

# Open Defecation Practice and Its Implications in Sub-Saharan Africa

Odafivwotu Ohwo\*

Department of Geography and Environmental Management, Faculty of Social Sciences, Niger Delta University,  
Wilberforce Island, Bayelsa State, Nigeria

\*Corresponding author: drohwodafe@gmail.com

Received May 14, 2019; Revised July 12, 2019; Accepted July 26, 2019

**Abstract** Open defecation (OD) is the lowest form of sanitation and its elimination could enhance the attainment of the Sustainable Development Goal (SDG) 6.2 target. Hence, this study is aimed at the analysis of OD practice and its implications in sub-Saharan Africa (SSA). This study used a descriptive design based on data obtained from the WHO and UNICEF (2017) Joint Monitoring Programme (JMP) report. Open defecation data of countries in SSA were extracted from the global estimates and used to determine the status of OD in the region. The analysis revealed that OD is still widely practiced in SSA with negative implications on the health and socio-economic wellbeing of the people. Progress towards ending OD in most countries in the region is very slow, in fact, in some countries, the proportion of people practicing OD has increased. For example, from 2000-2015, OD increased by 7% in Djibouti, while it decreased by 53% in Ethiopia. Hence, the t-test analysis revealed that there was no significant difference in the proportion of total OD reduction in the region from 2000 to 2015. It was also revealed that OD practice is more prevalent in the rural area than urban area in SSA. The major determinants of OD in SSA are socio-cultural, religious, physical, demographic and economic factors. The study recommends some strategic options which could reduce OD practice in SSA.

**Keywords:** *open defecation, health and socio-economic implications, sub-Saharan Africa*

**Cite This Article:** Odafivwotu Ohwo, "Open Defecation Practice and Its Implications in Sub-Saharan Africa." *World Journal of Social Sciences and Humanities*, vol. 5, no. 2 (2019): 92-100. doi: 10.12691/wjssh-5-2-5.

## 1. Introduction

Safe water, sanitation and hygiene (WASH) services are important requirements for healthy and socio-economic wellbeing, as they are primary drivers for disease control, human dignity and comfort. Hence, there have been concerted efforts by national governments and the United Nations to ensure that everyone has access to these basic human requirements. The Millennium Development Goals (MDGs) and the Sustainable Development Goals (SDGs) include certain goals and targets for WASH services in order to achieve easy access to these supporting pillars of life. Specifically, SDG 6.2 target focus on achieving access to adequate and equitable sanitation and hygiene for all and end open defecation, paying special attention to the needs of women and girls and those in vulnerable situations, by 2030 [1]

Generally speaking, appreciable progress has been made with these global efforts, however, much still needs to be done to achieve the very ambitious SDGs targets, especially target 6.2 that focus for the first time on ending open defecation (OD), which is the practice of disposal of human faeces in fields, forest, bushes, surface water, or other open spaces. Open defecation is the worst form of sanitation and one of the clear manifestations of poverty

[2]. Achieving open defecation free (ODF) is one of the first steps towards attaining adequate sanitation, as the Joint Monitoring Programme (JMP) ladder for sanitation, has OD at the bottom of the ladder [1]. The practice of OD has several implications, as it pollutes both surface and groundwater sources, which facilitates the transmission of pathogens that cause waterborne diseases, especially diarrhea [3]. Diarrhea disease is a leading cause of death among children, especially below the age of five. It has been estimated that diarrhea causes 800,000 deaths yearly from about 1.7 billion reported cases worldwide [4], making it the second leading contributor to the global burden of disease, as measured in disability-adjusted life years (DALYs) [5].

The number of people using unimproved sanitation worldwide was estimated to be 2.3 billion people in 2015. Of this number, 892 million people (38.78%) practice OD globally and 220 million (24.6%) of this population live in sub-Saharan Africa [1]. Going by these figures, it is evident that the health and socio-economic welfare of the people is endangered, especially in sub-Saharan Africa (SSA). Open defecation practice disproportionately affects developing countries more than developed countries; rural population than urban population, and the poor than the rich [6]. For this reason, any strategy to end OD that does not recognize this trend may not succeed.

In order to achieve significant improvement towards ending OD in SSA, there is the need to analyze the current

state of OD among the various countries in the region, as the often quoted regional averages of OD conceal the true state of affairs across individual countries. Such analysis will reveal countries with high rate of OD in the region, so that more attention can be focused on them and encouraged to act rightly to end OD. However, past studies focused mainly on an aspect of OD such as determinants of OD or implications of OD, and are usually restricted to a section or region of a specific country [7-12], which makes it difficult to appreciate the pattern of OD among the countries in SSA. Hence, the objectives of this study are as follows: to analyze the status of open defecation among the countries in SSA; to identify the major determinants of OD in SSA; and to assess the health and socioeconomic implications of OD in SSA.

## 2. The Study Area

Sub-Saharan Africa refers to the countries of the African continent south of the Sahara Desert (Figure 1). It comprises of 50 countries [1], although some countries such as Chad, Sudan, Mauritania, Niger and Mali belong both to the Saharan Desert region and sub-Saharan Africa region. It is geographically located between latitudes  $20^{\circ}\text{N}$  and  $35^{\circ}\text{S}$  of the Equator and longitudes  $50^{\circ}\text{E}$  and  $18^{\circ}\text{W}$  of the Greenwich meridian. It has an estimated population of 962, 287, 000 people in 2015, with Nigeria

having the highest population of about 182, 202, 000 people, while Seychelles has the lowest population of 96, 000 people.

