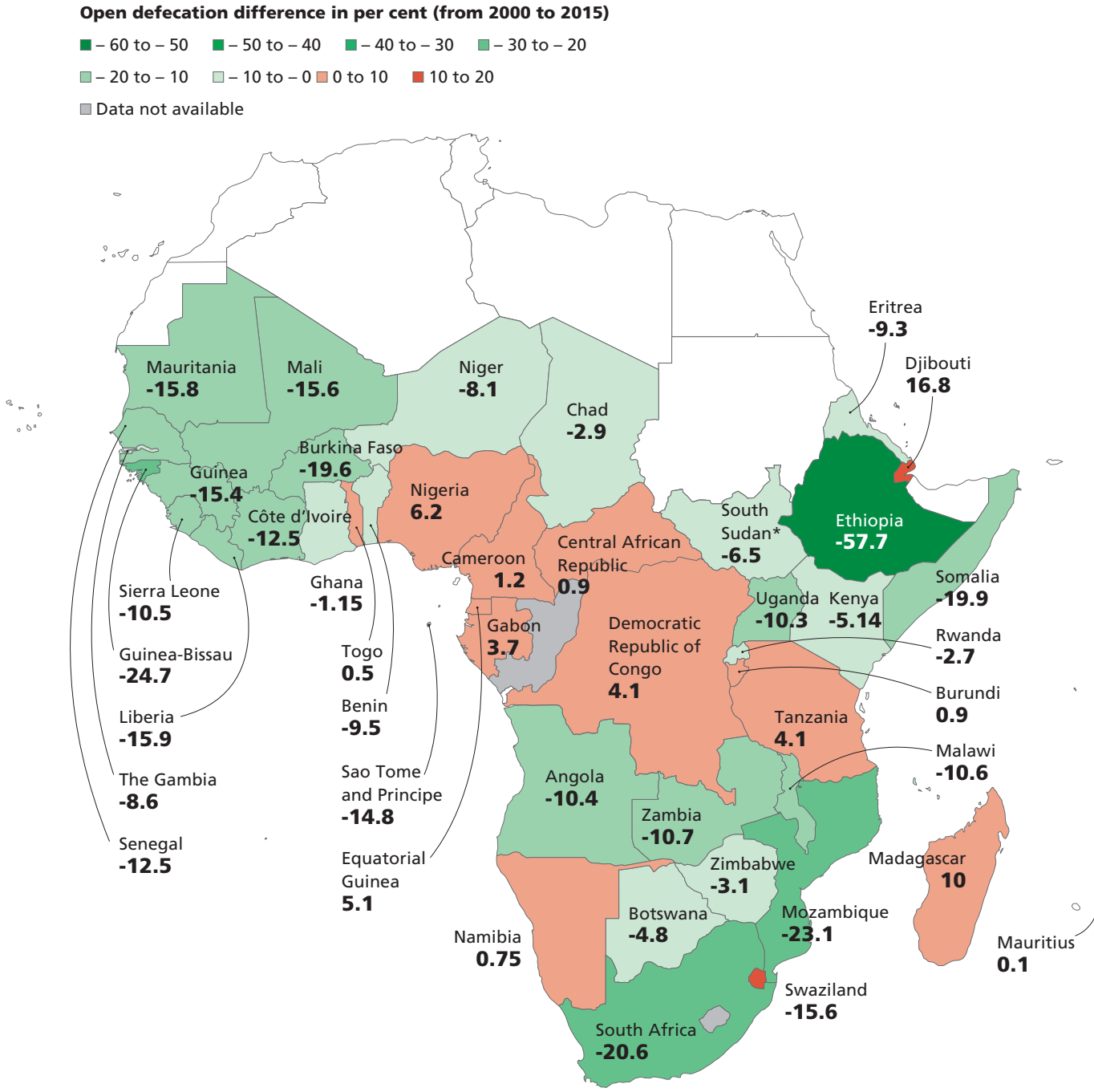
Central: Cameroon, Central African Republic, Chad, Congo, Democratic Republic of Congo, Republic of Equatorial Guinea, Gabon, São Tomé and Principe

South: Angola, Botswana, Lesotho, Madagascar, Malawi, Mauritius, Mozambique, Namibia, South Africa, Swaziland, Zambia and Zimbabwe

Source: JMP, 2017

Analyzing the improvement in the state of open defecation in rural areas, it is clear that rural Ethiopia has been the most improved among all Sub-Saharan African countries. The worst performing country is Djibouti (see *Map: Performance of countries on open defecation*)

Map: Performance of countries on open defecation

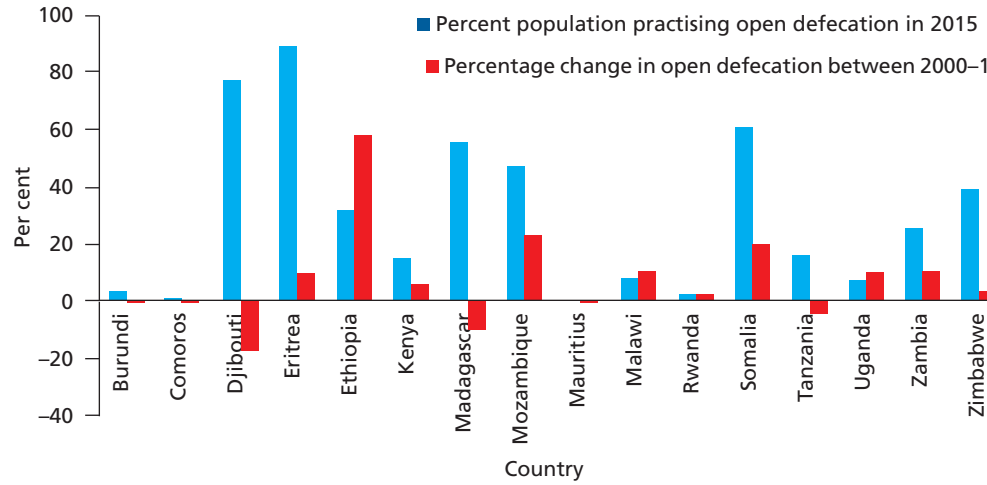


**South Sudan formed in 2011, data available from this year*
Source: JMP, 2017

The improvement is clearly linked to the strategies adopted, but also to the seriousness demonstrated in efforts to execute those strategies. For example, Ethiopia has rolled out a proper strategy to improve the state of open defecation (see *Box: How Ethiopia reduced open defecation*). Kenya, just south of Ethiopia, has comparable per capita income but the state of sanitation, measured through reduction in open defecation in rural areas, is only half as good as Ethiopia's. Both countries have large rural populations—80 per cent in the case of Ethiopia[8] and 70 per cent in the case of Kenya[9]—so comparing the state of rural sanitation might give us a better idea of the national picture in these countries. According to the 2017 JMP report, while open defecation was reduced by 50 per cent in Ethiopia, it was only reduced by 5 per cent in Kenya. Both these countries are located in the eastern part of the region, where most people practise open defecation (see *Figure 3: State of open defecation in rural areas of eastern Sub-Saharan Africa*).

