*International Research Journal of Environmental Sciences*_____ ISSN 2319–1414
Vol. **8(4),** 61-68, October **(2019)** *Int. Res. J. Environmental Sci.*

Review Paper

The challenge of open defaecation (OD) and community-led total sanitation (CLTS) in Nigeria – A Review

Mela Danjin[1*] and Henry O. Sawyerr[2]
[1]College of Nursing and Midwifery Gombe (CONMG), Gombe State, Nigeria
[2]Environmental Health Science Programme, School of Allied Health and Environmental Science, Kwara State University (KWASU), MaleteIlorin, Kwara State, Nigeria
danjin67@yahoo.com

Available online at: www.isca.in, www.isca.me
Received 17th January 2019, revised 22nd June 2019, accepted 28th July 2019

Abstract

Recent World Health Organization report ranked Nigeria as number two (2) nation in Open Defaecation (OD). This is affirmed as an environmental nuisance that has over time engaged the attention of both government and non-governmental organizations (NGOs). And as part of their social responsibility the academia and corporate organizations working within the purview of environmental and public health domains have exhibited no less concern. Amidst a number of responses from government and other stakeholders in Nigeria, is the adoption of Community-Led Total Sanitation (CLTS) principle. The objective of this review paper aimed to examine this all-important subject matter, and to take a look at the enormity of the challenges and the efforts made so far in the country. Intense literature review was conducted on peer review journals and published work on OD in Nigeria. This aimed to assess (a) to what extent has OD been a public health risk in our communities? (b) What common practices within existing socio cultural norms in Nigeria constitute the prime drivers of OD? (c) What are the common impediments to combating OD in Nigeria? Conclusive review indicate that one of the proven strategies often deployed at community and programme level, Community-Led Total Sanitation (CLTS) or the Community Approach for Total Sanitation (CATS) as examined in the Nigerian context – its adaptability, effectiveness or otherwise. A few models were critically examined and relevant recommendations were made.

Keywords: Defaecation, CLTS, CATS, enteropathy, schistosomiasis, helminth, diarrhoeral.

Introduction

As at the year 2015, WHO/UNICEF reports that 892 million people worldwide were practicing open defaecation (OD) and that about a quarter of this figure (220 million) reside in Sub-Saharan Africa (SSA)[1]. The report also hinted that majority of the African countries are way less than half covered with the minimum hand washing facilities and three out of five people in SSA with basic hand washing facilities (89 million people) resided in urban areas. According to the report almost one third of the people of the world – that's little over 2 billion persons – lack decent toilet of their own ('basic' or 'safely managed' sanitation). The direct or indirect effects of these poor sanitation indicator sincludemal nutrition, environmental enteropathy, poor child cognitive development and hence lower educational outcomes at schools, increased risk of infectious diseases (trachoma, diarrhea, schistosomiasis, soil-transmitted helminth, etc), and low productivity among adults[2-5]. Everyday about 1,000 childmortality due to water and sanitation-related avoidable diarrheal diseases are recorded; with overall water, sanitation, and hygiene being responsible for 829,000 deaths from diarrhoea in the year 2016[6-7].It is no wonder therefore, that Sustainable Development Goals (SDGs) especially target 6.2 makes a clarion call for ending OD and achieving universal access to sanitation, having due regard for equity, dignity, gender, and sustainability[6].

The Nigeria National Demographic and Health Survey, reports that only 30% of households in the country have an improved toilet facility that is not shared with other households and that only 61% of the households in Nigeria have access to an improved source of drinking water[8]. These socio-demographic figures bespeak high tendencies for OD in the country. This picture has been corroborated by the multiple indicator cluster survey (MICS) 2016-2017 findings which yielded 23.5% national prevalence of OD[9].Thisfigure was far higher in the rural(32.4%) than the urban (6.0%) areas, and regionally, North central had the highest (50%), while North West recorded lowest figure (14.3%). The MIC survey also revealed that only 35.9% people in Nigeria are users of improved sanitation facilities, while another 19.1% use unimproved sanitation facilities. Nigeria is in the group of twenty countries in the world where access to basic sanitation is decreasing rather than increasing and where 67% its people lack decent toilet facilities[10].This invariably points to an unacceptably poor open defaecation free (ODF) status and huge gaps in personal health practices with attendant health risks in the country.