Sub-Saharan Africa experiences diverse climatic types due to its position across equatorial and subtropical latitudes in both the northern and southern hemisphere. Most parts of the region experiences high temperatures (especially the northern parts), high precipitation and humidity (especially in the western and central parts). Different types of vegetation are equally found in the region, such as humid rainforest, savanna, grasslands with scattered trees. Rocks of different types and formation are found in the region; hence, it is richly endowed with different minerals (copper, gold, diamond, petroleum etc). Most of the countries economics in the region are dependent on the extraction of these resources.

The region has one of the highest poverty rates in the world, with a high youthful population and unemployment rate. Healthcare, educational and infrastructural facilities are poorly provided in most countries of the region, hence it has high mortality rate. This situation has increased the level of insecurity and criminality in the region, which had negatively affected direct foreign investment, thereby increasing the economic woes of most of the countries in the region. This situation affected the capacities of SSA countries to meet most of the MDGs and currently threaten the achievement of the SDGs, especially goal 6.



Figure 1. Africa, Showing Sub-Saharan Countries

### 3. Method of Study

This study focused on the analysis of OD practice and its implication in sub-Saharan Africa. The study used a descriptive design based on data obtained from [1] Joint Monitoring Programme (JMP) report that contains global estimates on progress on drinking water, sanitation and hygiene-2017 update and SDG baselines. Open defecation data of countries in SSA were extracted from the global estimates and used to determine the status of OD in the region. Statistics obtained include the estimated total population of each country in the region, the proportion of urban population, and the proportion of urban, rural and total population of each country in the region that practices OD, with the reference years of 2000 and 2015. From the total proportion of OD practice, the proportion of OD change was determined for each country between 2000 and 2015. This was done to determine the level of progress made by each country in reducing OD. In addition, the Student's t-test was used to determine whether there was significant difference in the proportion of total OD reduction in sub-Saharan Africa from 2000 to 2015. Also, the Student's t-test was used to test whether there was significant difference between the proportion of OD in the rural and urban areas in 2015.

The determinants, health and socioeconomic implications of OD in SSA were highlighted using empirical studies obtained from a review of related literature from peer review journals, textbooks, conference proceedings, commissioned studies and the internet. The rest of the

paper was discussed under the following sub-themes: Status of open defecation in sub-Saharan Africa, determinants of open defecation, health and socioeconomic implications of open defecation, curbing open defecation in sub-Saharan Africa and conclusion.

### 4. Status of Open Defecation in Sub-Saharan Africa

Reference [1] revealed that globally, 2.9 billion people (39%) used a safely managed sanitation service, where excreta was safely disposed of in situ or treated off-site. The report also revealed that 600 million people used a limited sanitation service, that is, improved facilities shared with other households; while 892 million people still practiced open defecation globally; with SSA accounting for 220 million people (24.6%). Nigeria contributes significantly to the number of people practicing OD in SSA, as 47.4 million Nigerians, representing (21.5%) practiced OD, which was 26% of Nigeria total population in 2015. This shows that the proportion of people practicing OD in SSA varies among the countries in the region (Table 1). For example, in 2015, 76% of the total population of Eritrea practiced OD (the highest in the region); while Seychelles, Réunion and Mauritius were ODF, as opposed to the global and SSA averages of 12% and 23%, respectively (Table 1). Hence, analysis of OD based on regional averages may not reveal the true situation among the various countries in the region.

**Table 1. Estimates of Open Defecation Practice in Sub-Saharan Africa**

S/N	Country/Region	Year	Population (x 1,000)	(%) Urban	Urban OD (%)	Rural OD (%)	Total OD (%)	Total OD Change (%)
1	Angola	2000	15 059	32	19	67	51	-18
		2015	25 022	44	3	56	33	
2	Benin	2000	6 949	38	39	86	68	-13
		2015	10 880	44	28	76	55	
3	Botswana	2000	1 737	53	4	41	21	-4
		2015	2 262	57	2	36	17	
4	Burkina Faso	2000	11 608	18	9	85	71	-23
		2015	18 106	30	7	65	48	
5	Burundi	2000	6 767	8	2	3	2	1
		2015	11 179	12	1	3	3	
6	Cameroon	2000	15 928	46	1	13	7	0
		2015	23 344	54	1	14	7	
7	Cape Verde	2000	439	53	17	31	23	5
		2015	521	66	18	47	28	
8	Central African Republic	2000	3 726	38	4	35	23	1
		2015	4 900	40	6	36	24	
9	Chad	2000	8 343	22	18	85	71	-3
		2015	14 037	22	17	82	68	
10	Comoros	2000	548	28	1	1	1	0
		2015	788	28	1	1	1	
11	Congo	2000	3 109	59	3	17	9	-1
		2015	4 620	65	2	20	8	
12	Côte d'Ivoire	2000	16 518	44	7	59	36	-12
		2015	22 702	54	4	47	24	
13	Democratic Rep. of Congo	2000	48 049	35	3	14	10	2
		2015	77 267	42	4	18	12	
14	Djibouti	2000	723	77	2	60	16	7
		2015	888	77	7	77	23	
15	Equatorial Guinea	2000	531	39	0	0	0	4
		2015	845	40	3	5	4	
16	Eritrea	2000	3 535	18	41	98	88	-12
		2015	5 228	23	33	89	76	
17	Ethiopia	2000	66 444	15	23	90	80	-53
		2015	99 391	19	7	32	27	