Political stability plays a role in good governance (which also includes an improved state of sanitation) but it is only one of the many factors responsible. Ghana, which is Africa's most stable democracy and one of the fastest growing countries of the continent in terms of the Human Development Index, would take 500 years to become open defecation-free, as per UNICEF claims. Despite being a rising economy, Ghana will not be able to meet the water and sanitation SDG by 2030 if it is unable to check open defecation.[10]

Figure 3: State of open defecation in rural areas of eastern Sub-Saharan Africa



Source: JMP report, 2017

If political stability had been the only reason, Ghana would be as successful in its efforts to improve sanitation as Ethiopia. Where did Ghana fall short?

There are many reasons for Ghana's failure to match the progress made in Ethiopia. Unclear direction and weak strategy, coupled with lack of intent in execution are the main culprits. For instance, the country did not have a dedicated sanitation ministry till January 2017. Before that, sanitation work was overseen by the Ministry of Water Resources, Works and Housing. Since it formed only a part of the mandate of this umbrella ministry, it could not command the ministry's undivided attention. The government is also guilty of not providing enough funds for sanitation. In 2015, Ghana announced that it will increase its spending

How Ethiopia reduced open defecation[11]

How did Ethiopia, one of the poorest countries in the world, achieve positive results in the sanitation sector? The secret of Ethiopia's success lies in the fact that it recognizes sanitation as a health problem. Unlike in India, where sanitation and drinking water are under a single ministry, Ethiopia has put sanitation under the health ministry. In fact, the Ethiopian government's Health Extension Programme, started in 2003, is responsible for rolling out key sanitation interventions in rural areas, where 85 per cent of the country resides. Of the 16 broad services offered under the scheme, seven cover hygiene and environmental sanitation, such as excreta, solid and liquid waste disposal, water quality control, and personal hygiene. Under it, two women health workers are employed in every 'kebele' (the smallest administrative unit of Ethiopia, similar to a ward in India) to sensitize families about sanitation and to encourage them to build toilets.

Its Trachoma Prevention Programme is another example of how integrating sanitation with the health programme helps. Rolled out in 2002, the scheme promoted construction of toilets, because poor sanitation and lack of personal hygiene are important triggers for the spread of infectious disease that can leave people blind. In just a year, the access to toilets in some rural areas increased from six to over 50 per cent, says Kamal Kar, whose Kolkata-based non-profit Community-Led Total Sanitation (CLTS) Foundation works on sanitation issues in the Amhara region of Ethiopia. A follow-up after three years showed that the communities continue to use the toilets, he adds.

In 2013, the government took the concept of integration a step forward by starting the One WASH (water, sanitation and hygiene) National Programme to synergize sanitation work carried out by six ministries—water, irrigation, electricity, education, finance and economic development—with the health ministry's efforts. Ethiopia has ensured that sanitation programmes do not focus merely on the construction of toilets but also promote the idea of using them. "Today, local communities and political leaders together discuss the types of sanitation services required, reflect on the tariff, and monitor performance," says Kebede Worku, Ethiopia's Health Minister. This principle of participation is visible in all sanitation programmes. In the Health Extension Programme, for example, the services provided at the kebele level are customized to meet the needs, demands and expectations of the people.

The Community-led Total Sanitation and Hygiene Programme (CLTSH), another important sanitation scheme that was started in 2009, is implemented by school health clubs and water committees at the kebele level. Community participation has not only given a boost to the construction of toilets, but also ensured the long-term sustainability of the practice.

The country also has open defecation-free verification and certification guidelines and has set up committees, at every administrative level, from kebele to the national level, to verify that the guidelines are being followed. "After a kebele is declared open defecation-free, monitoring is done by trained leaders from the community. We also have a system where kebeles are coded according to their open defecation-free status," says Worku.

A recent report by Water Aid asserts that all of this has been possible because the Ethiopian government has "strong development priorities". It also attributes the political stability of the current government, which has been in power for two decades, for the success. Worku says the country is already reaping the benefits of these efforts. "Between 2000 and 2016, open defecation reduced from 82 to almost 32 per cent. In the same period, under-five mortality reduced from 166 per 1,000 live births to 67," he adds. The Minister further states that toilets in public places have allowed girls in rural areas to attend schools even during menstruation. "Additionally, it preserves the dignity of disabled people and is good for the environment," he says.

on sanitation to 0.5 per cent of its GDP by 2020. But the allocation in 2017 budget was an abysmal 0.01 per cent. Even more disappointingly, the budgetary allocation for sanitation in 2017 was 16 per cent less than that in 2016.

The problem is also cultural. Most Ghanaians associate heat and smell from latrines with diseases, and believe open defecation is the cleaner option, opines UNICEF, adding that the government has not taken measures to induce the necessary behavioural change. A July 2016 study published in BioMed Central's (BMC) *Public Health* says that increasing migrant population and the high demand for housing in the face of limited availability of space has resulted in general unwillingness and inability to establish private sanitation facilities in the communities in Ghana.[12] The study also reports that landless people are unwilling or unable to spend on sanitation. About 80 per cent of Ghana's population is landless.

Leaving aside the construction of new toilets, there is an even more pertinent problem in Sub-Saharan Africa in the form of underuse of existing toilets. A 2015 Public Library of Science (PLOS) study on neglected tropical diseases carried out focused group discussions in the rural area (Kakwiya) of the Petauke district in the eastern province of Zambia.[13] There were approximately 261 households in the study area with 52.9 per cent toilet coverage. A typical toilet is basically a pit in the ground, sometimes covered by a slab. The toilets had some kind of cover fitted with a sack, occasionally even a door. Pork tapeworm (*Taenia solium*) is endemic to the region. Underuse of sanitary facilities is an important factor responsible for the spread of *T. solium*. The study found that the following were the main reasons for not building individual household toilets:

1. People in charge of building toilets did not give the task priority.
2. Sharing toilets was very common and seemed the natural thing to do.
3. Means to build toilets (either funds or material) were lacking.
4. There was lack of knowledge about how to build toilets.
5. There was lack of awareness about the importance of using toilets.
6. Open defecation was a long-standing cultural practice.