It is in light of the above that government and development partners in Nigeria have demonstrated concern through the adoption of proven interventions. Some of these responses include the mainstreaming of key programmatic measures such as the Sustainable Total Sanitation (STS) which encourages hardware provision and the community-led total sanitation (CLTS) which aims to change OD behavior at the community level by "triggering" disgust or shame around the practice and initiating community-ledprovision of sanitary toilet facilities[11]. Government ministries and departments such as the Ministry of water resources at federal and state levels and relevant departments at local government level in collaboration with agencies like Unicef, WaterAid, UKaid have taken buy-in initiatives into programmes aimed at improving water supply and sanitation. Policy documents that provide strategic direction in this regard have been developed and monitoring frameworks put in place. Hence, this paper aims to; take a look atopen defaection (OD) practices as a public health problem in Nigeria, examine the concept of Community-Led Total Sanitation (CLTS), examine the various models of Community-Led Total Sanitation (CLTS) experimented in Nigeria, identify the challenges to the prevention of OD in Nigeria and to as well recommend some possible solutions to overcoming identified challenges to implementing CLTS in Nigeria.

Open Defaection (OD) practices as a public health problem in Nigeria

UNICEF has defined open defecation (OD) as the practice of people going out "in fields, bushes, forests, open bodies of water or other open spaces, rather than using the toilet to defecate'[11].

Globally, Nigeria ranks third in OD as about fifty million of the population indulge in it. It is said to be an age-long tradition that has stubbornly persisted among the different cultures in the country. It is widely practiced in both rural(32.4%) and urban (6.0%) areas, as slums and ghettos keep springing up on regular basis and residential buildings make no provision for adequate sanitation or toilet facilities[9,12].

Open defecation has been implicated in many cases of diarrhoea, typhoid fever, hepatitis, cholera and polio among other diseases in Nigeria. Diarrhoea is the leading cause death in children under five years, with more than 88 per cent of diarrhoea in children attributable to OD which also makes them vulnerable to malnutrition and stunting etc. It increases the risk of polio infection as it is mainly transmitted through the faecal-oral route. Therefore, it is not surprising that Nigeria has found it very difficult to eliminate polio in spite years of relentless efforts[12].

Available evidence shows that a gram of faeces contains about one million bacteria, 10 million viruses and one thousand parasite cysts. Furthermore, children's faeces is said to contain more bacteria than adults'[11].

Generally speaking, OD in urban areas is driven by a number of factors which include giving priority to more dwelling rooms for rent than toilets in densely populated areas and unwillingness to invest in toilets by landlords and tenants. This explains why in the cities faeces are sometimes disposed of in public spaces -in some areas in Lagos, people use rail tracks at night to defecate, and in some cases any nearby refuse dump becomes a quick option for OD (Figure-1). On the other hand, in rural areas, the availability of nearby bushes encourages the option of open defecation[11,12].

If left in the open, faeces are carried by flies, fluid (water), finger and field (the famous four of the F-Diagram of disease transmission Figure-2) and infect another person through the faecal-oral route. Hookworm, that enters the body through unprotected feet, has a direct link with open defecation[13].

Figure-1: Open defecation scenarios in Nigeria (The Punch, Nairaland, Inside business online)[12,26].

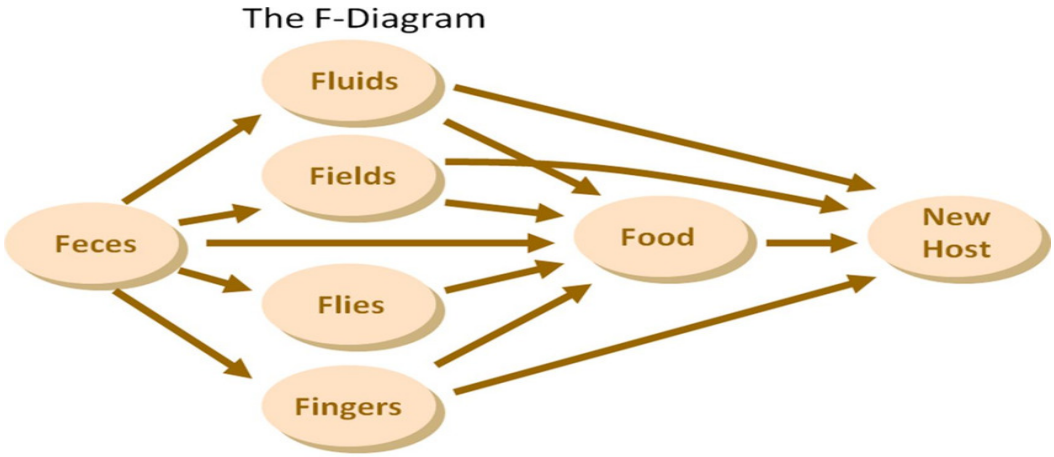

Figure-2: The F-Diagram[2]