S/N	Country/Region	Year	Population (x 1,000)	(%) Urban	Urban OD (%)	Rural OD (%)	Total OD (%)	Total OD Change (%)
18	Gabon	2000	1 232	80	1	3	2	1
		2015	1 725	87	3	7	3	
19	Gambia	2000	1 229	48	1	10	6	-5
		2015	1 991	60	0	2	1	
20	Ghana	2000	18 825	44	8	32	22	-3
		2015	27 410	54	8	31	19	
21	Guinea	2000	8 799	31	2	39	27	-12
		2015	12 609	37	1	24	15	
22	Guinea-Bissau	2000	1 315	37	4	55	36	-20
		2015	1 844	49	2	30	16	
23	Kenya	2000	31 066	20	2	20	17	-5
		2015	46 050	26	3	15	12	
24	Lesotho	2000	1 856	20	10	54	46	-16
		2015	2 135	27	4	40	30	
25	Liberia	2000	2 892	44	26	77	55	-13
		2015	4 503	50	23	61	42	
26	Madagascar	2000	15 745	27	17	45	38	6
		2015	24 235	35	23	55	44	
27	Malawi	2000	11 193	15	2	18	16	-10
		2015	17 215	16	2	7	6	
28	Mali	2000	11 047	28	5	28	22	-14
		2015	17 600	40	1	13	8	
29	Mauritania	2000	2 711	49	21	76	49	-19
		2015	4 068	60	10	61	30	
30	Mauritius	2000	1 185	43	0	0	0	0
		2015	1 273	40	0	0	0	
31	Mozambique	2000	18 265	28	24	70	57	-21
		2015	27 978	32	12	47	36	
32	Namibia	2000	1 898	32	15	75	56	-6
		2015	2 459	47	20	76	50	
33	Niger	2000	11 225	16	23	93	82	-11
		2015	9 899	19	13	85	71	
34	Nigeria	2000	122 877	35	10	29	23	3
		2015	182 202	48	14	36	26	
35	Réunion	2000	737	90	-	-	-	0
		2015	861	95	-	-	-	
36	Rwanda	2000	8 022	15	2	5	4	-2
		2015	11 610	29	2	2	2	
37	Sao Tome and Principe	2000	137	53	64	78	71	-21
		2015	190	65	43	63	50	
38	Senegal	2000	9 861	40	4	38	24	-9
		2015	15 129	44	2	25	15	
39	Seychelles	2000	81	50	-	-	1	-1
		2015	96	54	-	-	0	
40	Sierra Leone	2000	4 061	36	6	38	26	-7
		2015	6 453	40	6	27	19	
41	Somalia	2000	7 385	33	12	80	58	-19
		2015	10 787	40	7	60	39	
42	South Africa	2000	44 897	57	3	26	13	-11
		2015	54 490	65	1	5	2	
43	South Sudan	2000	6 693	17	-	-	-	NA
		2015	12 340	19	22	70	61	
44	Sudan	2000	28 080	32	24	64	51	-24
		2015	40 235	34	4	38	27	
45	Swaziland	2000	1 064	23	2	29	23	-12
		2015	1 287	21	1	14	11	
46	Tanzania	2000	33 992	22	2	12	10	1
		2015	53 470	32	2	16	11	
47	Togo	2000	4 875	33	24	74	58	-7
		2015	7 305	40	15	75	51	
48	Uganda	2000	23 758	12	2	17	15	-9
		2015	39 032	16	2	7	6	
49	Zambia	2000	10 585	35	2	36	24	-9
		2015	16 212	41	1	25	15	
50	Zimbabwe	2000	12 500	34	4	42	29	-3
		2015	15 603	32	0	39	26	
51	Sub-Saharan Africa	2000	642 172	31	9	42	32	-9
		2015	962 287	38	8	32	23	
52	Global	2000	6 126 622	47	4	34	20	-8
		2015	7 349 472	54	2	24	12	

Source: Adapted from WHO and UNICEF (2017)  
 NA (Not applicable, no data for year 2000).