The study also identified a few reason for underuse of existing toilets:

1. The toilets were not constructed well.
2. Washing hands after use was cumbersome in the toilets.
3. Long queues in front of toilets.
4. Using toilets meant less food for pigs.
5. People did not know how to use a toilet.
6. People were not comfortable in using a toilet.

The authors of the report suggested a bottom-up culture-sensitive approach and innovative control strategies adapted to local reality to sort out these issues.

WHAT CLOSES OPEN DEFECATION?

Sub-Saharan Africa missed the sanitation MDG by a very wide margin. To understand why these countries missed the target we first need to develop an understanding of the factors which would have helped these countries achieve these targets.

A 2016 study on the determinants of improvement in sanitation (between 2000 and 2015) in Sub-Saharan Africa shows that the most progress was made in countries which had also made progress in the education sector.[14] Thus, countries like Botswana, Comoros, Congo Republic, Gabon, Mauritius, Sao Tome and Principe, Swaziland, and The Gambia achieved good results. The study also suggests that countries which are highly urbanized and have greater population density have achieved more improvements in terms of sanitation. Urban areas of Sub-Saharan Africa have had greater success in improving sanitation (19.8 per

cent) than rural areas (7.8 per cent). According to United Nations Population Division, the annual growth rate of the population of urban areas in the region in 2014 was 4.1 per cent, compared to 1.9 per cent in rural areas. Highly urbanized countries with higher density of population rely on economies of scale to reduce the costs of sanitation services. More populous countries which have evenly distributed population put pressure on sanitation services and make it difficult to achieve positive results.

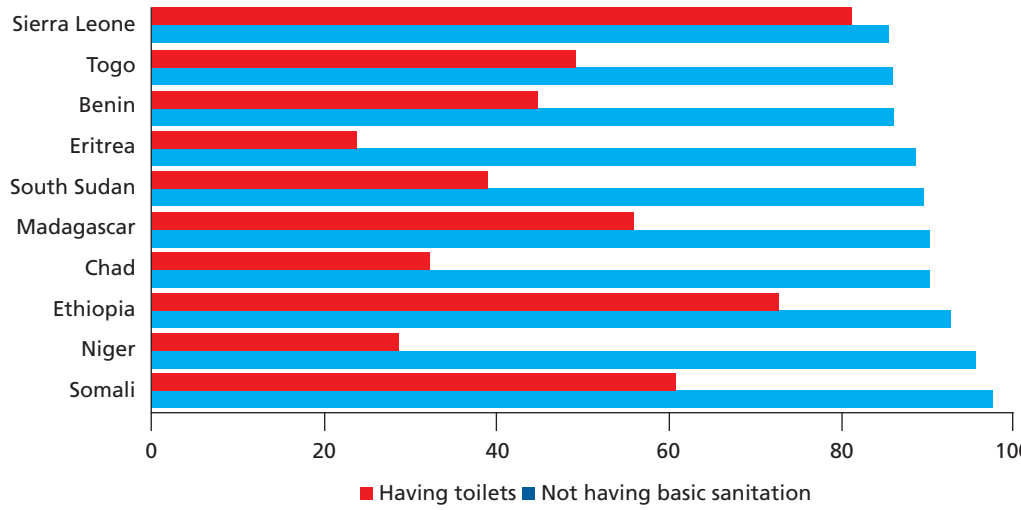
Last but not least, as already mentioned, political stability is also a factor, as a stable country can attract aid and investment more easily than an unstable country.

OPEN DEFECATION AND BETTER SANITATION

Around 691 million people in the region lacked access to basic sanitation services in 2015, 220 million of whom practised open defecation. The worst ten countries in the world in terms of percentage of population with access to decent toilets are in the region, according to a 2017 Water Aid report.[15]

The regional average of the number of people with access to somewhat decent toilets is 28 per cent, as per the 2017 JMP report. There has been only a 3 per cent increase in access to basic sanitation services between 2000 and 2015. Ethiopia finds a place in the bottom ten in the list of countries with the greatest percentage of people not having access to decent toilets as well as in countries where the least percentage of people practise open defecation (see *Figure 4: Countries in Sub-Saharan Africa having worst basic sanitation coverage*). What this means is that Ethiopia has made significant strides in reducing the number of people at the bottom of the sanitation ladder through access to rudimentary community latrines. Almost 90.7 million people in the country lack access to basic facilities of sanitation, which is almost 1.8 times the population of neighbouring Kenya. While 41.1 per cent urban areas report access to basic sanitation, this percentage drops to 20.1 per cent for rural areas.[16]

Figure 4: Countries in Sub-Saharan Africa having worst basic sanitation coverage



Source: JMP report, 2017

Table 1: State of open defecation in rural Sub-Saharan Africa

Sector	Country	Improvement in open defecation between 2000 and 2015 (per cent)	Comment
Eastern	Ethiopia	57.70	Best. Open defecation reduced, but mostly replaced by unimproved sanitation. The richest section show mostly unimproved sanitation.
	Djibouti	-16.80	Worst. People have opted for open defecation in place of unimproved sanitation across years.
Western	Guinea-Bissau	24.70	Best. Open defecation replaced by unimproved sanitation. Unimproved sanitation followed by maximum well-to-do sections of the society.
	Cabo Verde	-15.80	Worst. Distinct decrease in unimproved sanitation—people went back to open defection.
Central	Sao Tome and Principe	14.80	Best. Reduction in both open defecation and unimproved sanitation. Improvement in basic sanitation.
	Democratic Republic of the Congo	-4.10	Worst. The latest data shows that the poorest go for open defecation and the richest choose unimproved sanitation in place of open defecation.
Southern	South Africa	20.60	Best. Reduction in open defecation and unimproved sanitation. Improvement in basic sanitation.
	Namibia	-0.70	Worst. The latest data shows that the poorest go for open defecation and the richest choose unimproved sanitation in place of open defecation.