The concept of Community-Led Total Sanitation (CLTS): Community-Led Total Sanitation (CLTS) refers to an innovative way of motivating communities to take self-driven initiatives for the complete elimination of open defecation (OD). By this communities are encouraged to carry out self-appraisal and evaluation regarding OD and initiate actions towards the achievement of open defecation free (ODF) status. The key idea in CLTS is recognizing the fact that mere provision of toilets doesn't translate to their use, neither can it result in improved sanitation and hygiene[13].

Community-Led Total Sanitation (CLTS) comes under a general name known as Community Approach for Total Sanitation (CATS). The cardinal principles of CATS which entails creating demand for sanitation in communities with the aim of stopping OD given the right enabling environment, consists of five pillars, namely stopping OD, promoting hand hygiene using soap, improving drinking water quality and food security at household level, and managing solid as well as liquid wastes[5].

On the other hand, Total Sanitation Campaign (TSC) entails the provision of subsidies or sanitation hardware, and its success measured by the number of people that have access to a toilet. There is complete reliance on administrative action instead of community participation in addressing its sanitation problems. This has, however, often led to uneven adoption, sustainability issues and partial usage. It has also given rise to a subsidy-dependence culture. Hence, the two methodologies differ not only in philosophy, but in approach and definitions of success[14].

Again, CLTS dwells more on behavioural change that is required to ensure genuine and sustainable sanitary improvements. It invests more in community mobilization than in hardware, shifting focus from toilet construction for individual households to the creation of ODF communities/ villages. Awareness is created that as long as a few continues to practice OD everyone remains in danger of infections. CLTS aims at triggering the desire for communal and collective change which elicits collective action and thereby encouraging innovation and mutual support as well as sourcing of appropriate local technology, resulting in greater community ownership and sustainability[13].

CLTS was first introduced by Dr. Kamal Kar, an Indian development worker, working on the platform of a partnership between Village Education Resource Centre (VERC) and Water Aid Bangladesh, in the year 2000 in Mosmoil village, while assessing a typical subsidized sanitation programme. Drawing on his years of experience in participatory approaches on a range of development projects, Karsucceeded in persuading the local NGO to stop the top-down toilet construction subsidy programmes. Strongly advocating change in institutional attitude and the need to draw on more local mobilization and facilitation to enable villagers analyze their sanitation and waste management situation bringing about collective decision-making to stop OD[13].

The adoption and spread of CLTS within Bangladesh was rapid with informal institutions and NGOs being prime vehicles– indigenous and international NGOs were quick to adopt the approach. The World Bank Water and Sanitation Programme (WSP) was key in promoting the spread of CLTS to India and developing countries. Thereafter, governments and some organizations became vital promoters and protagonists of CLTS, - some of whom include Water Aid, UNICEF, Plan International, WSSCC, Tearfund, SNV, Care, WSP, World Vision and so on. As we speak, over sixty nations in Africa and other parts of the developing world are continuously spearheading and popularizing CLTS. As part of their national policy many governments have also adopted CLTS[13].

Models of Community-Led Total Sanitation (CLTS) experimented in Nigeria

Community-Led Total Sanitation (CLTS) and its different forms have been piloted in Nigeria by a number of organizations like Water Aid Nigeria in collaboration with the government at

different levels. The findings from these pilots were used to mainstream CLTS into some of the key approaches for rural sanitation and development as well as an acceptable Strategy for the Scale-up of Sanitation and Hygiene towards the achievement of the Millennium Development Goals s in the country. With this many states in the country embarked on remarkable implementation of CLTS as a vital tool towards the achievement of a holistic sanitation practices in their communities[15].