Table 1 also revealed that the practice of OD is more common in the rural area than urban area in SSA. In 2015, 46 countries (92%) had more proportion of their population practicing OD in the rural area, and the proportion of the rural population practicing OD among the countries in the region ranged from 0-89%, with Eritrea having the highest percentage (89%), while Mauritius had the lowest (0%). In the urban area the range of OD was 0-43%, with Sao Tome and Principe having the highest (43%), while Mauritius equally had the lowest (0%). Seven countries (14%) had 20% and above proportion of their urban population practicing OD in 2015; while in the rural area it was 31 countries (62%). Furthermore, 10 countries (20%) had an increase in the percentage of their respective urban population practicing OD from 2000 to 2015, while in the rural area; it was 13 countries (26%). The analyses of urban and rural rates of OD in SSA countries show that OD practice was more pronounced in the rural area of the region. The Student's t-test, which was used to determine whether there was significant difference between the rate of OD in the rural and urban areas in the region in 2015, shows a significant difference as the calculated t-test was 6.74, while the t-test table value was 1.671 at 0.05 significance level. This shows that the rates of OD in the rural and urban area are not the same. The test result suggests that more efforts should be made to significantly reduce the practice of OD in the rural area of SSA.

The proportion of total OD change ranged from -53% to 7%; with Ethiopia having the highest reduction (-53%) from 2000 to 2015, while the proportion of OD increased in Djibouti from 16% to 23%, a difference of seven per cent within the same period. This shows that Ethiopia was adjudged as the best country in the region in terms of progress made to reduce open defecation, while Djibouti was adjudged the worst-ranked country, which actually show worrying deterioration in OD practice from 2000-2015. The proportion of total OD reduction in the region was very low, as only six countries (12%) had 20% and above reduction in OD from 2000 to 2015. It was therefore not surprising that the Student's t-test result shows that there was no significant difference in the proportion of total OD reduction from 2000 to 2015, as the calculated t-value was 1.46, while the table value was 1.671 at 0.05 significance level. This confirms the assertion that the rate of OD reduction in the region is low. At this slow pace of progress, many countries in the region may miss the set target by 2030 if urgent measures are not taken to fast track the rate of OD reduction. The analyses also show that not much progress was made during the MDGs period from 2000 to 2015 in reducing the proportion of the people practicing OD in the region. This revelation is a wakeup call for countries in the region to redouble their efforts in reducing and eventually ending OD, so that the SDG 6.2 target can be achieved by 2030.

It should be noted that globally, only SSA and Oceania experienced increase in the number of people practicing OD, probably due to high population growth rate, which led to an increase in OD practice from 204 to 220 million people in SSA and 1 to 1.3 million in Oceania [1]. Reference [13] had noted that the mere reduction in OD does not guarantee adequate sanitation, as in most countries, which have experienced reduction in OD

practice, had led to increased in the use of unimproved sanitation such as uncovered pit latrine, bucket and hanging toilets. This situation had reduced the gains in the reduction of OD in the region.

## 5. Determinants of Open Defecation in Sub-Saharan Africa

### 5.1. Socio-cultural and Religious Determinants

Reference [12] identified culture as a driver of OD in their study of Odi and Kaiama Riverine communities, Bayelsa State, Nigeria. In their report they quoted one of the respondents who said that nothing was wrong with OD as it was an age long practice which has been passed on from generation to generation. The respondent did not see any link between health outcomes and OD practice, with the statement that "anybody that will live long will live long, not because of the place they toilet." Statements like this indicate that some of the people feel comfortable with the practice of OD, which would make it difficult to use shame as a driver of positive behavioural change to end OD in the community. Unfortunately, studies in other climes have reported similar findings. For example, [14] in their study in a rural settlement in northern India revealed that even those that have toilets at home or have access to the one built by the government to end OD still defecate in the open.

Reference [7] reported that 68% of the respondents in their study in Wa Municipality of Ghana uphold the belief that cultural practices and traditional beliefs influence where some people defecate in the community. For example, they quoted a public toilet attendant who explained that the reason why some of the people don't use the public toilets after 9 pm was the fear of encountering witches, wizards and bad spirits that were believed to visit the toilets at night. Similarly, [15] reported that in Uganda, people were compelled to defecate at random in the bush and surrounding to prevent sorcerers with easy access to their excreta for devilish purposes. In another study, [16] revealed that a Muslim householder in Kumasi, Ghana, refused to use a latrine because the latrine faced the direction of Mecca, which he considered absurd. These cultural and religious beliefs if not adequately and promptly addressed could constitute a serious hindrance to governments and other donor agencies efforts to end OD in the region.

### 5.2. Physical, Demographic and Economic Determinants

Several studies carried out in different countries in SSA and elsewhere have equally identified physical, demographic and economic factors as major determinants of OD practice [7,8,17,18,19]. A study by [20] in Ghana revealed that a major physical constraint to building a toilet in the study area was unavailability of space. This is so because in some locations buildings are closely spaced and houses were initially built with no toilet facilities. Now that some of the households are willing to build

toilets they are constrained by availability of space to build their toilets, which encourage OD. In addition, [19] report on studies on OD carried out in rural communities in four West African countries (Burkina Faso, Ghana, Mali and Nigeria) revealed that the geophysical conditions in some locations make the provision of latrines more challenging, either because the ground is so hard or too sandy and unstable for latrine construction. The report cited examples of part of Mali and Gwarandok area in Nigeria where the ground was so rocky to dig pit latrines in the usual way. Pit latrines construction in such areas require technical expertise (which is not readily available) and financial resources that the people often cannot afford.