Source: JMP report, 2017

On the whole, reduction in open defecation in urban areas meant improved sanitation but the same did not necessarily hold true for rural areas (see *Table 1: State of open defecation is rural Sub-Saharan Africa*). Urban coverage of basic sanitation services exceeds 50 per cent in four countries but rural coverage exceeds 50 per cent in only two countries.

As mentioned earlier, the 2017 JMP report on rural Sub-Saharan Africa states that 32.2 per cent of the population practised open defecation in 2015. Another report by the same programme in 2000 had reported the percentage to be 42.1 per cent. This means an improvement of about 10 per cent had been achieved over the 15 years. However, the corresponding numbers vis-à-vis improvement in sanitation are much lower. Around 7 per cent population has moved towards unimproved sanitation in the same period. This leads to the conclusion that the region as a whole is switching from open defecation to unimproved sanitation (see *Box: Rural Ethiopia eradicates open defecation but moves towards unimproved toilets*). The probable reason for adopting such technology is the lowest capital cost of unimproved pit latrines (see *Table 2: Cost of improving sanitation*). But such a state of affairs is not conducive for achieving sustainable sanitation.

As per the JMP report, open defecation is practised mostly by the poorest quintile in the region, but the richest quintile show a worrying trend of practising unimproved sanitation. So while two island states, Cape Verde and Seychelles, met the MDG target of reducing the percentage of people without access to basic sanitation to less than 50, and countries like Rwanda, Mauritius and South Africa have also achieved basic sanitation coverage of more than 50 per cent, we should not be misled and remember to take into account the wide disparity between rural and urban, and rich and poor neighbourhoods to arrive at a more true picture of the state of sanitation in the region.

Table 2: Cost of improving sanitation

Country	Unimproved	Basic improved		Advanced (full excreta management)	
		Wet pit toilet	Dry pit toilet	Pit latrine with sewerage and treatment	Pit latrine with faecal sludge management
Côte d'Ivoire	15.2	75.9	15.2	521.4	74.9
Ethiopia	7.6	329.2	54.9	234.4	33.7
The Gambia	9.3	17.8	8.1	288.5	41.4
Guinea-Bissau	7	37.8	6	215.1	30.9
Kenya	24.4	43.6	24.4	392.1	56.3
Mozambique	5.9	86	11.3	181	26

*In US $ in 2015

Source: G. Hutton and M. Varughese, 2016

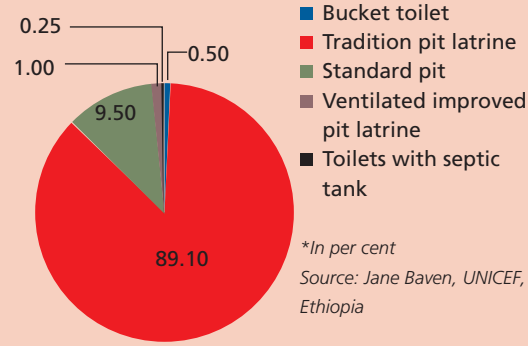
Rural Ethiopia eradicates open defecation but moves towards unimproved toilets

No doubt the country has made a big leap towards attaining open defecation-free status, but UNICEF puts a question mark on the improved sanitation status attained by Ethiopia. Recent surveys by UNICEF and Global Sanitation Fund have cast doubt over the percentage of improved sanitation recorded by the JMP report of 2015 and the government, as per Jane Bevan, Rural WASH Manager, UNICEF, Ethiopia. Bevan adds that her organization is very concerned about the limited health impact the increased percentage of unimproved sanitation would have. Traditional toilets in Ethiopia are made with sticks and mud and the drop holes are rarely covered, she adds.[19]

Baven says that Community-led Total Sanitation and Hygiene has improved sanitation in five of the eight regions studied. But the majority of toilets are traditional and not effective barriers to prevent diseases.

The 2015 Water and Sanitation Programme report by World Bank states that an agreement was reached between the government of Ethiopia and the JMP team in 2011 as per which JMP's calculation of sanitation coverage applies a formula that estimates that 50 per cent of "pit latrines without slabs" in Ethiopia should be considered as improved facilities. As a result, there is a significant variation between the improved latrine coverage reported in Demographic and Health Survey and the improved latrine coverage reported by the JMP in the same year, despite the fact that they make use of the same data set.

Figure 5: Types of toilets in rural Ethiopia*



*In per cent

Source: Jane Baven, UNICEF, Ethiopia

Access to improved toilets has been minimal in Sub-Saharan Africa, between 2000 and 2015, there has been almost no increase in such facilities. A 2011 World Bank report demonstrated that such facilities have been a luxury adopted only by the richer classes of the society.[17] Instead, the use of traditional toilets by poorer sections of the society has mushroomed, which may suggest a desire to use better toilets, impeded only by resource and technological constraints.

However, it is worth noting that the concern of the growth of traditional toilets never came up in policy discussions as the MDG only focussed on improved sanitation. Financial constraints are pushing countries in the region towards use of traditional toilets. For example, Namibia, where more than 60 per cent population does not have access to decent toilets, launched Harambee Prosperity Plan in 2016 to put an end to the practice of unsafe sanitation like bucket toilets. Progress has been slow because of obvious financial constraints. In a little over one year, only 876 safe toilets have been built in the country to replace the bucket toilets.[18]

MANAGEMENT OF WASTEWATER

Traditional toilets in Sub-Saharan Africa are the most common mode of sanitation and are growing at a steep rate. According to a 2008 report of the World Bank and Water Sanitation Programme,[20] there has been a 2.8 per cent annual increase in the number of such toilets in urban areas, and 1.8 per cent increase in rural areas. This is almost two times the rate of increase in the number of flush and improved toilets.

To complicate matters, WHO and UNICEF classify hanging and bucket toilets, as well as pit and shared toilets, as unimproved toilets along with traditional toilets. Unimproved toilets can directly or indirectly contaminate groundwater and soil, hence management of the waste coming out of these toilets is a must. Because of such classification and official apathy, there has been an increase in the proportion of unimproved sanitation in rural areas of the region, from 31.5 in 2000 to 38.5 per cent in 2015.