CLTS Pilot Project in Nigeria

Between 2004 and 2006 Water Aidran pilot CLTS in 9 communities of Benue state, Nigeria. This was kick-started with a visit of some Nigeria stakeholders to Bangladesh, after which a model was designed using the Bangladeshi concept as a guide. Water Aid and its LGA and NGO partners implemented the pilot project with promising results –there was sudden increase in latrine construction and an improved hygiene practices in focal communities. Though the pilot recorded remarkable degree of success it had its own challenges. Hence, the lessons learnt from the pilot were used for modifications in strategy and consequent expansion of the CLTS approach into the then Water Aid's joint programme with UNICEF in 24 communities of 12 LGAs in Benue, Enugu, Ekiti and Jigawa states[16].

At end line a sample of 13 out of the 24 communities were. The main finding of the evaluation is that CLTS as a community sanitation strategy in the project area was very effective in promoting remarkable reductions in the practice of OD in communities with many records of communities that achieved ODF. It was also remarkably successful in encouraging the construction of latrines as the 13 communities recorded an increase from 116 latrines at CLTS baseline to 1,060 within just 8 months period – all were free of subsidy. For unsubsidized latrines, this record was unprecedented in Nigeria. There were also improvements in personal hygiene, environmental sanitation of communities, security and dignity of girls etc. This notwithstanding, the approach was said to have had much less success in urban communities and in areas with ongoing latrine subsidy programmes, and in larger communities. Additionally, CLTS was also found to be most effective in such communities where trained external facilitators provided guidance to communities through intensive, participatory mobilisation process that makes use of the items in the CLTS toolbox (transect walks, social mapping and faecal load calculations). The evaluation found that an easily accessible source of water constituted a very vital factor for the effectiveness of CLTS[16] (Figure-3).

Nigeria was one of the first few countries in Africa to have resorted to the Community-Led-Total- Sanitation (CLTS) Approach in 2005-2006. Since 2010, UNICEF has helped to promote the Community Led Total Sanitation (CLTS) approach in Nigeria, with the aim of promoting access to sanitation in the poor, rural communities[17].Over a period of five years (2010-2014) under the UK Aid supported Sanitation, Hygiene and Water in Nigeria (SHAWN) project, UNICEF supported about two million people gain access to sanitation, water and hygiene. Under the SHAWN project, two out of 10 wards in Mai'Adua LGA of Katsina were prioritised for CLTS interventions by Katsina State Rural Water Supply and Sanitation Agency (KTRUWASA), Bakori LGA WASH Department along with UNICEF[17].

The implementation of CLTS in Nigeria has been anchored by various government institutions such as the Water Sanitation and Hygiene Committees (WASHCOMs), task groups at national, state and local levels and many Community Based Organizations (CBOs). Water and sanitation units, departments and agencies have been instituted at the local government and state levels in well over twenty States of the country[18].At the national level the activities of these outfits are coordinated by the Federal Ministry of Water Resources (FMWR)towards promoting, advocating and scaling up CLTS[18].

In Nigeria initially a scattered approach involving triggering communities all over a State was adopted. But soon it was realized that such an approach was not effective and hence an LGA-wide approach was introduced with encouraging results. As of July, 2014 CLTS has been initiated in all 36 States and FCT. Triggering has taken place in 19,467 communities of which 9,728 (around 50%) were declared ODF. Of this 3,276 (close to 34%) have been certified[18] (Table-1).

CLTS Experiment in Nigeria – Road Map for ODF Nigeria, Action against Hunger[18, 24].
Figure-3: CLTS Scenarios in Nigeria.

Table-1: Status of CLTS Implementation in Nigeria - (As of July 2014)[18].