Demographic characteristics of household heads have been identified by several studies as a major determinant of OD practice in SSA. For example, [8] in a study, exploring the determinants of open defecation in Nigeria, using demographic and health survey data, reported that the results show significant relationships between OD and education attainment, gender, wealth, place of residence, geo-political region, ethnicity, access to electricity, amongst others. The findings further revealed that the educational attainment of household heads determines the level of OD practice. Hence, only 2.1% of household heads educated beyond secondary school practice OD; while 93% of those practicing OD were not educated beyond secondary school. The author asserts that educational level of household heads is important as they are the major decision makers regarding the adoption of latrine in Nigeria. Similarly, [17] in a study in Ghana and Ethiopia equally stated that OD practice is significantly determined by demographic variables such as gender, education, household size, housing characteristics and access to drinking water. In the same vein, a study in rural Tanzania by [18] also identified demographic variables such as income, education, religion, occupation and condition of toilet as factors that influence OD practice. In South Africa, a study by [21] reported similar findings of demographic characteristics (income, age, gender, education level, health education, race, and employment status) that determine OD practice. These various studies show that OD practice is significantly influenced by demographic characteristics of households.

The income level of households has been identified by some studies in SSA and elsewhere as a major determinant of OD [18,22,23,24] especially in rural areas where the conditions for OD are much more prevalent. The [25] assert that in Mozambique, structuring the population into wealth quintile revealed that in both urban and rural areas the prevalence of OD is highest with the poorest quintile. For example in rural area of Mozambique, 96% of the poorest quintile practices OD, compared with 13% of the richest quintile. The reason for this may be connected with the lack of finance to build latrines, not necessarily ignorance of the health impact of OD by those who practice it. A study in Ghana by [7] also attributed the inability of farmers and artisans respondents to own a latrine to poor income from their occupations; hence, only 6.3% out of 132 respondents who were farmers and 5.2% of artisans had household toilets.

Other studies in Benin Republic and Mozambique by [26] and [2], respectively, corroborate the assertion that poorer households have higher tendency to practice OD

than their richer counterparts. A study in rural Tanzania on ending OD by [18] reported that 46% of households planning to build a latrine identified the cost of latrine as a major constraint; while 44% of households with no plans to build a latrine indicated financial constraints. The findings from these studies clearly show that household income level determines ownership of toilets and the likelihood to avoid OD.

## 6. Health and Socioeconomic Implications of Open Defecation

The relationship between the practice of OD and prevalence of waterborne diseases has been established in the literature due to faecal contamination of drinking water sources, as infected human excreta contains several harmful organisms (pathogenic viruses, bacteria pathogens, protozoan cysts and helminth eggs), which have caused health challenges such as diarrhea, cholera, viral infections and typhoid [27]. Reference [3] also alluded to the fact that the practice of OD facilitates the transmission of pathogens that cause diarrhea diseases – the second leading contributor to the global burden of disease, as measured in disability-adjusted life years [28]. A study by [29] shows that OD has led to the contamination of drinking water sources in the rural areas of Burkina Faso, Ghana and Niger Republic, resulting in outbreaks of diarrhea, with children showing signs of under nutrition, malnutrition and stunting. In the same vein, [10] established a link between OD and diarrhea in their study of the menace of open defecation and disease in the Nadowli-Kaleo District of Ghana. The report noted that children often suffer from diarrhea because they always play and crawl on the ground soiled with faeces and walk barefooted on farm infected lands.

Reference [11] identified chronic effects of OD to include soil-transmitted helminthiasis, giardiasis, increased anaemia, environmental enteropathy and small intestine bacteria overgrowth, stunting and long-term impaired cognition; while [30] assert that OD and poor sanitation facilities are associated with increase vulnerability of women to hookworm infestation, resulting in maternal anemia, which is directly associated to adverse pregnancy outcomes [31]. Adverse pregnancy outcomes associated with OD include low birth weights, preterm births, stillbirths and spontaneous abortions [32]. These studies show that the health impacts of OD is wide spread and could exacerbate other health conditions such as diarrhea and malaria. For example, [10] observed that in Nadowli-Kaleo District of Ghana, OD practice has led to increase in flies' and mosquitoes' infestation because the OD areas which are usually bushy serve as breeding grounds to these carriers of pathogens, which could cause diarrhea and malaria. A study carried out in the rural Dangla District of Northwest Ethiopia on the prevalence of diarrhea in children below the age of five, shows that the prevalence rate was 36.1% among those that practice OD and 9.9% among those who are ODF [33]. The wide margin (26.2%) in diarrhea prevalence between households that practice OD and those that are ODF is a clear indication that the elimination of OD practice will result in significant health gains in the community.

Therefore, any strategy designed to reduce associated health challenges of OD in SSA without factoring in the provision of adequate sanitation may not yield optimal results.