It has also been observed that isolated pit latrines in Africa frequently pose health problems whenever they overflow during the rainy season. Research has shown that in countries of Africa where pit toilets are used frequently, groundwater is also used as a major source of drinking water.[21 & 22] For example, in 2010–11, the percentage of people in Zimbabwe using pit latrines was 42.6 per cent. The proportion of population using groundwater as a source of drinking water was 64 per cent. A similar situation exists in Zambia, Uganda, South Africa, Rwanda, Kenya, Ethiopia etc. According to the 2017 JMP report, rural Ethiopia has a lower proportion of improved pit toilets (20.6 per cent) and a higher proportion (almost twice) of pit toilets without slabs (53.3 per cent). Kenya, which has a similar economic profile, shows higher coverage of pit toilets without slabs—the proportion of improved pit toilets in the rural areas is 39.1 per cent and that of pit latrines without slabs is 44.7 per cent. Thus, the quality of groundwater in these countries is threatened every time these toilets overflow during heavy showers. Moreover, flies and other insects can easily access uncovered pits, increasing the chances of the spreading of many vector-borne diseases.

A 2013 study of groundwater quality in an informal settlement of Zimbabwe by Graham *et al* (where more than 75 per cent households use pit latrines) reports detectable total and faecal coliform in more than two-thirds of the study boreholes and domestic wells.[23] The authors concluded that incomplete linings in most latrines contributed to high levels of groundwater contamination. Along with the coliform concentration, high levels of nitrate

contamination have also been observed in areas with high density of pit latrines. A 2013 study by T. Tillet proved that microbes and chemicals travel upto 15 metres from pit latrines. Other studies, cited in the report, suggest that microbes can travel even further, between 25–50 metres or more, from pit latrines. A study published in 2012 in the *International Journal of Water Resources and Environmental Engineering* on Langas, a peri-urban slum in Kenya, showed that wells near latrine pits were highly contaminated.[24]

To reduce the microbiological and chemical contamination of groundwater, the researchers suggested latrine liners as well as raised toilets. Latrine liners can minimize seepage of pit contents into groundwater, and raised latrines may help minimize groundwater contamination by increasing vertical separation and promoting aerobic digestion of waste, as asserted by the 2013 study by Graham *et al.*[25] To reduce the chemical contamination of groundwater by wastewater, the same study suggests ecological sanitation and composting toilets.

Although pit latrines are considered the best method of disposing waste in African countries, there have been numerous studies which show a relationship between use of pit latrines and presence of microbes (faecal coliform) and chemicals (nitrate, phosphate and ammonia) in the nearby drinking sources. Hence, Tillet opines that positioning of pit latrines with respect to groundwater sources should be done very carefully.

Chapter 3

Impacts of unsafe sanitation

HEALTH IMPACTS

The dubious distinction of being the top three in the world in terms of proportion of people practising open defecation goes to three Sub-Saharan African countries (Eritrea: 76 per cent, Niger: 71 per cent and Chad: 68 per cent). Understandably, these countries also lack basic sanitation services. This adds to the burden of disease in the area. A report by WHO states that Sub-Saharan Africa has the highest under-five mortality rate in the world, with one in 13 children dying before their fifth birthday.[26] A 2016 article on the effects of poor water and sanitation in ten laggard countries of western Africa shows that the risk of water and sanitation-related diseases is very high.[27] The authors suggest that there is a need for a strong intervention by the public and private sectors in these countries, because improvement in sanitation and access to safe water will result in alleviation of poverty and prevent re-emergence of neglected tropical diseases.

Poor countries like Madagascar and Tanzania demonstrate the link between inadequate access to sanitation and adverse health impacts clearly.[28] In Tanzania, there has been an increase in open defecation in the last 15 years.[29] Only 17.2 per cent rural population has access to any decent toilets. Nine children die every day due to diarrhoea, and one in three children shows signs of stunted growth.[30]

SCHOOL SANITATION

Sanitation coverage in schools is lowest in the region, according to a 2015 UNICEF publication.[31] Tanzania reported the lowest coverage of toilets in schools, with only one in ten schools having decent toilets. South Africa, on the other hand, shows 100 per cent toilet coverage in schools. However, Rwanda, Zimbabwe and South Sudan are some of the countries which have shown drop in toilet coverage in schools between 2008 and 2013 (see *Table 3: Toilet coverage in schools of a few Sub-Saharan countries*). Lack of toilets in schools hits female students the hardest and there are incidents of dropping out for this reason, as well as due to myths surrounding the menstrual cycle. A 2012 report on Sierra Leone found that most rural schools in the country did not have toilets at all. In other areas, school toilets did not have separate toilet facilities for girls and boys.[32] This prevented girls from attending schools. With the implementation of a policy of universal primary education in 2012, the report predicts further dropping out of adolescent girls.

In 2017, the Tanzanian Ministry of Education, with support from Water Aid and other partners, introduced national guidelines on minimum standards for water, sanitation and hygiene in schools. The government has also launched a campaign to end open defecation by 2019 and ensure everyone has access to basic sanitation by 2025.

Table 3: Toilet coverage in schools of a few Sub-Saharan countries

Country	2008	2013
Angola	52	54
Benin	57	74
Botswana	50	50
Burkina Faso	34	39
Burundi	10	53
Cameroon	44	41
Cabo Verde	79	100
Central African Republic	39	44
Chad	13	36
Comoros	27	50
Congo	15	15
Côte d'Ivoire	43	45
Democratic Republic of Congo	29	29
Djibouti	80	85
Equatorial Guinea	25	40
Eritrea	66	66
Ethiopia	17	37
Gabon	61	61
Gambia	61	71
Ghana	48	62
Guinea	43	69
Guinea-Bissau	8	28
Kenya	19	20
Lesotho	40	40
Liberia	82	82
Madagascar	25	29
Malawi	20	205
Mali	16	24
Mauritania	0	27
Mauritius	100	100
Mozambique	50	50
Namibia	75	80
Niger	12	14
Nigeria	32	32
Rwanda	97	95
Sao Tome and Principe	70	87
Senegal	50	66
Seychelles	100	100
Sierra Leone	62	62
Somalia	45	45
South Africa	75	100

South Sudan	52	42
Swaziland	72	72
Tanzania	11	11
Togo	11	22
Uganda	75	75
Zambia	20	45
Zimbabwe	53	43

*In per cent

Source: UNICEF, 2015

ECONOMIC LOSS

Are African countries keeping their promise, made as part of the Ngor Declaration adopted at the fourth African Conference on Sanitation and Hygiene, of spending 0.5 per cent of GDP on sanitation and hygiene? The answer is a clear no. Data available on eight countries shows that they spend far less than 0.5 per cent of their GDP on sanitation (see *Table 4: Expenditure on WASH in Sub-Saharan Africa*).