State/FCT	No of LGAs	Total no of Triggered communities	No of ODF declared Communities	%	No of ODF Certified Communities	%
Abia	17	368	166	45.1	18	10.8
Adamawa	21	209	3	1.4	0	0
AkwaIbom	31	215	0	0	0	0
Anambra	21	559	506	90.5	106	20.9
Bauchi	20	2200	1690	76.8	394	23.3
Bayelsa	8	92	0		0	0
Benue	23	1607	1385	86.2	639	45.8
Borno	27	85	30	35.3	0	0
Cross River	18	1461	742	50.8	373	50.3
Delta	25	65	0		0	0
Ebonyi	13	343	281	81.9	19	6.8
Edo	18	75	0	0	0	0
Ekiti	16	274	95	34.7	22	23.2
Enugu	17	578	441	76.3	34	7.7
FCT (Abuja)	6	98	9	0	0	0
Gombe	11	42	17	40.5	0	0
Imo	27	462	401	86.8	10	2.5
Jigawa	27	1404	513	36.5	386	75.2
Kaduna	23	226	58	25.7	1	1.7
Kano	44	1569	75	4.8	23	30.7
Katsina	34	1595	1242	77.9	729	58.7
Kebbi	21	197	114	57.9	88	77.2
Kogi	21	322	157	48.8	20	12.7
Kwara	16	384	230	60	0	0
Lagos	20	327	5	1.5	0	0
Nasarawa	13	149	0	0	0	0
Niger	25	190	46	24.2	0	0
Ogun	20	679	257	37.8	84	32.7
Ondo	18	207	123	59.4	0	0

State/FCT	No of LGAs	Total no of Triggered communities	No of ODF declared Communities	%	No of ODF Certified Communities	%
Osun	30	1500	670	44.7	220	32.8
Oyo	33	131	88	67.2	10	11.4
Plateau	17	56	0	0	0	0
Rivers	23	133	0	0	0	0
Sokoto	23	671	159	23.7	0	0
Taraba	16	721	190	25.4	76	40
Yobe	17	219	25	11.4	14	56
Zamfara	14	44	10	22.7	10	100
Total	774	19,467	9,728	50	3,276	33.7

The sanitation situation in the country prompted the National Council on Water Resources in 2014 to prioritize the development of a roadmap towards eliminating open defecation in the country, in line with the United Nations global campaign for ending open defecation. This initiative tagged "Making Nigeria Open Defecation Free by 2025: A National Roadmap" was developed by the Federal Ministry of Water Resources with invaluable support from UNICEF and other key sector players across Nigeria. In 2016, the National Council on Water Resources endorsed this road map as a mean to eliminate open defecation in Nigeria[18].

Community Led Total Sanitation (CLTS) has proven to be an effective approach towards accelerating sanitation access in the country having exponentially grown from a mere 15 ODF communities in 2008 to over 14,000 ODF communities in 2016. The expansion of CLTS program has led to a growing pool of trained CLTS facilitators and has improved the quality of triggering and ODF certification process. In terms of providing the enabling environment for the implementation of the ODF road map, the Ministry of Water Resources has clearly prioritized elimination of open defecation in its recently launched "Partnership for Expanded WASH (PEWASH)" program[18].

Achieving an ODF Nigeria would require constructing nearly 20 million household toilets and 43,000 toilets in schools, health centres and public places requiring an average annual investment of about NGN 100 billion (approximately 75% household investment; 25% government contribution)[18].

A laudable institution-driven CLTS initiative by the academia has been piloted by the Kwara State University (KWASU) Centre for Ecological and Environmental Research Management and Studies (CEERMS) Malete, in 19 states and the Federal Capital Territory (FCT) Abuja, Nigeria[19].

Challenges to the prevention of OD in Nigeria

Though there are quite a good number of drivers of OD in Nigeria, three might be more fundamental: poverty, lack of lavatories and ingrained cultural norm, which makes the practice socially accepted in some parts of the society[12].

Challenges related to implementation of CLTS in Nigeria include; dearth of trained facilitators required for CLTS scale-up, weak and Insufficient monitoring and follow-up by the Water Sanitation and Hygiene outfits at local levels, dysfunctional archival, documentation and information system in States and LGAs performance on CLTS, lack of steady ascendance up the sanitation ladder, Failure of communities that were considered triggered in attaining ODF certification, Slippage –a situation in which communities hitherto certified Open Defaecation Free relapsing to their initial OD status. Other challenges include; Weak political commitment to CLTS projects, Incentives for Natural Leaders, Other existing pre-CLTS sanitation projects with latrine hardware subsidy components, Lack of sustainability local resource mobilization framework and Poor coordination.

Recommendations: To be able to overcome most of the challenges outlined above it is imperative to institute the following measures; in addition to the participatory community appraisal approach of CLTS, there is the need to coerce non-compliant communities or households to stop open defecation, by passing appropriate laws and advocating peer sanction mechanism at community level.