The socioeconomic implications of OD in SSA are equally severe as the health impacts. For example, a report by [13] revealed that in 2015, African countries lost about 0.9% of their Gross Domestic Product (GDP) to poor sanitation; while open defecation alone cost 18 African countries, which constitute more than 50% of Africa's population about US\$2 billion. Unfortunately, these countries invest less than 0.1% of their GDP in sanitation, although African leaders had resolved to spend at least 0.5% of their GDP in this sector as part of the Ngor Declaration, which was adopted at the fourth African Conference on Sanitation and Hygiene in 2015 [13]. Similarly, [34] estimated that OD cost Nigeria US\$1 billion yearly. In addition, another estimated sum of US\$243 million is lost each year in access time, as each person practicing OD, spends an estimated 2.5 days a year in search of a private place to defecate. Open defecation also cost other countries in the region huge amount of money yearly-Ghana, US\$79 million, Malawi, US\$57 million, Kenya and Burkina Faso US\$26 million each, Niger and Chad US\$23 million each, Mozambique and Benin US\$22 and US\$21 million, respectively [34]. Apart from these major costs, other subsidiary losses each year to OD include premature death, access time, productivity losses whilst sick or accessing healthcare and amount spent on healthcare. In fact, almost all countries in the region bear huge cost to OD.

Some studies [10,35,36] have shown that OD has considerable social cost as it can increase the vulnerability of girls and women to verbal, physical and sexual harassment and violence. In Nairobi, Kenya, [36] reported cases of girls and women who were assaulted or raped when trying to access places for defecation in the dark or at night. This situation has led to physical injuries and psychological trauma of affected persons. Similarly, data from the 2008-2009 Kenya Demographic and Health Survey (DHS) show that the risk of non-partner sexual violence increased to 40% among those who practice OD. In addition, those who practice OD face the risk of being bitten by snakes or other wild reptiles [10]. Also, OD negatively affects the dignity of those that practice it. Furthermore, it is unsightly and produces offensive odour, thereby degrading the aesthetics of the environment.

## 7. Curbing Open Defecation in Sub-Saharan Africa

In order to significantly reduce the rate of OD in the region, and be on track to achieving the SDG 6.2 target, several strategic methods have to be developed and implemented in SSA countries in order to address the major determinants of OD. Since there is variation in the nature and severity of OD amongst the countries in the region (Table 1), the strategic options chosen to tackle the menace should be peculiar to the needs and characteristics of the area in question. One of the major requirements to reduce OD in SSA is for all countries in the region to develop a comprehensive, functional and implementable

sanitation policy that details a strategic plan of action to end OD. The plan must spell out share responsibilities of governments at different levels, donor agencies, community based organizations, civil society organization, communities and individuals. The financial requirements for the implementation of the policy should be determined and budgeted for; the needs of girls, women and the disable should be protected and the respective governments in SSA should develop the needed political will and supportive legal framework to implement the policy document. In addition, there should be an in-built robust review, monitoring and implementation system to ensure that the policy document achieve its goals.

One method that have proven to be effective in addressing the practice of OD especially in rural areas is the Community-Led Total Sanitation (CLTS) strategy, which was pioneered by Kamal Kar, a development consultant from India, in Rajshahi district of Bangladesh in 2000. The primary aim of CLTS is to mobilize and motivate communities to willingly and sustainably eliminate OD through the realization of the consequences of OD on the health and socio-economic well being of members of the community. This process of social awakening can be stimulated by facilitators from within or outside the community. In this strategy, emphasis is on the creation of awareness and behavioural change, which trigger community action to seek self solution to OD without any form of either external financial support or subsidy to assist community members to provide their sanitation facilities.

Although CLTS is a community based strategy for achieving ODF communities, however, for optimal results there is the need to also pay attention to the bias of individual households as the choice of the community may not always be the choice of every household in the community. For example, in Nigeria, [37] noted that feedback from the field shows that during the CLTS process, households that practice OD do not attend meetings in order to avoid embarrassment. Hence, it advocates for the need to develop a strategy that combines the merits of both community and individual approaches, which would bring some changes in the triggering process currently adopted under CLTS without losing the basic CLTS principles. Since the outcome of the application of CLTS may not be the same in all SSA countries where it has been applied, therefore, the challenges that confront its implementation in the affected countries and communities should be documented and worked on to achieve optimal results.

There should be increased and sustainable advocacy against OD in all countries in the region. This can be achieved by a strong network and effective coordination of civil society organizations (CSOs), community based organizations (CBOs) and nongovernmental organizations (NGOs). Also, the mass media has to key into the advocacy by assisting in publicizing and educating the people on the benefits of ODF communities. In addition, governments should as a matter of policy build toilets in public places such as markets, motor parks, schools and healthcare facilities, which could go a long way in discouraging OD. It should however be noted that such public toilets should be maintained and made attractive for people to willingly use them.

To sustainably tackle the menace of OD in the region, two major determinants of OD-poverty and illiteracy have to be addressed. These challenges can be solved by the design of workable poverty eradication programmes and improvement in education by all countries in the region, as studies have indicated that the rich and the educated are less likely to practice OD compared to their poorer and less educated counterparts. Deliberate efforts should be made by governments at all levels to reduce the number of out-of-school children, comprehensively implement the Universal Basic Education (UBE) programme and intensify adult education. Also, sanitation clubs should be encouraged in schools, where children would learn more on the importance and how to achieve good sanitation. These would help to liberate the people from ignorance and inimical cultural and religious beliefs and practices that encourage OD. Also, education could improve the income level of the people, which would make it easier for them to raise the financial requirements to provide toilets for their respective households. Furthermore, building laws that are silent on sanitation in any of the SSA countries should be reviewed. The provision of adequate toilet facilities in a building design should be made mandatory before approval is given. Also, owners of existing buildings without adequate toilets should be given timelines to provide them; failure of which should attract severe penalty. In order to achieve this, all countries should develop appropriate technologies that fit their local peculiarities.