A 2016 research published by LIXIL Group Corporation, a global leader in housing and building materials, products and services, in collaboration with Water Aid and Oxford Economics, found that Africa spent around US $19.3 billion in 2015 on sanitation, an increase of 24.5 per cent from 2010 numbers. The report titled *The true cost of poor sanitation* brought to light the severe economic burden of inadequate sanitation in low-income and lower-middle income countries.[33] The cost paid by Africa for poor sanitation services is equivalent to 0.9 per cent of its GDP, higher than the global average. In terms of cost as a share of GDP, the top ten affected countries are all concentrated in Sub-Saharan Africa and South Asia.

A 2012 World Bank survey of eighteen countries to understand economic burden of poor sanitation revealed that the annual loss in each country was 1–2.5 per cent of the GDP (see *Table 5: Economic burden of poor sanitation in Sub-Saharan Africa*). The study showed

Table 4: Expenditure on WASH in Sub-Saharan Africa

Countries	2012 GDP (in million US $)	WASH expenditure as percentage of GDP in 2012	Sanitation as percentage of WASH expenditure	Sanitation as percentage of GDP	Sanitation expenditure (in million US $)	Projection of 0.5 per cent GDP (in million US $)	Gap (in million US $)
Ethiopia	43,311	0.30	2	0.01	2	217	215
Ghana	41,939	0.44	3	0.01	7	103	96
Benin	6,020	0.98	14	0.13	8	30	22
Morocco	95,980	0.38	36	0.13	128	479	351
Tunisia	45,660	0.46	36	0.17	76	228	152
Senegal	11,250	0.81	31	0.25	28	56	28
Burkina Faso	9,250	1.04	25	0.26	24	46	22
Democratic Republic of Congo	8,720	1.69	23	0.39	34	43	9

Source: I. Rognerud and C. Fonseca, 2016

Table 5: Economic burden of poor sanitation in Sub-Saharan Africa

Country	Loss due to poor sanitation in 2012 (in million US $)	Estimated loss per person (in US $)	Loss in terms of per cent of country's GDP	Per cent of population having access to safe toilets in 2012	Per cent of population having access to safe toilets in 2015
Benin	104	12	1.5	13.1	13.9
Burkina Faso	171	11	2	19.9	22.5
Central African Republic	26	5.5	1.2	24.8	25.1
Chad	156	15	2.1	9.6	9.6
Democratic Republic of Congo	208	3	1.6	20.2	19.7
Congo	144	35.8	1.1	14.6	15
Ghana	290	12	1.6	13.7	14.3
Kenya	324	8	0.9	30	29.8
Liberia	17.5	4.9	2	16.1	16.9
Madagascar	103	5	1	8.6	9.7
Malawi	12.1	3.8	1.1	41.7	43.5
Mauritania	41	13.1	1.2	40.2	44.6
Mozambique	124	6	1.2	21.2	23.6
Niger	148	10	2.4	8.9	4.4
Nigeria	3	20	1.3	33.6	32.2
Tanzania	206	5	1	19.8	23.5
Uganda	177	5.5	1.1	18.4	19.2
Zambia	194	16.4	1.3	30.1	31.1

Source: Africa: Economics of Sanitation Initiative. Water Sanitation Programme Report, 2012 and JMP report, 2017

that the major cost could be attributed to premature deaths, including of children under the age of five, by diseases like diarrhoea. Other significant costs were loss of productivity and time due to the practice of open defecation.[34] The study estimates that the countries lost around US $2 billion annually due to only open defecation. The study explains that each person without access to a toilet can spend up to 2.5 days a year in search of privacy to defecate, resulting in losses totalling almost US $500 million. Women shoulder a huge proportion of this cost as they spend additional time accompanying young children or sick or elderly relatives to relieve themselves, as well as finding a safe place for urination.

Better sanitation can not only save lives (human resource), and money otherwise spend on healthcare, but it is also an important marker of improved infrastructure, attracting tourists and investments from outside (see *Table 6: How better WASH facilities help the economy—the case of Ghana*).

Table 6: How better WASH facilities help the economy—the case of Ghana

Cause	Saving	Income
Prevention of outbreak of epidemics (e.g. cholera)	US $1.2 million per year	
Reduction in sanitation-related funeral cost	US $ 2.9 million per year	
Abatement of water pollution	Not available	
Better cognitive development (early childhood diarrhoea contributes to undernourishment, stunting and wasting away, which are associated with malnutrition and, in turn, with reduced long-term cognitive development)	Not estimated	
Promotion of tourism		US $8.5 million per year
Recycling excreta		Not estimated

Source: https://www.wsp.org/sites/wsp.org/files/publications/WSP-ESI-Ghana-brochure.pdf

Chapter 4

Existing policies to improve the state of sanitation

The big challenge in the region continues to be translating policy into practice, but that is another story. It has been observed that even existing policies lack clear definition of institutional roles, creating multiplicity in administration and, therefore, confusion.

Rwanda, Uganda, Tanzania, Nigeria and Ghana are excellent case studies to understand the policy challenges faced in the efforts to achieve the targets set by the water and sanitation Sustainable Development Goal (SDG).[35] The major issue is the development of a nation-wide sanitation policy, putting it in charge of a Central ministry, while the responsibility of implementation lies with local actors who have little or no capacity or resources to effectively implement and monitor sanitation facilities (see *Table 7: Roles and responsibilities of key actors in select countries*). These countries should learn from the example of South Africa, which developed a National Sanitation Policy in 2016 with clearly defined roles and responsibilities.

Rwanda aims to achieve 100 per cent household sanitation and hygiene by 2020. However, contradictions between the national sanitation and hygiene guidelines and on-ground practice is delaying the march towards this safe sanitation goal. For example, guidelines for toilet technologies usable in Rwanda prescribe standards for toilets (including design, structure, location and condition) as well as for personal hygiene. But such guidelines are rarely followed because of socio-cultural practices and financial constraints. This can be explained by the case of the Burera district. Here it is common to find toilet superstructures that are not properly constructed, and urine diversion dry toilets (UDDT), which are not correctly used. The reasons for this are lack of prioritization of toilets at the household level, lack of awareness of guidelines and standards, and irregular and insufficient monitoring of toilet facilities.

Lack of awareness among local actors and communities, and almost non-existing capacity-building impedes expansion of access to safe sanitation in Nigeria.