Town planners and other government agencies in charge of built environment should also ensure that toilets are incorporated in building plans and structures being developed. Policy and budgetary provisions on Water and sanitation must be seen as critical elements of governance.

And to facilitate the achievement of ODF status in communities and for the sustainability of the gains of CLTS in Nigeria, it is recommended that a number of measures be sustained[15]. Such include capacity building in resource mobilization for the provision of sanitation facilities in public places and institutions, Promotion of networking and Partnership with Civil Society Organizations and media for mobilization of financial and human resources for scale-up, Continuous sensitization and advocacy to policy makers, Innovations in terms of strategies for responding to high sanitation services demand through marketing and the Promotion of locally sourced innovations and affordable technologies for construction of latrines that canless vulnerable to collapse and other deficiencies.

Other measures include; Sharing of best practices in knowledge and technology across national, States, LGAs and Community boundaries, Continuous engagement of Natural Leaders for the facilitation of CLTS promotion in contiguous communities, Continuous training and orientation of facilitators in target communities for CLTS, Provision of operational and technical support towards invigorating relevant institutions, Intensifying monitoring and follow up using verifiable data and Strengthening WASH information system for the improvement of dissemination and management of CLTS data.

Conclusion

The persistence of OD despite documented efforts by the government and its development partners, underscores the Public Health significance of the problem in Nigeria. Hence, the call for continued efforts by all stakeholders for more locally oriented innovations to address the underlying issues of poverty, cultural norms and lack of public infrastructure for sanitation and hygiene should be intensified. Again, proactive response measures targeted at proffering solutions that suits the different epidemiological patterns of OD should be deployed. For instance, the approach to tackling OD in rural communities should be different from that of urban OD communities. There should be more multi-sectoral synergy among all key players like research bodies and the academia, development partners, agencies, CSOs and superintending government organs in the country.

And in view of the tremendous success of the elimination of OD by means of CLTS strategy in other climes,[20-23] all efforts must be aimed at the effective implementation of the approach and its adapted forms in Nigerian communities. The attainment of 100% ODF verified and certified communities in Nigeria is not only a doable task but a task that must be done.

Acknowledgement

The authors acknowledge the kind gestures of all relevant authorities for the use of figures, data and tables presented in this paper.

References

1. WHO/UNICEF (2017). Joint Monitoring Programme. Progress on Sanitation and Drinking Water—2017 Update and SDG Baseline; World Health Organization: Geneva, Switzerland.

2. Oloruntoba E.O., Folarin T.B. and Ayede A.I. (2014). Hygiene and sanitation risk factors of diarrhoeal disease among under-five children in Ibadan, Nigeria. *African Health Sciences*, 14(4), 1001-1011. http://doi.org/10.4314/ahs.v14i4.32

3. Strunz E.C., Addiss D.G., Stocks M.E., Ogden S., Utzinger J. and Freeman M.C. (2014). Water, sanitation, hygiene, and soil-transmitted helminth infection: a systematic review and meta-analysis. *PLoS medicine*, 11(3), e1001620.

4. Mbuya M.N. and Humphrey J.H. (2016). Preventing environmental enteric dysfunction through improved water, sanitation and hygiene: an opportunity for stunting reduction in developing countries. *Maternal & child nutrition*, 12, 106-120.

5. Odagiri M., Muhammad Z., Cronin A., Gnilo M., Mardikanto A., Umam K. and Asamou Y. (2017). Enabling factors for sustaining open defecation-free communities in rural Indonesia: a cross-sectional study. *International journal of environmental research and public health*, 14(12), 1572. doi: 10.3390/ijerph14121572.

6. United Nations (2018). Sustainable Development Goals (SDG). https://www.un.org/sustainabledevelopment/ water-and-sanitation, 2018 (Accessed on 14/09/2018).

7. World Health Organization (2014). Mortality and burden of disease from water and sanitation. *Global Health Observatory (GHO) data*. http://www.who.int/gho/phe/water_sanitation/burden/en, (Accessed on the 15/09/2018).

8. National Population Commission (NPC) [Nigeria] and ICF International (2014). Nigeria Demographic and Health Survey 2013. Abuja, Nigeria, and Rockville, Maryland, USA: NPC and ICF International.