## 8. Conclusion

In spite of the associated negative consequences of OD on the health and socio-economic well being of the people, this study has shown that SSA countries are still battling with the menace of OD, which is still widely practiced in most of the countries in the region, especially in the rural area. The t-test results show that there was significant difference in the proportion of OD in the rural and urban areas in the region in 2015, while there was no significant difference in the proportion of total OD reduction from 2000 to 2015 in the region. With the slow progress in ending OD amongst the countries in the region, SSA may miss the SDG 6.2 target, just as it did during the MDGs period, if drastic measures are not taken to fast track the process of ending OD. One of the first steps towards ending OD should be the identification of the major determinants of OD in each country of the region, and apply the required strategic mix to addressing them. The CLTS strategy has proven to be successful in several communities in different countries where it has been applied especially rural communities. Therefore, the application of CLTS and other strategic options discussed in this paper would go a long way to reducing OD in SSA and place the region on the partway to achieving SDG 6.2 target by the year 2030. Achieving this target would improve the health and socio-economic wellbeing of the people in SSA.

## References

- [1] FWHO & UNICEF. Progress on Drinking Water, Sanitation and Hygiene: 2017 Update and SDG Baselines, Geneva: License: CC BY-NC-SA 3.0 IGO, 2017.
- [2] Giné-Garriga, R., Flores-Baquero, Ó, de Palencia, A. J. F & Pérez-Foguet, A. "Monitoring sanitation and hygiene in the 2030 agenda for sustainable development: A review through the lens of human rights". *Science of the Total Environment*, 580: 1108-1119. 2017.
- [3] Galan, D. I, Kim, S. S & Graham, J. P "Exploring changes in open defecation prevalence in sub-Saharan Africa based on national level indices". *BMC Public Health*, 13: 527: 1-12. 2013.
- [4] UNICEF. *Pneumonia and Diarrhoea - Tackling the Deadliest Diseases for the World's Poorest Children*, New York: United Nations Children's Fund, 2012.
- [5] Clasen, T. F, Bostoen, K, Schmidt, W. P, Boisson S, Fung I. C. H, Jenkins, M. W, Scott, B, Sugden S & Cairncross S. Interventions to Improve Disposal of Human Excreta for Preventing Diarrhoea, *Cochrane Database Syst Rev*, 6. 2010.
- [6] WHO & UNICEF. *Progress on Sanitation and Drinking Water – 2015 Update and MDG Assessment*, Geneva: World Health Organization, 2015.
- [7] Osumanu, I. K, Kosoe, E. A & Ategeeng, F. "Determinants of open defecation in the Wa Municipality of Ghana: Empirical findings highlighting socio-cultural and economic dynamics among households". *Journal of Environmental and Public Health*, Volume 2019, Article ID 3075840, 10 pages, 2019.
- [8] Abubakar, I. R. "Exploring the determinants of open defecation in Nigeria using demographic and health survey data". *Science of the Total Environment*: 637-638C: 1455-1465, . 2018
- [9] Okullo, J. O, Moturi, W. N & Ogendi, G. M "Open defecation and its effects on the bacteriological quality of drinking water sources in Isiolo County, Kenya". *Environmental Health Insights*, Volume 11: 1-8. 2017.
- [10] Ameyaw, S & Odame, F. S. "The menace of open defecation and disease in the Nadowli-Kaleo District, Ghana". *International Journal of Scientific and Research Publications*, Volume 7, Issue 12, 743-749. 2017.
- [11] Mara, D. "Elimination of open defecation and its adverse health effects: A moral imperative for governments and development professionals, *Journal of Water, Sanitation and Hygiene for Development*, 07.1: 1-12. 2017.
- [12] Sample, E. D, Evans, B. E, Camargo-Valero, M.A, Wright, N.G & Leton, T. G. "Understanding the drivers of sanitation behaviour in riverine communities of Niger Delta, Nigeria: the case of Odi and Kaiama communities". *Journal of Water, Sanitation and Hygiene for Development*, 6 (3): 491-499. 2016.
- [13] Sengupta, S, Verma, R & Kazmi, S Bottom to the Fore: *Rural sanitation in Sub-Saharan Africa*, Centre for Science and Environment, New Delhi, 2018.
- [14] Coffey, D, Gupta, A., Hathi, P, Khurana, N, Spears, D, Srivastav, N. & Vyas, S. "Revealed preference for open defecation, *Economic & Political Weekly*, 49, 43. 2014.
- [15] Belcher, J.B. "Sanitation norms in rural areas: a cross-cultural comparison". *Bulletin of Pan American Health Organization*, Vol. 12, No. 1: 34-44, View at Google Scholar, 1978.
- [16] Cotton, A, Franceys, R, Pickford, J & Saywell, D. *On-Plot Sanitation in Low-Income Urban Communities: a Review of Literature*, Water, Engineering and Development Centre, Loughborough University, Leicestershire, UK. 1995.
- [17] Crocker, J, Saywell, D & Bartram, J. "Sustainability of community-led total sanitation outcomes: evidence from Ethiopia and Ghana". *International Journal of Hygiene and Environmental Health*, 220 (3), 551-557. 2017.
- [18] Sara, S & Graham, J. "Ending open defecation in rural Tanzania: which factors facilitate latrine adoption? *Int. J. Environ. Res. Public Health*, 11(9): 9854-70. 2014
- [19] WaterAid. *Towards total sanitation: socio-cultural barriers and triggers to total sanitation in West Africa*, report, Water Aid, 2009.
- [20] Jenkins, M. W & Scott, B. "Behavioral indicators of household decision-making and demand for sanitation and potential gains from social marketing in Ghana". *Soc. Sc Med.* 64, 2427-2442. 2007.
- [21] Kirigia, J. M & Kainyu, L. "Predictors of toilet ownership in South Africa, *East African Medical Journal*, 77(12): 667-672. 2000.
- [22] Roche, R, Bain R & Cumming, O. "A long way to go- estimates of combined water, sanitation and hygiene coverage for 25 Sub-Saharan African countries". *PLoS ONE* 12(2): 2017.
- [23] O'Reilly, K., Dhanju, R., & Goel, A. "Exploring "The remote" and "the rural": open defecation and latrine use in Uttarakhand, India. *World Development*, 93, 193-205. 2017.