Poor coordination between ministries in Uganda and Ghana results in a weak institutional framework and non-enforcement of policies. Over and above this, there were reports of political interference in the sanitation sector which has affected the growth of this sector in these country.

Tanzania has involved the private sector and civil society to close the sanitation loop. The country has adopted an out-an-out commercial approach. But too much reliance on private players and their involvement in sanitation governance is making sanitation less accessible to the citizens.

Table 7: Roles and responsibilities of key actors in select countries

Institutional roles and responsibilities	Rwanda	Uganda	Tanzania	Nigeria	Ghana
Planning or policy formulation	Ministry for Infrastructure and the Working Group of Ministry of Health	Ministry of Water and Environment, Ministry of Health, Ministry of Education and Sports, and general public	Ministry of Water, Ministry of Health and Social Welfare, Ministry of Vocational Training, and National Sanitation and Hygiene Steering Committee	National Council on Water Resources and Federal Ministry of Water Resources	Ministry of Water Resources, Works, and Housing, and Ministry of Local Government and Rural Development,
Financing	Ministry of Finance, Ministry of Health, Ministry of Infrastructure, Ministry of Local Government, and the private sector	Ministry of Water and Environment, Ministry of Finance, Planning and Economic Development	Ministry of Health and Social Welfare, Ministry of Water, Ministry of Regional Administration and Local Government, and Ministry of Education and Vocational Training	National Council on Water Resources	Ministry of Water Resources, Works, and Housing, Ministry of Local Government and Rural Development, Ministry of Education, and Ministry of Health
Regulation	Rwanda Utility Regulatory Agency	'Urban Water Supply Regulation Unit' within the Directorate of Water Development	Ministry of Water, and Ministry of Education and Vocational Training	Federal Ministry of Water Resources	Water Resources Commission and Public Utilities Regulatory Commission
Implementation	Local government (district level), private operators, and Ministry of Education	Local government, District Health Departments, Public Health Departments, and Ministry of Education and Sports	Local government authorities and Prime Minister's office	Local government, Water and Environmental Sanitation Committees, Water and Environmental Sanitation Department, and the private sector	Community Water and Sanitation Agency and Ghana Water Company Limited

Operation and maintenance	Community-based organizations (CBOs), private operators, and households or landlords	CBOs (water and sanitation committees), private operators, NGOs, households or landlords	Local government authorities, private operators, and households or landlords	Local government, Water and Environmental Sanitation Committees, and the private sector	Community Water and Sanitation Agency and Ghana Water Company Limited
Monitoring and evaluation	Ministry of Natural Resources, Rwanda Environmental Management Agency, and Ministry of Infrastructure	Ministry of Water and Environment, Ministry of Health, sub-county or urban councils, local governments, Ministry of Local Government, joint sector reviews, and joint technical reviews	Tanzania Water and Sanitation Network, Annual Joint Water Sector Review, and biannual water sector development programme	National Council on Water Resources	Ministry of Water Resources, Works, and Housing, Ministry of Local Government and Rural Development, Ministry of Education, and Ministry of Health

Source: N. Ekane et al, 2016

Not your typical open and shut case[36]

Kebede Worku, Ethiopia's State Minister for Health, talks about the turnaround achieved in his country in the field of sanitation

Open defecation was practised by 44.3 million Ethiopians in 1990 and 28.3 million in 2015. That is an average reduction of 4 percentage points per year over 25 years. What, in your view, has brought about this change which made Ethiopia a classic example of success in the region?
The first and foremost reason for this success is Ethiopia's conducive environment and decentralized system which allows communities and political leaders to discuss what type of health services are to be provided and also to monitor the performance together.

The health extension programme and the Community-led Total Sanitation and Hygiene (CLTSH) approach are pillars for improving sanitation in the country. "Women Development Armies" and school sanitation clubs promote hygiene at the community level. Environmental health activities play a great role in improving the hygiene and environmental health activities in the country.

How much of your budget is spent towards water, sanitation and hygiene? Do you have a role for non-profits and donors in the sanitation sector?
Ethiopia spends 0.01 per cent of its GDP on sanitation. There is a substantial public investment in sanitation services. Key donors, multi-lateral and bilateral organizations and non-profits are involved in many areas of the country with different hygiene and environmental health components.

Many villages in India have still not become open defecation-free (ODF). How did you ensure that rural regions in Ethiopia become ODF?
Ethiopia's Federal Ministry of Health, along with regional health bureaus and development partners, has developed the CLTSH training manual, CLTSH implementation guidelines and an ODF verification and certification protocol. Once toilets are built, their use is verified through verification and certification committees at each level—from kebele (village) to national level. Once ODF state is attained, one of the indicators to ensure that it is sustainable is to judge the performance of kebele, Woreda (district), zone and regional-level political leaders. After the declaration of ODF, toilets are handed over to trained environmental and religious leaders from the communities. A follow-up flag award is given to the kebele residents based on their ODF status, i.e. green for ODF, red for slippage.

Does good sanitation help improve the health and economic situation of citizens?
Between 2000 and 2016, open defecation reduced from 82 per cent to almost 32 per cent and toilet coverage increased by 50 per cent. Under-five mortality has reduced from 166 deaths per 1,000 live births to 67 deaths during the same period.

Health benefits are usually considered to be the most significant impact of hygiene and sanitation, but other factors are also important. Safe, private sanitation facilities can help women and girls to be secure and healthy, can encourage girls' attendance in schools past puberty, can help preserve the dignity of disabled people, and can also improve the environment.

The effect of poor sanitation in society is not only limited to health but also to an economic and welfare dimension and to the environment. The Economics of Sanitation Initiative (ESI) desk review conducted by the professional service firm water sanitation programme (WSP) and the World Bank in 2013 indicates that poor sanitation costs Ethiopia Birr 13.5 billion (US $496.2 million) each year, equivalent to about Birr 170 (US $6.2) per person per year, or 2.1 per cent of the GDP. Yet, eliminating the bad practice would require only 6 million latrines to be built and used.

How do you ensure self-disposal of faecal matter in non-sewer areas? Is your country looking in to dece tralized wastewater treatment as an option in non-sewer countries?
Almost all rural parts of Ethiopia are non-sewer areas. Self-disposal is ensured by health extension workers based at the community level. For non-sewer urban communities and urban towns which have sewer systems, urban municipalities, in collaboration with the urban health sector, ensure the self-disposal.