9. National Bureau of Statistics (NBS) and United Nations Children's Fund (UNICEF) (2017). Multiple Indicator Cluster Survey 2016-17, Survey Findings Report. Abuja, Nigeria: National Bureau of Statistics and United Nations Children's Fund.

10. Water Aid. (2018). Sustainable Total Sanitation: An emerging framework.

11. Unicef India (2018). Eliminate Open Defecation - Eliminate Open Defecation. http://unicef.in/Whatwedo/11/Eliminate-Open-Defecation (Accessed on 19/09/2018).

12. Punch Newspaper (2018). Open defecation: Nigeria's sanitation challenges. (April 22, 2018). https://punchng.com/open-defecation-nigerias-sanitation-challenges/(Accessed on 16/09/2018)

13. IDS. (2018). Community-Led Total Sanitation Approach. CLTS Knowledge Hub. Institute of Development Studies (IDS). http://www.communityledtotalsanitation.org/page/clts-approach (Accessed on 14/09/2018).

14. Dyalchand A., Khale M. and Vasudevan S. (2010). Institutional arrangements and social norms influencing sanitation behaviour in rural India. In: Mehta L., Movik S., editors. Shit Matters: The Potential of Community Led Total Sanitation. Practical Action; Rugby, UK.

15. IDS. (2015). Community-Led Total Sanitation, Nigeria. CLTS Knowledge Hub. Institute of Development Studies (IDS). http://www.communityledtotalsanitation.org/country/nigeria (Accessed on 14/09/2018)

16. Unicef Nigeria (2018). Case Study: Community-Led Total Sanitation in Nigeria. https://www.unicef.org/wcaro/ WCARO_Nigeria_CLTSCase-studies.pdf (Accessed on 23/09/2018)

17. Unicef Nigeria (2011). Nigeria: community-led total sanitation pays off. https://www.unicef.org/nigeria/ media_6517.html (Accessed on 18/09/2018).

18. UNICEF & FMWR (2016). Federal Ministry of Water Resources. Making Nigeia Open Defecation Free by 2025: A National Roadmap. https://www.unicef.org/nigeria/ NATIONAL_ROAD_MAP_FOR_ELIMINATING_OPEN _DEFECATION_IN_NIGERIA.pdf (Accessed on 16/09/2018)

19. KWASU (2018). Kwara State University (KWASU) Centre for Ecological and Environmental Research Management and Studies (CEERMS) Community-Led Total Sanitation (CLTS) Project (Unpublished).

20. Alzua M.L., Pickering A.J., Djebbari H., Lopez C., Cardenas J.C., Lopera M.A., Osbert N. and Coulibaly M. (2015). Impact Evaluation of Community-led Total Sanitation (CLTS) in Rural Mali. CEDLAS, Working Papers 0191, CEDLAS, Universidad Nacional de La Plata.

21. Kar K. and Chambers R. (2008). Handbook on Community-Led Total Sanitation. Plan UK & Institute of Development Studies at the University of Sussex: London, UK.

22. Kar K. (2014). The road to 2015: experiences and challenges from Community-Led Total Sanitation (CLTS). https://steps-centre.org/blog/road-2015-experiences-challenges-community-led-total-sanitation-clts/ (Accessed on 19/09/2018).

23. Tessema R.A. (2017). Assessment of the implementation of community-led total sanitation, hygiene, and associated factors in Diretiyara district, Eastern Ethiopia. *PLoS ONE*, 12(4), e0175233. http://doi.org/10.1371/ journal. pone. 0175233

24. Action Against Hunger (2018). Nigeria: Effectiveness And Sustainability of Community-led Total Sanitation. https://www.actionagainsthunger.org/publication/2018/02/nigeria-effectiveness-and-sustainability-community-led-total-sanitation

25. Wagner and Lanois (1958). The F- Diagram. https://www.google.com/search?q=Wagner+and+Lanois+1958&tbm=isch&source=univ&client=firefox-b-d&sa=X&ved=2ahUKEwjng8Lp9qzgAhURmuAKHf8WB9EQsAR6BAgGEAE&biw=1093&bih=501imgrc=SAyM-JmpWXsFJM

26. Report (2018). SHAME: Over 50m Nigerians Defecate Openly (Pictured)–UNICEF - Health (5) –Nairaland. https://www.nairaland.com/2751680/shame-over-50m-nigerians-defecate/4