- [24] Mulenga, J. N., Bwalya, B. B & Kaliba-Chishimba, K. "Determinants and inequalities in access to improved water sources and sanitation among the Zambian households". *International Journal of Development and Sustainability*, Vol. 6 No. 8: 746-762. 2017.
- [25] WHO & UNICEF (2014) Progress on Drinking Water and Sanitation, 2014 Update, Geneva, Switzerland, [http://www.who.int/water\\_sanitation\\_report/en/](http://www.who.int/water_sanitation_report/en/).
- [26] Gross, E., & Gunther, I. "Why do households invest in sanitation in rural Benin: health, wealth, or prestige?" *Water Resources Research*, 50, 8314-8329. 2014.
- [27] Pruss-Ustun A, Bos R, Gore F & Bartram J. Safer Water, Better Health: Costs, Benefits and Sustainability of Interventions to Protect and Promote Health, World Health Organization, <http://www.who.int/quantifyingehimpacts/publications/saferwater/en/>. 2008. Accessed 10 August, 2017.
- [28] WHO. The Global Burden of Disease: 2004 update. Geneva: World Health Organization, 2008.
- [29] USAID (2017) West Africa Water Supply, Sanitation and Hygiene Program, Real Impact: West Africa, [Online] Available: [[https://www.usaid.gov/sites/default/files/documents/1865/RI\\_WA\\_WASH\\_508.pdf](https://www.usaid.gov/sites/default/files/documents/1865/RI_WA_WASH_508.pdf)] Accessed July 30, 2018.
- [30] Strunz, E. C, Addiss D. G, Stocks, M. E, Ogden, S, Utzinger, J & Freeman, M. C "Water, sanitation, hygiene, and soil-transmitted helminth infection: a systematic review and meta-analysis". *PLoS Med*. 2014.
- [31] Bora R, Sable C, Wolfson J, Boro K & Rao R. "Prevalence of anemia in pregnant women and its effect on neonatal outcomes in Northeast India". *J Matern Fetal Neonatal Med.*, 27: 887-91. 2014.
- [32] Padhi, B. K., Baker, K. K., Dutta, A., Cumming, O., Freeman, M. C., Satpathy, R., Das, B. S. & Panigrahi, P. "Risk of adverse pregnancy outcomes among women practicing poor sanitation in rural India: a population-based prospective cohort study". *PLoS Med*. 12 (7), e1001851. 2015.
- [33] Ayalew, A. M, Mekonnen, W. T, Abaya, S. W & Mekonnen, Z. A "Assessment of diarrhea and its associated factors in under-five children among open defecation and open defecation-free rural settings of Dangla District, Northwest Ethiopia" *Journal of Environmental and Public Health*, Volume 2018, Article ID 4271915, 8 pages.
- [34] WSP (2012) Economic Impacts of Poor Sanitation in Africa, [Online] Available: [<https://www.zaragoza.es/contenidos/medioambiente/onu/825-eng-v12.pdf>] Accessed, August 7, 2018.
- [35] Corburn J and Hildebrand, C. "Slum Sanitation and the Social Determinants of Women's Health in Nairobi, Kenya". *J Environ Public Health*, 1-6. 2015.
- [36] Van Houweling E, Hall R P, Sakho D. A, Davis J and Seiss M. "The role of productive water use in women's livelihoods: evidence from rural Senegal". *Water Alternatives*, Vol. 3, No 5: 658-67. 2012.
- [37] Federal Ministry of Water Resources. Making Nigeria Open-Defecation-Free by 2025: A National Road Map, Abuja, Nigeria. 2016.



© The Author(s) 2019. This article is an open access article distributed under the terms and conditions of the Creative Commons Attribution (CC BY) license (<http://creativecommons.org/licenses/by/4.0/>).