The Ethiopian government is currently using traditional decentralized systems in most parts of the country for the treatment of sewage. The operation and maintenance of onsite disposal systems is left to homeowners, which has caused problems because many traditional systems currently in use do not provide adequate treatment to protect public health. But with a rapidly increasing population and decreasing water resources, wastewater is becoming a significant resource.

Chapter 5

Suggested actions to achieve the Sustainable Development Goal

Sub-Saharan Africa has among the lowest levels of access to both drinking water and sanitation globally. The region has failed to meet the MDG target for drinking water, with 32 per cent of the population estimated not to have access to an improved water source at the end of the MDG period, and an estimated 102 million people still drinking surface water. An estimated 695 million people still use unimproved sanitation facilities.

How will the region achieve the targets set by the sanitation and potable water SDG?

Focus on sanitation a must: A 2017 paper in *PLOS One* says that less than half of the population in Sub-Saharan Africa (41.5 per cent) has gained access to improved drinking water without having access to sanitation or hygiene facilities, around 15.4 per cent have access to improved drinking water and basic sanitation facilities but not improved sanitation services, and even less than 5 per cent have access to improved potable water, sanitation and hygiene facilities.[37] Thus, only 5 per cent are meeting the requirements of the SDG. It is also clear that the state of sanitation is much worse than that of access to drinking water, and countries need to focus on this weak link by investing heavily in the sanitation sector.

Better management of funds: But pumping in more money will not solve the problem by itself. For example, Côte de Ivoire has been successful in spreading the use of traditional latrines with the state covering a high proportion of the cost. On the other hand, Kenya has advanced slowly in achieving improvement in the state of sanitation despite considerable spending by the government. Large investments by the government and other donors must be supported by better planning so that every single penny is spent well. Attention must be paid to the needs of women and girls and they should be involved in the process of decision-making on how to spend the money. Governments and other donors must view these investments as long-term, and all funds must be spent in a transparent and efficient way.

Ensure that accurate data is collected and made available: Data scarcity is a major problem in the region. Better data can help identify problems better, and also improve assessment of interventions, allowing flexibility and inviting official confidence and sure-footedness. Donors can play a vital role in this by funding operational research and helping in the documentation and sharing of best cases in the field of improvement in health effects and WASH interventions. A number of donors working in the region on WASH—Bill and Melinda Gates Foundation, USAID, UNICEF, Children's Investment Fund Foundation, UK Department of International Development, Germany's Federal Ministry for Economic Cooperation and Development, European Union, The Japan International Cooperation Agency, African Development Bank and Swedish International Development Cooperation Agency—should take the lead in this direction.

Promote low-cost but effective technologies: However, it must be remembered that despite national and international financial interventions, the challenge is immense and the money raised might not seem adequate at first glance. This is where low-cost sanitation technologies come into play. For example, Rwanda has achieved notable improvement in basic sanitation without large investments. This has been done through synergizing the efforts of the public and private sectors and innovative and imaginative use of low-cost technologies.[38]

Sort out issues with institutions and policy frameworks: A key impediment to the success of previous sanitation interventions in rural areas has been the lack of a coherent policy and adequate institutional framework. Responsibilities are currently divided between many different ministries. Poor coordination among the ministries result in poor institutional framework. Though the ministries of health are supposed to take the lead, their other responsibilities appear to be crowding out their ability to act on sanitation. Sanitation needs a clearer focus at the heart of health policy if coverage is to substantially increase. This should include learning lessons from past interventions on successes and failures, and recognizing the need for larger financing mechanisms, whether market- or public sector-based.

The parameter is use, not the number of toilets: The emphasis in the region has been on counting the toilets rather than their usage. Implementation of policy has been top-down and the initiatives have always been supply-driven. Governments should change their focus from construction to usage and maintenance of systems.

A dialogue between the public and private stakeholders: Access to better sanitation facilities is both a basic human need as well as an important marker of national and global progress and well-being. This fact should be used to achieve convergence between private efforts and needs and larger institutional interventions. To strengthen sanitation governance, there is an immediate need to translate expectations and information coming out of the dialogue between public and private stakeholders into policies.

Ensure better monitoring and evaluation: Strong monitoring systems should be in place to check the implementation of policies. Monitoring and evaluation of projects needs immediate attention. It is generally believed that monitoring and evaluation requires 1–2 per cent of a large projects' budget. In this region, the percentage may be significantly higher, in the order of 5–10 per cent, given the limited statistics and data collection capacity, reports a 2011 African Development Bank Group publication.[39] The report talks about effective setting up of monitoring and evaluation systems. Once in place, projects should be integrated into such a system to achieve strict and achievable pre-set goals.

Various steps are being taken by governments in this direction. For instance, in 2013, African leaders adopted their own Agenda 2063—a set of seven 'aspirations' that resemble the SDGs. They envision an "Africa you would like to have 100 years after the founding of the OAU (Organization of African Unity)". The idea was undertaken by having a set of goals that direct people to discuss, create partnerships and find investments to execute plans. This promotes and urges people to get more involved in government policies and, hence, helps overcoming various challenges.[40] The governments of Sierra Leone, Uganda, Madagascar and Togo volunteered to conduct national reviews of their implementation of the 2030 Agenda. Such action should be encouraged and promoted in other countries of the region as well.

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Due to various historical and political reasons, Sub-Saharan Africa has been unable to meet the basic needs, like potable water and sanitation, of its people. Most countries of the region were unable to meet the Millennium Development Goals (MDGs) and are falling short of targets towards meeting the Sustainable Development Goals (SDGs) for 2030.

Ethiopia has shown the maximum improvement in eradicating open defecation by making sanitation a part of the health ministry's mandate. But this did not ensure a sustainable solution. A common trend observed in many African countries, which showed such improvement, is the replacement of open defecation by unimproved toilets. Hence, the region is in a dire need of a sustainable solution for the management of liquid waste.

Now the nations of the region, free from the shackles of the past, must buckle-up and come up with imaginative policy frameworks and innovative technologies to solve their sanitation problems. This will, of course, need large-scale financial interventions as well, from national and international actors.

The world-wide race to meet the SDG targets on sanitation and drinking water will be won or lost in Sub-Saharan Africa. The world is watching the countries in this region. It is time they realize this and take the lead in pushing the world towards sustainable development.

This scoping paper introduces the reader to the state of sanitation in the region, the efforts made by various countries, policy gaps, and the way forward.

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